Role of Triangular Cooperation (government-scientific & research organization-private sector) in advancing 3R and circular economy in Asia-Pacific (TrC_3rCE) [Session on IPLA – a SDG Partnership]

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ISWMAW is now IPLA Global Secretariat

Status of Waste Management in a few countries

Country	MSW mil ton/Yr	kg/day Per capita	Collection efficiency	% recycled	% Composted	% Energy Recovery	% other treatment	% Landfill
Bangladesh	8.64	0.43	Urban:70% Rural: 35%	15%in Dhaka	3 %	NA	NA	82%
Bhutan	44,800	0.53	Urban:70% Rural: 25%	10 % in Urban	1 %	NA	NA	97%
Brazil	79.9	0.972	90.8 %	31.9%	10%	0.1%	4%	59%
Egypt	30	0.8	60 %	11.5%	NA	NA	NA	88%
India	62	0.5	Urban:95% Rural:55%	28 %	12 %	3 %	5 %	57%
Italy	29,5	1.5	100%	26%	18%	19%	11%	26%
Lebanon	2.55	1.0	90%	8%	15%	-	10%	70%
Portugal	4.52	1.26	100%	10%	25%	20%		34%
Nigeria	32.59	0.49	30%	??	??	???	??	95%
S. Africa	59	0.7	74%	11%		unknown	2	90%
Rep. of Korea	17.86	0.95	97.5%	36%	23%	25.3%	0%	15.7%; 3% by‘20
Sri Lanka	2.74	0.4 –1.0	Western Province:59%;Others:8%	15%	5%			80%
USA	254	2.0	100%	25.3%	9.7%	11.7%	-	53.8%

MASS-VALUE-CARBON 1900-2050 : COURSE CORRECTION:

Material extraction has fuelled economic progress since the Industrial Revolution, at the same time causing human-made greenhouse gas emissions.

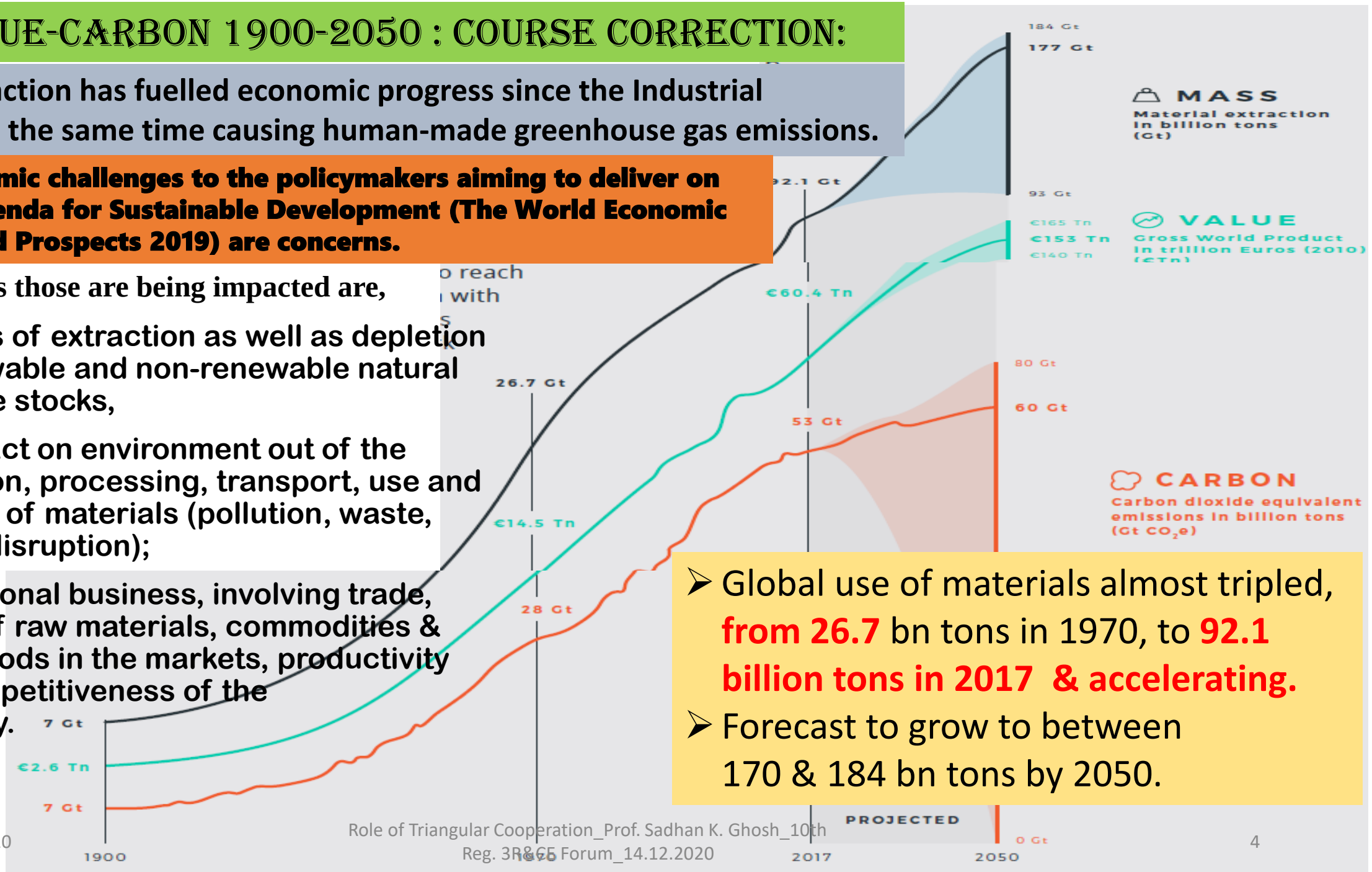
Macroeconomic challenges to the policymakers aiming to deliver on the 2030 Agenda for Sustainable Development (The World Economic Situation and Prospects 2019) are concerns.

