

Circulating and Ecological Sphere (CES) approach towards the integration of climate and Sustainable Development actions in Asian city-regions

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Sustainable Development Challenges



Climate change risk



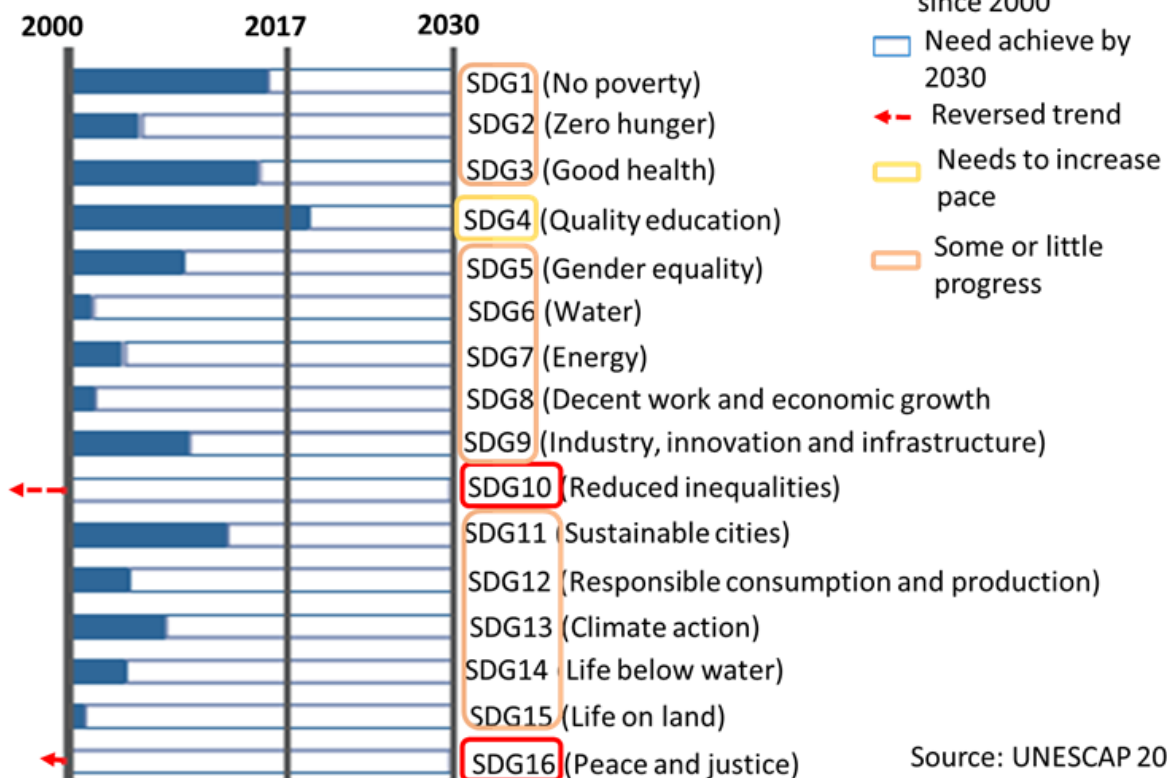
Disaster risk



Ecosystem and biodiversity loss

