

Circulating and Ecological Sphere (CES) Concept for Integrated Actions towards Localization of Climate and Sustainable Development Actions.

This brief describes an approach for addressing sustainability challenges that integrate social, environmental, and economic considerations within a city region. This approach, known as the Circulating and Ecological Sphere (CES) encompasses spatial integration of urban/peri-urban/rural interdependencies to address complex sustainability challenges related to, for example, climate change mitigation and adaptation, ecosystem services, and green development within a city-region. To realize simultaneous improvements in society, the economy and the environment, the CES approach aims to foster sustainable urban-peri-urban and rural partnerships that can achieve greater resilience through resource circulation and low carbon development pathways. Mutual dependency across rural, peri-urban and urban spheres present opportunities of effectively harnessing these linkages to collectively address net zero, resilience and adaptation efforts within a city region sphere.

Achieving greater societal sustainability and resilience requires new approaches to integrating diverse knowledge around social, cultural, economic, and environmental/ecological dimensions.

The world is faced with enormous social, political, economic, and environmental challenges, stemming from resource overconsumption (particularly by the wealthy), environmental degradation, population pressures, climate change, and deeply entrenched inequalities, among others. The ambition expressed in the UN2030 Agenda and its Sustainable Development Goals, the Paris Climate Agreement, and the Sendai Framework for Disaster Risk Reduction underscore the urgency with which societies need to transform towards a more livable, just, and ecologically sustainable future. Achieving the plethora of Sustainable Development Goals, targets and indicators are ambitious, and achieving them with business as usual will not be possible. The COVID-19 pandemic has further amplified societal pressures, which could imperil progress towards achieving sustainable development. Therefore, it is imperative to enable processes for linking and simultaneously improving social, economic, and environmental dimensions.

Cities worldwide are experiencing multiple, interconnected challenges. Rapid and unplanned urbanization is negatively impacting the viability and provision of ecosystem services to urban areas. This situation coupled with an increasingly unstable climate is creating more severe impacts from extreme climate events that imperil infrastructure, health and livelihoods, and access to essential services. Rapid and unplanned urbanization, intersecting with climate change, is expected to affect both the demand and supply of ecosystem services, for instance with respect to the role of surrounding forests and wetlands in water quality and flood protection. More broadly, urban encroachment and the increasing extraction of natural resources from surrounding rural and peri-urban areas to urban areas underscores the need for a more balanced approach to development, one that emphasizes planning mechanisms and legal and policy frameworks to ensure more integrated urban-rural connectivity and the greater empowerment of local communities to protect critical ecosystem services.

Of the 2.5 billion people that will be added to the world's cities by 2050, 90 percent of that growth will occur in Asia and Africa (UNDESA 2018). In 2018, more than 55 percent of the world's population lived in urban areas and by the year 2050, this number is projected to rise to 68 percent. In Southeast Asia, the urban population is expected to increase from 320 million inhabitants in 2018 to 527 million by 2050 (UNDESA 2018). This rapid growth in population is increasingly impacting the availability and accessibility of housing, jobs, and access to clean water and sanitation and other public services, particularly for the urban poor, resulting in a lower quality of life, the spread of informal settlements, and urban sprawl into natural areas. The increase in climate migrants from rural areas in the future will further exacerbate these trends.

Cities around the world are now becoming vulnerable to extreme weather conditions, especially those conditions that trigger widespread flooding. Under a high emissions scenario, temperatures are projected to increase by up to 3⁰C in the late 21st century and the intensity of the monsoon is projected to increase resulting in greater flood risks. Slow-onset events such as sea level rise will threaten the availability of coastal land, diminish freshwater quality, and undermine delta rice production, which is an important source of food for the region, and recurrent drought is impacting upland irrigated crop production.

An increase in population in the region as well as increasing industrialization, and climate change have put pressure on these resources especially on land due to an increase in demand for food and energy production, both of which are highly water-intensive activities. Therefore, land management is crucial to managing the place, quantity, and quality of all natural resources.