- The factors those are being impacted are,

a) the rates of extraction as well as depletion of renewable and non-renewable natural resource stocks,

b) the impact on environment out of the extraction, processing, transport, use and disposal of materials (pollution, waste, habitat disruption);

c) International business, involving trade, prices of raw materials, commodities & other goods in the markets, productivity and competitiveness of the economy.



- Global use of materials almost tripled, **from 26.7** bn tons in 1970, to **92.1 billion tons in 2017 & accelerating.**
- Forecast to grow to between 170 & 184 bn tons by 2050.

Our world is only 9% circular now

This alarming statistic was the main finding of the first Circularity Gap Report.

"We have seen no signs the Circularity Gap is closing. Material use and carbon emissions continue on an upward trend. In terms of sustainability and circularity, the global engine of change is stuck in reverse; we are still heading in the wrong direction".

- The Circularity Gap & Emissions Gap remain dangerously high.
- We now live in a world that is 1°C warmer than pre-industrial levels.
- The Paris Climate Agreement seeks to limit global warming to well below 1.5°C.

- Achieving this ambition will require **- Rapid, far-reaching and unprecedented changes in all aspects of society**.

Present status of achievement of targets and projected distance from reaching the targets at the global level for some identified indicators. (Source: Global SD Report 2019). **Cooperation among the actors are the key to reduce the gap**

Major area of support to implement SDG 2030 is S&T advancement.

- Huge gap exists between developed & developing countries for bridging the scientific & technological divide.
- Need of close collaboration between North-South and South-North and the South-South collaboration and TrC_3rCE.
- Appropriate National S&T policy for devising transformation pathways for addressing the specific requirements of the country (Global SD Report 2019) is needed. TrC_3rCE will play a big role.