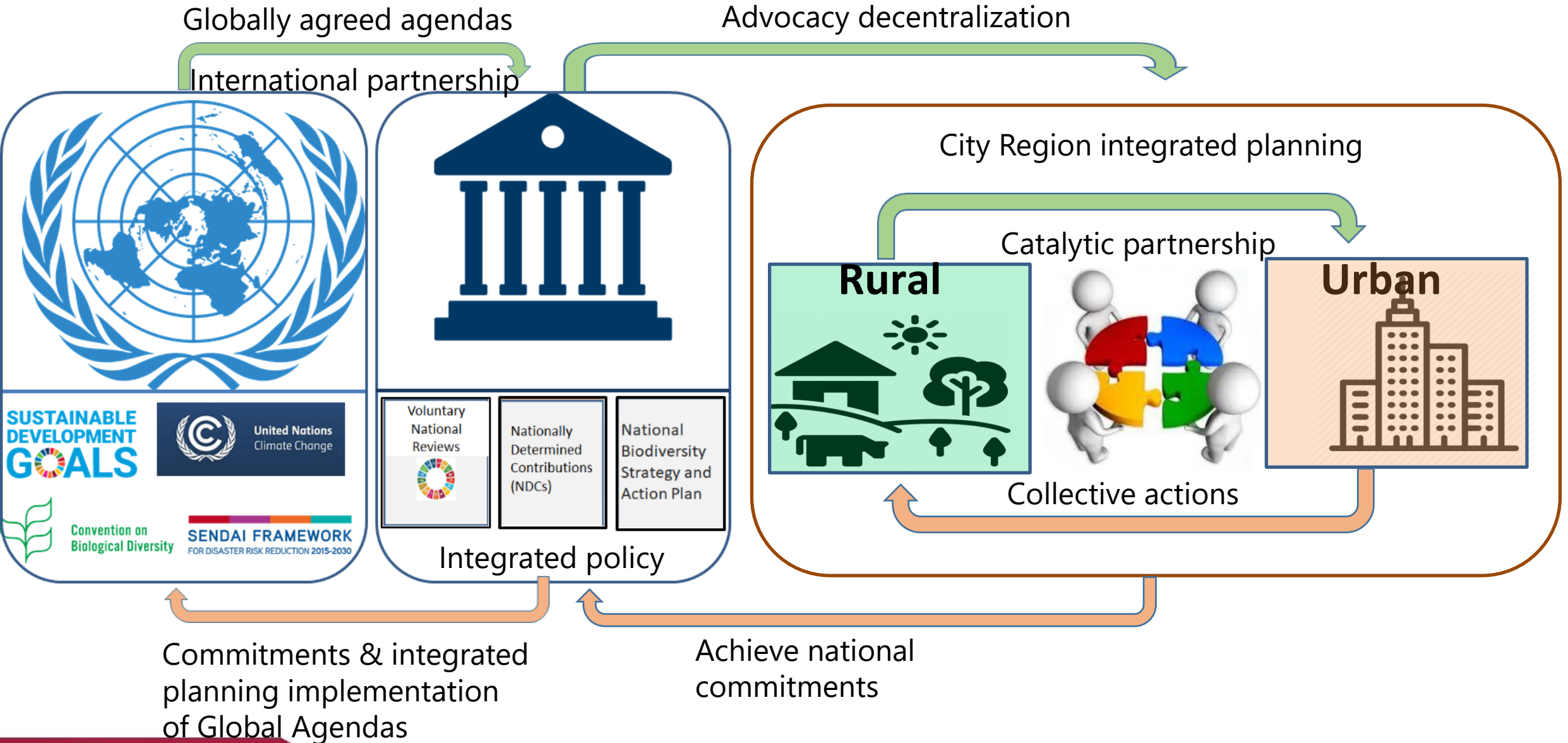


Pressure on natural resources

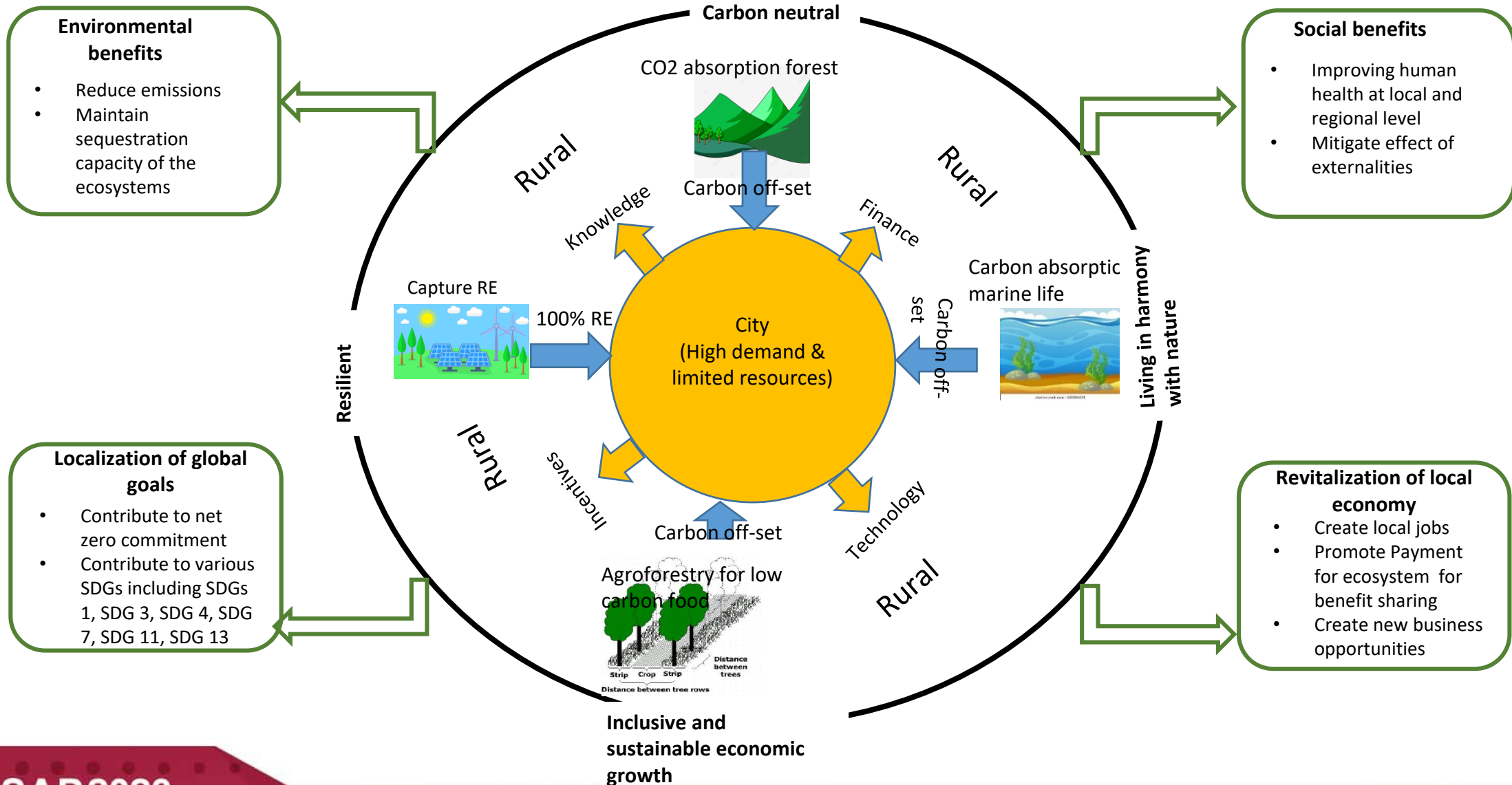


How we can achieve sustainable development?