Various regions represent myriad ecosystems and geo-climatic zones; different countries and their communities are exposed to various vagaries from climate change at different scales and intensities. Rapid urbanization and increasing concentration of built infrastructures around urban areas are viewed as necessary for supporting economic progress and competitive markets by allowing the establishment

of manufacturing & service production units. The changing urban landscapes, dotted with high-density developments, water-intensive land uses, reflecting building materials, etc., are emerging as increasingly incompatible with a changing climate. While guidelines exist, there are serious gaps in the implementation of adaptation actions owing to overlapping institutional arrangements, discrepant service provisions & development patterns, inequitable access to life support systems & critical infrastructures, etc. that pose a challenge. These factors are responsible for not only exposing populations in the same city to varied vulnerabilities but at times also leading to violent social conflicts during critical scenarios, such as scarcity of basic infrastructure availability.

Heatwaves and water scarcity are becoming regular features of many inland cities while flooding and cyclonic surges are being witnessed by coastal settlements. Flooding in coastal megacities of India such as Mumbai, Kochi, and Chennai, heatwaves in the Deccan plateau of Central India, riverine floods in cities along River Ganga, and local floods and landslides in the Kathmandu valley region in Nepal have become regular features. With two distinct annual monsoon seasons, coastal flooding and cyclonic winds prove devastating to many cities, particularly in the northern part of Sri Lanka (UNDRR 2019). In many transboundary river basin regions of South Asia, the fragile environmental resource base is observed to converge with critical socio-economic conditions of the societies (UNESCAP 2019).

The added burden on natural environments for supporting the rising demands from urban areas, the growing dependencies of the urban populace on surrounding natural resource regions, and a general lack of adequate conservation efforts towards the natural resources collectively make cities vulnerable to climate change stressors and extremities.

COVID-19 has effectively revealed societal fault lines and has at the same time demonstrated new possibilities for environmental recovery and protection. The unevenness by which countries around the world have responded to the COVID-19 virus has revealed common shortcomings with respect to higher covid-related morbidity and mortality among low-income, marginalized segments of society, and significantly greater indirect impacts of Covid on livelihoods and on access to safe and reliable food and water by the poor. COVID-19 is imperiling recent gains in reducing extreme poverty and spawning a hunger pandemic in some sectors of society, with a near doubling of acute hunger for the most food insecure, and increasing vulnerability to interlocking hazards, such as extreme events linked to a changing climate^{1,2}.

The carry-over effects of society-wide shutdowns on the environment have been mixed. On the plus side, the sudden and severe economic contraction has provided ‘breathing space’ for nature as evidenced by a temporary diminution in the steadily increasing rate of planet-warming emissions, as well as lifting the persistent smog enveloping fast-growing cities³. Evidence of how the sudden and widespread economic slowdown (in response to the pandemic) has reduced pressure on natural systems has emerged from China (Wang and Su, 2020), USA-Italy-Spain (Zambrano-Monserrate et al. 2020), and India (Lokhandwala and Gautam 2020, Kumar and Manage 2020, Patel et al. 2020, Mahato et al. 2020). On the other side of the ledger, governments have used the pandemic as an opportunity to curtail environmental and conservation protections, with potentially wide-ranging consequences. This mixed picture of how the pandemic is influencing the environment points both to the potential of reimagining a greener future and to the peril that unilateral actions have on the collective future.

The economic and social costs of the COVID 19 pandemic and lockdown have been high. India’s GDP growth is projected to fall from 4.2% in 2019 to 1.9% in 2020 (IMF 2020). A study from Thailand Science Research and Innovation shows that workers in the informal sector are experiencing a decline

¹ <https://www.worldbank.org/en/topic/poverty/brief/projected-poverty-impacts-of-COVID-19>

² <https://insight.wfp.org/covid-19-will-almost-double-people-in-acute-hunger-by-end-of-2020-59df0c4a8072>

³ <https://www.nature.com/articles/s41893-020-0581-y>

in income since most employers started to reduce their expenditures by laying people off. Sixty percent of vulnerable people, mostly in Bangkok, stated that Covid-19 has led to a loss of income. One immediate response by these more impacted groups has been their attempt to secure jobs in rural areas. However, the job market in the agricultural sector could not absorb an influx of job seekers from Thai cities, as it was facing drought during the beginning of the Covid-19 pandemic. Youth employment has been particularly hard hit, with the ADB and ILO (2020) reporting an increase in youth unemployment rates in Japan, Australia, Malaysia, Viet Nam, and Thailand in the first quarter of 2020 compared to the first quarter of 2019. Youth workers who moved from rural to urban centers for a secure livelihood have found that the COVID-19 pandemic is forcing them to return to their origin due to sudden job losses.