SDG no.	Goals	5 –10%	>10%	Negative Long-Term Trend
Goal 9	Industry, innovation and infrastructure	9.5. Enhancing scientific research-R&D expenses	9.5. Enhancing scientific research - (no. of researcher	
Goal 11	Sustainable cities & communities		11.1. Urban population living in slums*	
Goal 12	Sustainable consumption and production	Status of achieving (Gap in reaching) selected targets by 2030 (at current trends)		12.2. Absolute material footprint, and DMC*
Goal 14	Life below water			14.1.Continued deterioration of coastal waters* 14.4.Overfishing*

* Targets are estimated as Quantitative target which are not mentioned in indicator framework;

Major area of support from Government and TrC_3rCE and SDG 2030 Implementation

Status of CE implementation in the countries

Country	Matured CE driven society	Progressive CE driven society	Initiated CE driven society	Not initiated	Legislation Supporting CE
Australia		*			Y
Afghanistan				*	No
Bhutan			*		No
Brazil			*		No
Canada		*			Y
Rep. of China		*			Y
Denmark	*				Y
Europe	*				Y
Georgia			*		No
Germany	*				Y
Lao PDR				*	No
India		*			Y
Israel				*	No
Japan	*				
Kenya				*	No
Malaysia			*		Y
Mauritius				*	No

Country	Matured CE driven society	Progressive CE driven society	Initiated CE driven society	Not initiated	Legislation Supporting CE
Mexico			*		No
Morocco				*	No
Nigeria				*	No
Norway	*				Y
Philippines			*		No
Russian Federation			*		No
Slovenia		*			Y
Rep. of Korea	*				Y
Serbia		*			Y
Tanzania				*	No
Thailand		*			Y
Tunisia				*	No
Turkey		*			Y
UK	*				Y
USA		*			Y
Vietnam			*		No

Source: CE: Global Perspective, Springer, Ghosh, S. K., 2020

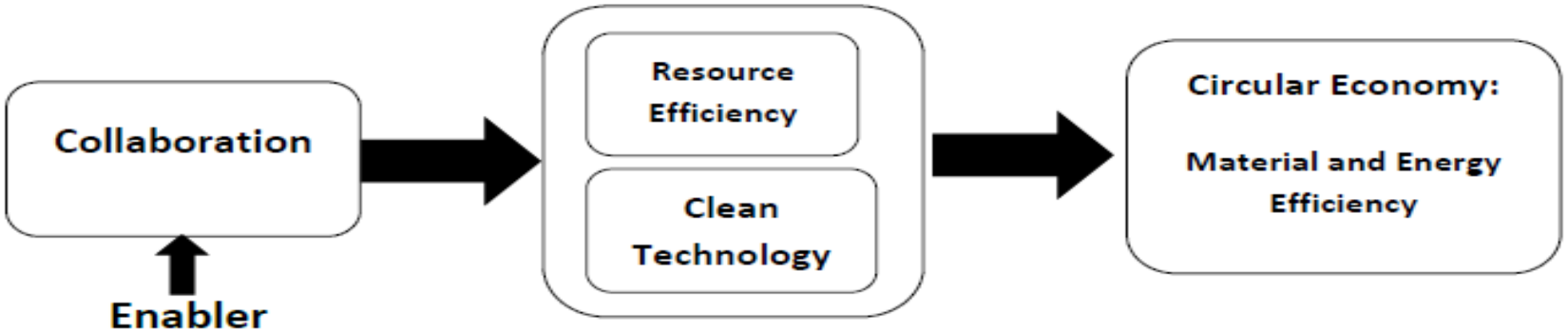
Cooperation

For improving the situation and reducing the materials extraction,

- National and international cooperation are essential.
- Promotion of 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
- In major consumer goods sectors, the magnitude of the material resource savings generated from a circular economy could result in up to US$ 706 billion annually.
- the Asia-Pacific region accounts for more than 60% of the global share of key fast-moving consumer goods sectors, the scale of potential benefits would positively impact the region's economic development.