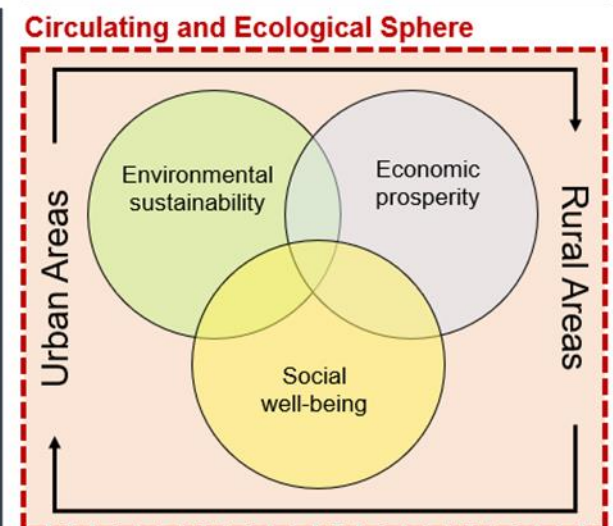
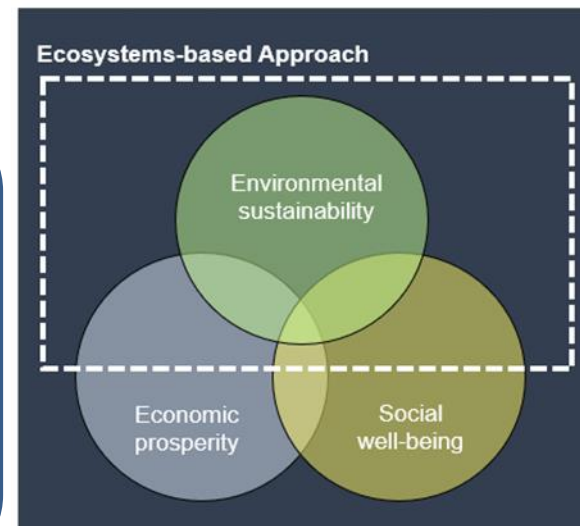
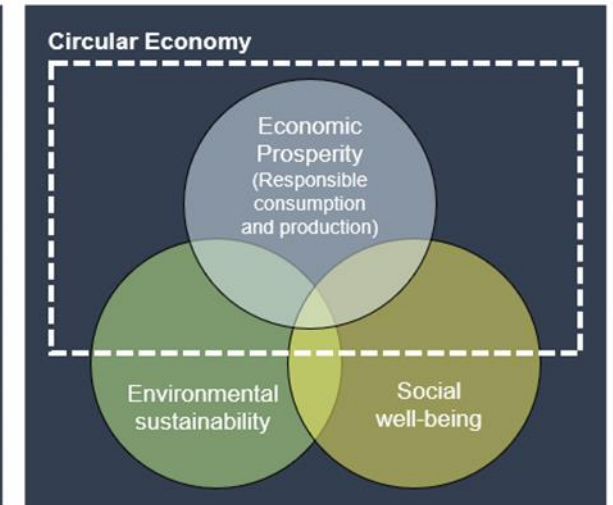
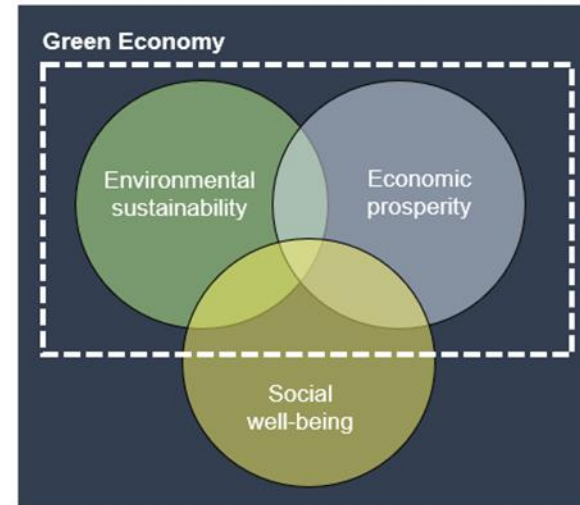
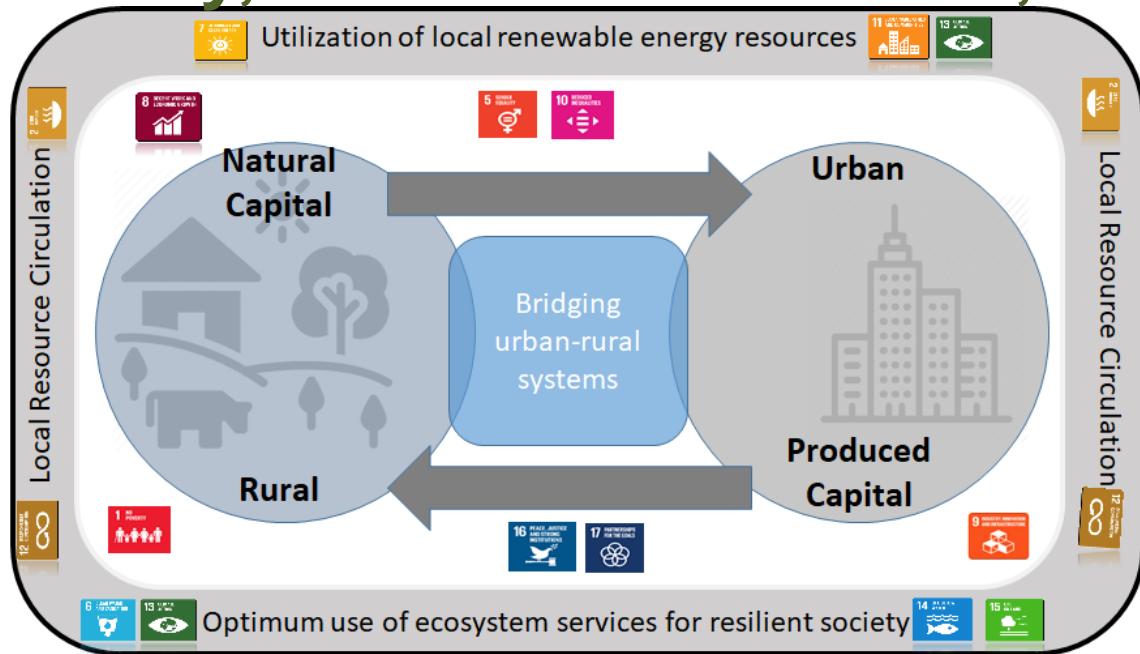
Pathway of Localization of Global Agendas