The CES approach offers a way forward for green recovery and more resilient society. The post-Covid ‘recovery’ period offers a unique opportunity to reexamine conventional assumptions and paths of economic development and environmental protection, so as to create openings for ‘bouncing forward’ towards a more transformative resilience rather than bouncing back to the old normal. A central tenet of the forward approach concerns the imperative of linking economic recovery with environmental protection and social sustainability. The CES approach, which emphasizes an integrated approach incorporating concepts already familiar in the sustainable development-green economy, rural-urban linkages, low-carbon, resource circulation, and ecosystem-based solutions, provides a means to realize a bouncing forward vision (Takeuchi et al. 2019).

The Circulating and Ecological Sphere (CES) concept has been proposed in the 5th Basic Environmental Plan of the Government of Japan to guide the implementation of Sustainable Development Goals (SDGs) regionally and locally (MOEJ 2018). The CES concept aims for simultaneous improvement of society, the environment, and the economy as covered by a major global agenda on SDGs, climate change, disaster risk reduction, and biodiversity conservation. *Therefore, this concept is applicable beyond Japan and can contribute to achieving global goals and targets through integrated actions that reflect local needs and priorities.*

In order to realize simultaneous improvements in society, the economy, and the environment, the CES concept aims to foster sustainable urban-peri-urban and rural partnerships that can achieve greater resilience through resource circulation and low carbon development pathways. Urban and rural areas are strongly interconnected through flows of food, water, energy, remittances, raw materials, finished products, labor, waste, and pollution. Moreover, risk exposure is spatially linked to the extent that ecosystem services in rural and peri-urban areas are sufficiently viable to protect urban areas from natural hazards and where economic activity in urban centers creates a potential for expanded rural and peri-urban livelihoods. This mutual dependency across rural, peri-urban, and urban spheres presents city-regions with opportunities to effectively harness these linkages to collectively address resilience and adaptation efforts within both urban and rural spheres. However, the potential synergies present in urban-rural scale connectivity have been largely neglected in conventional policy, governance, and development frameworks.

The CES concept is designed to maximize the unique strengths of urban-rural linkages in all regions through sustainable, equitable, and efficient use of natural capital in rural environments (mountainous, wetlands, agricultural, and fishing villages) combined with productive capital in cities in an integrated manner, leading to synergistic relationships with each other toward a sustainable and resilient regional sphere (Figure 1).

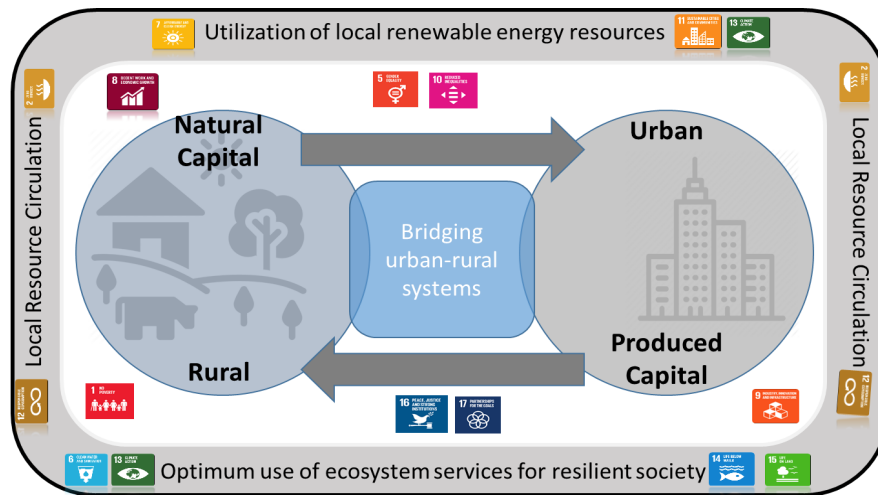


Figure 1: Conceptual illustration of Circulating and Ecological Sphere

Towards actionable plan on CES: A key aspect of fostering the CES concept is the creation of a framework of continuous iterative cycles between scientific evidence-based knowledge generation, regional knowledge sharing, capacity building of key actors, and co-design of solutions. Enabling such a process requires a multi-city effort built around a platform of reflective learning (Fig.2). With that regard, a regional-level initiative led by the Institute of Global Environmental Strategies and START International based in the USA to advance the CES approach in South Asia and Southeast Asia through a collaborative agreement was signed in 2019.