Generic scheme of Cooperation

Government should provide financial support to the academic and research organizations to develop new ideas and sustainable innovative technology that will help industries to develop suitable business and national & international markets. It is important to strengthen mechanisms of cooperation within the country and expand it for international collaboration. As knowledge flow does not respect borders and high-tech competition for resource efficiency has become global, efficiency in knowledge production & use will often involve global solutions, where TrC-3rCE will play a supportive and catalytic role.

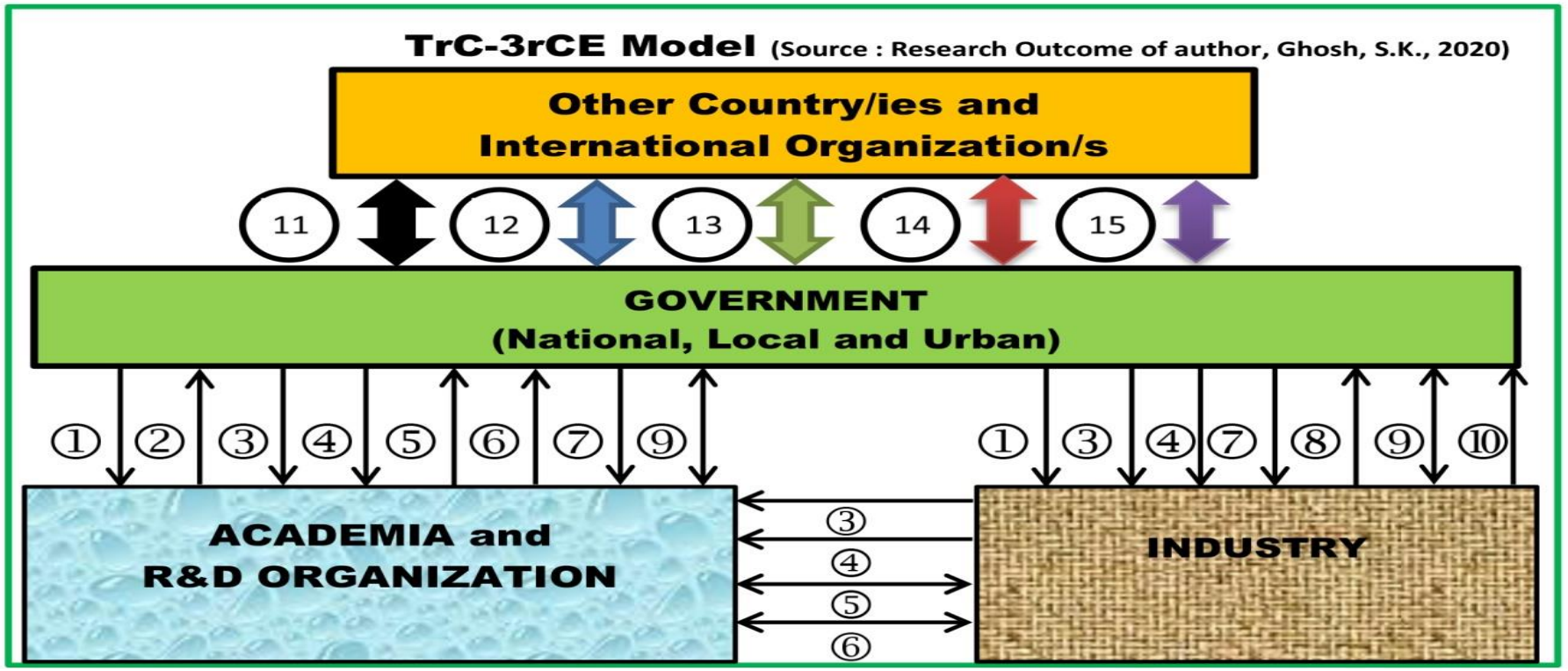


Cooperation and Partnership in TrC-3rCE

- **Partnership mechanisms and technological interventions** to harness economic opportunities through wide scale application of 3R and resource efficiency in key development sectors, including tourism industry;
- **3R science-policy-business interface** to turn the wastes into resource and potential for economic opportunities at national and local level;
- **A number of UN agencies such as, UNCRD, UNIDO, UNEP, UN ESCAP and UNDP, among others have been playing important role as knowledge broker, capacity development supporter and partnership facilitator in TrC-3rCE.**