Urban-rural linkages for optimum utilization of local resources towards the sustainable development



The Regional-CES is framed based on integration of low-carbon society, resource circulation, and living in harmony with nature



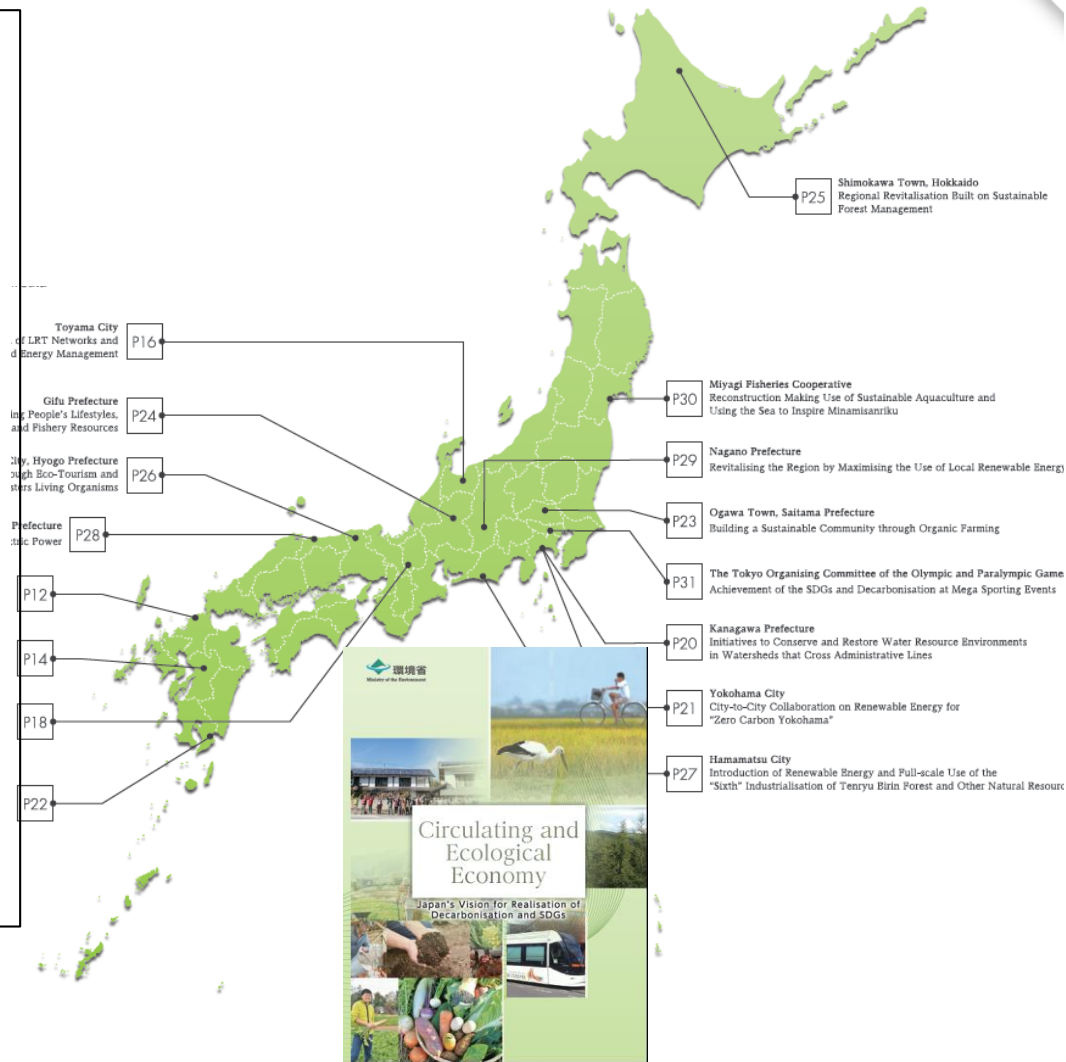
Basic Approach

- ◆ Explore simultaneous solutions for economic, regional and international challenges
- ◆ Maximize sustainable use of regional resources
- ◆ Enriching and strengthening partnerships