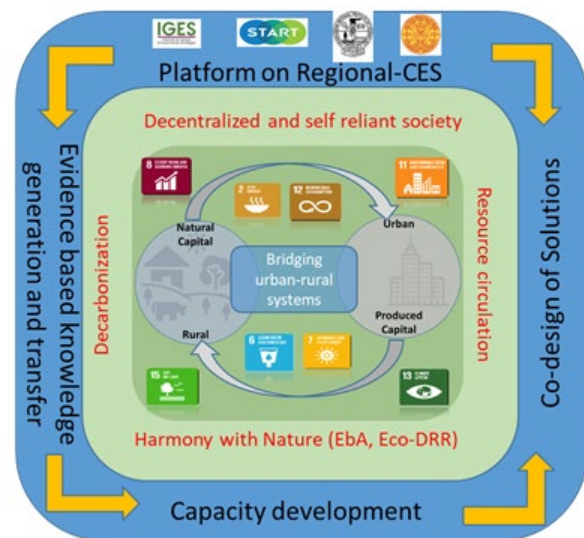


Figure 2: Framework for advancing the CES concept

The first regional workshop on “Circulating and Ecological Sphere approach for re-designing the city regions resilience“, held on 20-21 May 2021 engaged regional researchers to prioritize the challenges and issue areas that need the CES approach. The workshop revealed that the CES approach can apply to solve a broad range of challenges that developing Asia faces including environmental degradation, economy, climate change mitigation, and adaptation, water security, solid waste management, wetland degradation, unemployment, and floods etc. (IGES, 2021). Among various issue areas, it ranked top five priority issue areas for application of CES approach in developing Asia including utilization of locally available clean energy resources, managing affordable and accessible ecosystem services through benefit sharing, promoting eco-tourism and circular economy for waste management and optimum use of local resources for economic revitalization and creating jobs. It also highlighted several challenges like socio-economic dynamics, governance challenges like lack of institutional capacity,

financial implications for CES approach, and lack of awareness about the implementation of the CES concept by government organizations and local stakeholders.

On 14th October 2021, these regional efforts transformed into a multilateral collaboration by engaging the leading academic and research institutes in South and Southeast Asia and signing an agreement to establish a Consortium (namely CES-Asia Consortium) for advancing the Circulating and Ecological Sphere (CES) concept for enabling resilience of city regions in South and Southeast Asia (Fig.3). The members of the Consortium are Visvesvaraya National Institute of Technology (India), Faculty of Architecture and Planning, Thammasat University (Thailand), University of Dhaka (Bangladesh), University of Danang – University of Technology and Education (Viet Nam), Royal Thimphu College (Bhutan), University of Indonesia, Ateneo de Manila University (Philippines) and Institute of Forestry of Tribhuvan University (Nepal) (IGES 2021). The CES-Asia consortium involves universities working with cities and local governments to co-develop evidence-based knowledge that incorporates and adapts key elements of the CES framework shaped by the context of specific local needs and priorities. The CES-Asia consortium will provide a platform to bring national and local governments and key stakeholders to the CES platform in order to develop bottom-up priorities for actions, generate evidence-based knowledge, co-develop solutions and apply them. The platform involves universities working with cities to co-develop research plans and priorities that incorporate and adapt key elements of the CES framework shaped by the context of specific local needs and priorities.



Figure 3: MoU signing between the institutes and academia

The way forward: Adapting the CES framework to diverse socio-economic and environmental contexts across the globe requires attention to opportunities for policy coherence that can support more resilient city regions. Strong governance is a critical element, especially with respect to the role of local actors' and communities' needs and priorities. Such effort ensures that local entities are central to the processes of co-developing solutions and approaches to establishing co-engaged partnerships between communities, academia, politicians, and civil society. This requires re-thinking processes of incoherent policy-making, and uncoordinated development planning and practices. More attention needs to be given to city-region solutions by developing and applying approaches that are suited to dealing with complexities inherent within the urban-rural continuum. Such approaches should be truly participatory and value long-term processes and dialogue. As Macintyre et al. (2018) describe it "Transition/transformation-driven learning focuses on the role of learning in more emergent, reflexive and open system environments with a strong focus on including multiple actors." Taking into account the time required for authentic transformations to emerge in complex systems will require establishing longer-term partnerships and relationships at both regional and local levels that are durable and seen as legitimate.

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