- **SWITCH Asia**
- **SWITCHing India's Consumption to Fair & Sustainable Goods**
- **ERDF - URBAN INNOVATIVE ACTIONS**
- **COHESION FUNDING FOR 2021-2027**
- **A FEW OTHER**

Proposed model of Triangular Cooperation (TrC_3eCE)

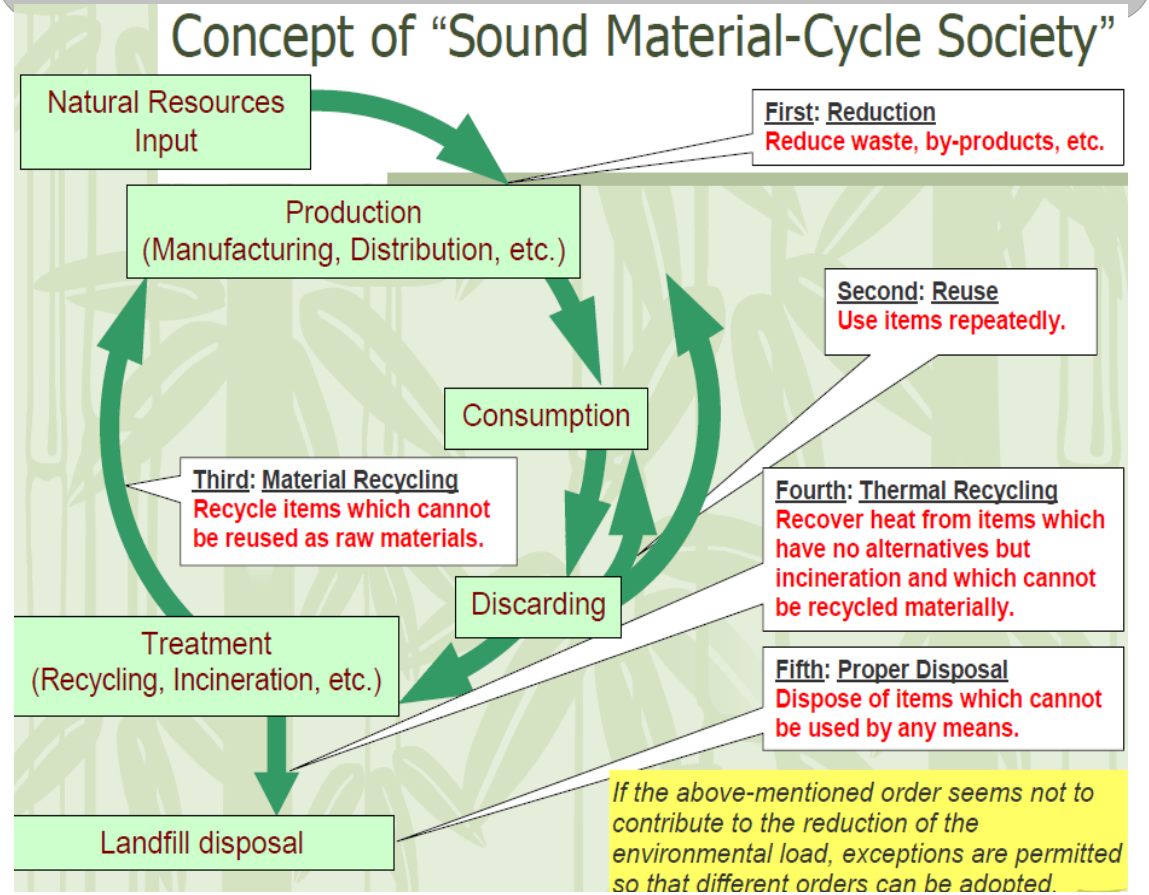


Interactive Components	Director of Interaction	Interactive Components	Director of Interaction	Interactive Components	Director of Interaction
1. Policy	Government to Academic; R&D institutes and to Industry	5. Innovation, theory of Sustainable production & consumption	Academic and R&D institutes to a) Government and b) to & from Industries	9. Inputs for Policy Instruments & International Collaboration Requirements	Academic and R&D institutes; and Industry to Government
2. Policy Theory & Hypothesis	Academic and R&D institutes to Government	6. Sustainable Technology	Academic and R&D institutes to a) Government and b) to & from Industries	10. Revenue generation & Employment	Industry to Government
3. Funding & Resource Support	Government to Academic and R&D institutes and Industry; And Industry to Academic and R&D institutes	7. Monitoring of Implementation	Government to Academic and R&D institutes and Industry;	11 to 15. International Collaboration	Government to Other country; International/multilateral organizations and empowered Academic and R&D institutes & Industry to collaborate themselves;
4. Requirements	Government to Academic and R&D institutes and Industry;	8. Production and Market	Industry to Government		

Case of TrC_3rCE – Republic of Korea and Japan

Samsung company, started as grocery trader in 1938, is now Republic of Korea's largest chaebol, operating in industries as diverse as electronics, insurance, construction and shipbuilding. ***In 2018, it produced roughly 15% of the nation's GDP***. Its founder, Lee Byung Chul, ***with help from government protectionist policies, expanded into textiles after the Korean War, electronics in the 1960s, then heavy industries, aerospace and computing during the 1970s and early 1980s***. By the 1990s and 2000s, Samsung was a world leader in tablets and mobiles, and in the design and manufacture of computer chips [(OECD Gross domestic spending on R&D (indicator) https://doi.org/10.1787/d8b068b4-en (Accessed 8/5/2020)].