CES in Action in Japan for localization of SDGs and climate actions

The Basic Environment Plan

Cabinet decision on April 17, 2018



Sustainable forest management for Regional revitalization

Use of local renewable energy for regional revitalization

Local circulation of resources and energy

Disaster resilient decentralized energy system

Local resource based community business

Urban rural partnership of managing catchment forest health for quality water sources

City-rural partnership for net zero

Organic farming based sustainable community

Organic farming based sustainable community

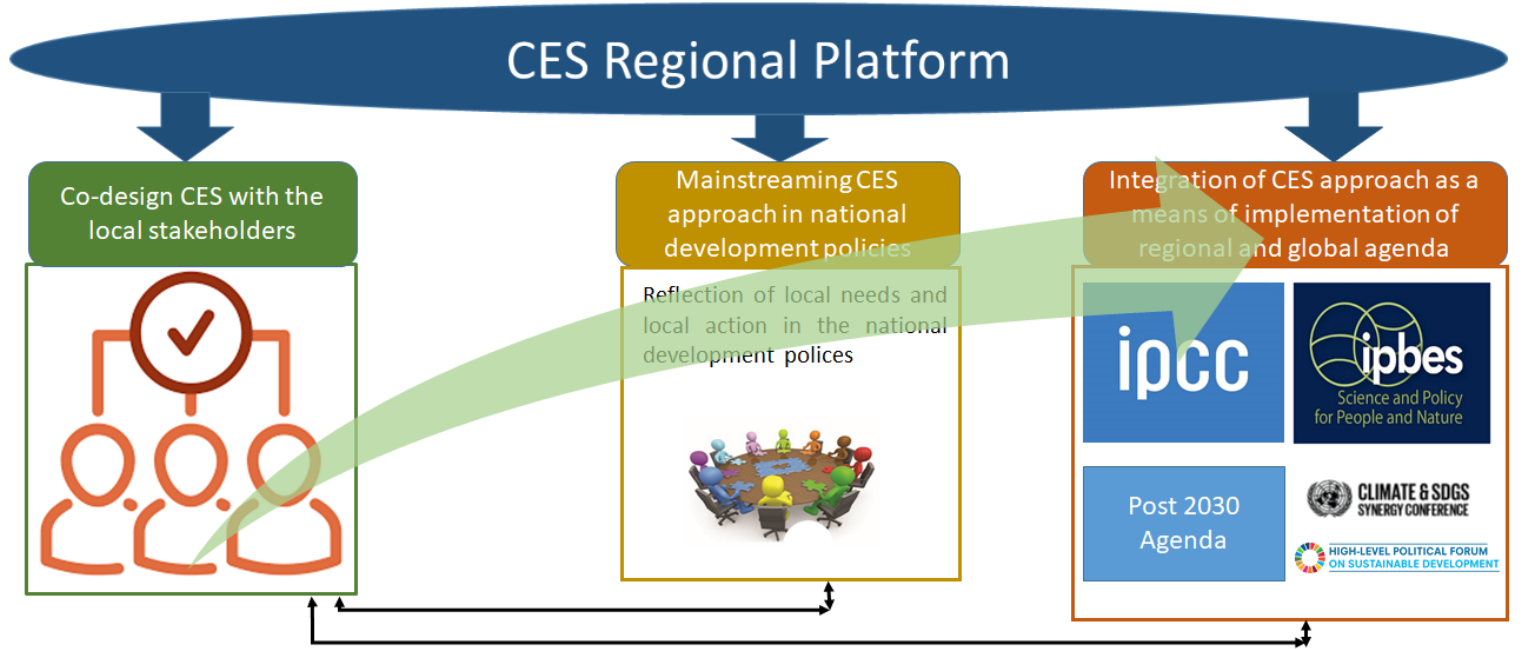
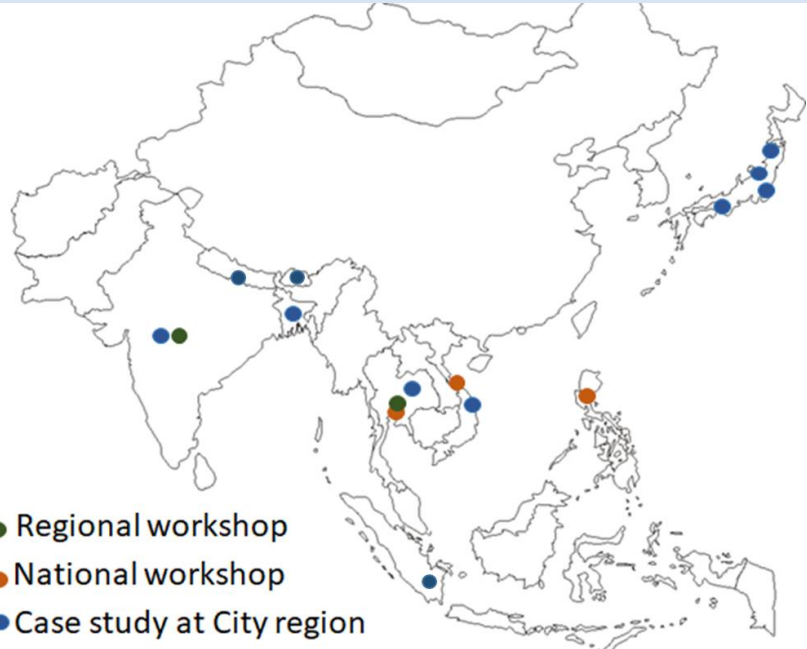
The CES-Asia Consortium was established on 14th October, 2021