A Sound Material-cycle Society 5.0 Economic Redesign : :consumption of natural resources is minimized and the environmental load is reduced as much as possible.



Case of TrC_3rCE – India and Rep. of China

India launched "Make in India" in 2015 and supporting SMEs in a big way spending huge amount of grants & Encouraging implementation of ZED.

Swachh Bharat Mission has a direct effect on improving the water quality of rivers and reducing marine littering through the sanitation and waste management targets in cities and villages. Various initiatives have been taken in India to curb the use of plastics as well as to reduce generation on plastics waste, recovery, recycling and reducing marine littering. plastic waste contributes nearly to 8% in the SWstreams while 60 % plastics waste is recycled and there are 4773 registered and 1080 unregistered ***plastic Manufacturing/Recycling units in India as per PWM rules 2018.This has been possible because of effective TrC_3rCE. Department of Science and Technology (DST) and Department of Biotechnology (DBT) and many other government organization are presently funding different projects..*** *which demonstrate the TrC_3rCE .*

Beijing works to implement policies aimed at increasing government-led innovation. In 2015, Beijing launched "Made in China 2025," a plan to increase mfg. capability and technological innovation within key industries. Thus 901 government guidance funds were launched with the goal of raising $347 billion to help lessen the burden of financing R&D for Chinese firms. Lucrative tax breaks are also being provided to firms to further incentivize investment in R&D. A *demonstration of TrC_3rCE*

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TrC_3rCE : international Research Projects

Horizon 2020, biggest EU Research & Innovation programme ever with nearly €80 bn funding available from 2014 to 2020 + private investment.

Horizon 2020 EU-India water co-operation by DST & DBT, Ministry of S&T, India, Executive Agency for SMEs & DG for Research & Innovation (DG R&I), European Commission.

Major policy priorities: 'Building a low-carbon, climate resilient future' (LC); 'Connecting economic and environmental gains – the CE; 'Digitising and transforming European industry and services' (DT); etc.

Together these Focus Areas give a combined budget of over €7 billion (2018-2020). A dedicated section brings together a spectrum of activities on next generation battery technologies to drive the transition towards a de-carbonised society.

INDIA-H2O one of seven research projects in India in consortium with research organizations and industries in 7 countries involving 20 universities, research organisations and industries research deals with water and waste water related issues supporting SDG 2030 agenda.

OPTOCE (Ocean Plastic Turned into an Opportunity in CE): Norwegian ministry of Foreign Affairs and NORAD funded Academic Collaboration to Combat Marine Littering & Micro plastics in Asia organized by SINTEF,, Norway to achieve the SDGs 11.6 & 12.4 on Waste management and CE, as well as SDG 14.1 on Marine litter reduction. **OPTOCE in India, Thailand, China, Vietnam & Myanmar.**

Research project "Global Status of Circular Economy" by International Society of Waste Management, Air and Water (ISWMAW) with 30 countries including the UNCRD and IPLA in 2017 for 2018-2022. Deals with the status of establishing CE related policies, implementation and forward planning. The document title are :, 1. Circular Economy: Global Perspective, (https://www.springer.com/gp/book/9789811510519) (2020), 2. Circular Economy: Recent Trends in Global Perspective (Yet to be released),. This TrC_3rCE initiatives involves govt., academia and Industries .

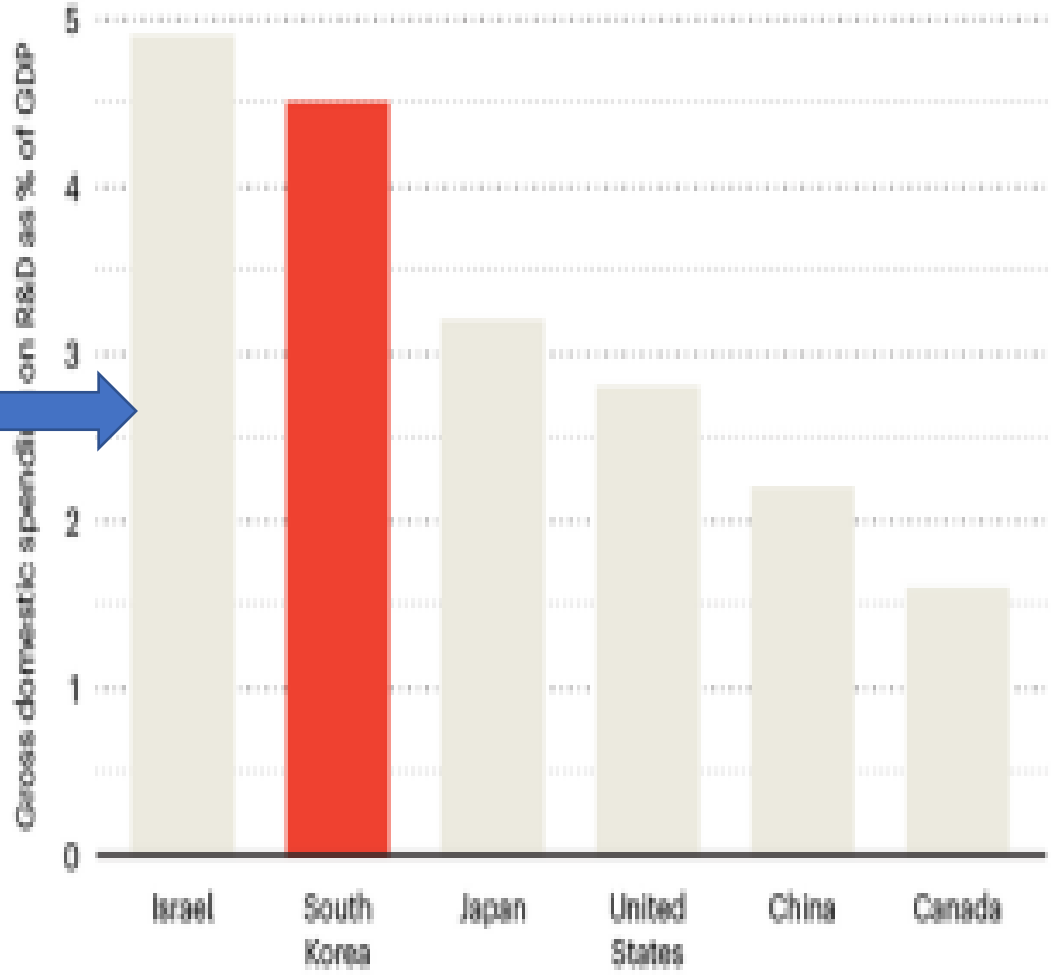
Case of TrC_3rCE – South Africa

The South African government had laid a strong foundation from which to drive a circular economy STI agenda, through the development and implementation of the Global Change Grand Challenge (DST, 2007), the Waste Research, the Bio-economy Strategy (DST, 2013b). ***The National Advisory Council on Innovation (NACI) has identified the circular economy as one of nine priorities of STI domains in the South Africa Foresight study (DSI, 2020)****. This is the environment which has been created in TrC_3rCE in South Africa.*

Case of TrC_3rCE - Israel

- Among all countries, ***Israel is the only country that spends a greater proportion of its GDP on R&D at 4.9 % whereas Republic of Korea spends only 4.5%.***

- The disparity in R&D among the countries are vast in terms of the total spent, in 2018 ranging from USD 16.3 billion in Israel to USD 526 billion in China and USD 551.5 billion in United States. Republic of Korea spent USD 95.4 billion on R&D in 2018. The results of the investment in research and development helps in bringing revenues in the country. However the focus on 3R and CE is not very effective in Israel. With this support, Israel may strengthen TrC_3rCE for achieving resource efficiency.



Case of TrC_3rCE - Brazil

National Biofuels Policy, named RenovaBio, 2017 of the Federal Ministry of Mines and Energy (MME) for the sustainable expansion and production of biofuels (Brasil, 2017) in the transport sector awards decarbonisation credits (CBios, equivalent to 1 ton of CO2e avoided). ***National Parliamentary Innovation for Bioeconomy a ("Frente Parlamentar para Bioeconomia", in Portuguese), was launched by National Congress in 2019 to foster biotechnology, biomass use to reduce GHG emissions and a better economy with bio-based products (Camara dos Deputados, 2019) which have been supported by the bioenergy associations in the country, industries, the universities and R&D organizations along with the support from farmers.*** *Success of bioenergy and bioeconomy sectors is a significant demonstration of TrC_3rCE in Brazil.*

TrC_3rCE : Conclusion & Recommendations

1. ***Vision :*** A robust mechanism for strengthening the TrC_3rCE to achieve resource efficiency by formulation of legislative framework and policy instruments evolved from a collaborative consultation that is implementable and continually improved by the intervention of actors, such as, governments, industries, academia, research organizations, NGOs, at large civil society with required inputs & support of developed country (ies) and/or multilateral organization(s).
2. **A robust policy instrument** and targeted framework.
3. **Funding to the private industries and academia and R&D organizations** for development of innovative sustainable products and processes. Incentives for industry to implement the new policies;
4. **Involve the actors in ongoing strengthening process** of the implementation strategies and periodic communication,
5. **Countrywide communication channel** on the systems and benefits, of transition to "circular economy and society".
6. **Reliance on academic and research organizations for innovative ideas and technology** supporting implementation of policies and more investment by industries in R&D.
7. **Creating markets for circular products and services** through public procurement, & driving innovation and investment
8. **Facilitating financing and adapting financing me**thods for circular economy activities
9. **Integrating the circular economy into SDG 2030, the Habitat III New Urban Agenda and Paris Agreement commitments**

Thank You

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