Goal: Mainstreaming the Regional-CES concept to address sustainability challenges through integrated actions in city regions of Asia

Footprint of CES-Asia Consortium

Bangladesh | Bhutan | India | Indonesia | Japan | Nepal | Philippines | Thailand | Vietnam

Ten (10) consortium members have signed the Partnership Agreement

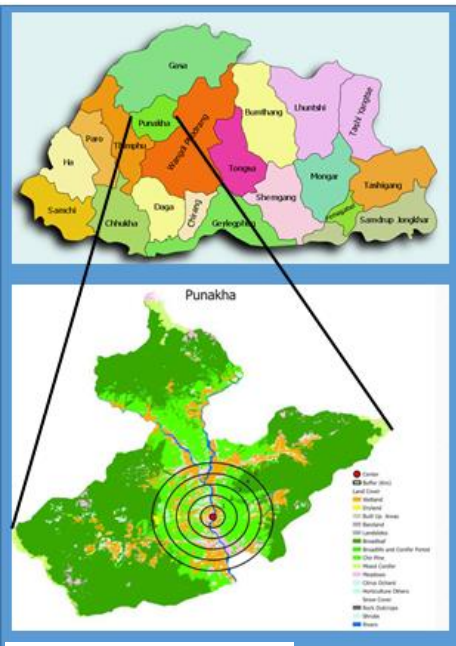


Our Approach: Towards Advancing the CES-application

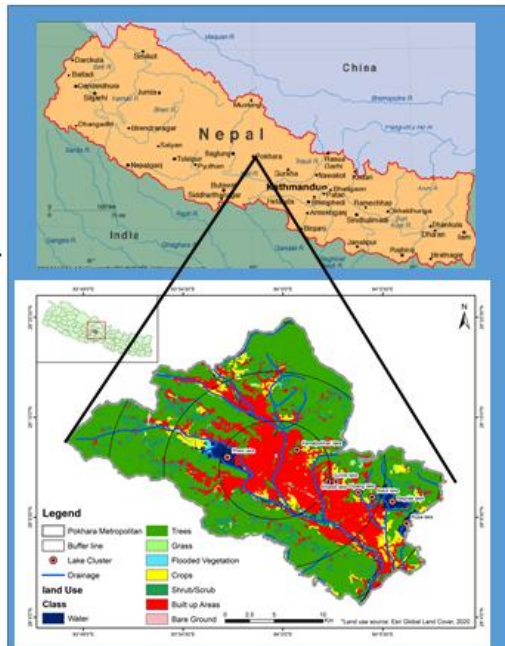


Evidence based Scientific Knowledge Generation for CES for Application of CES in the Local Context

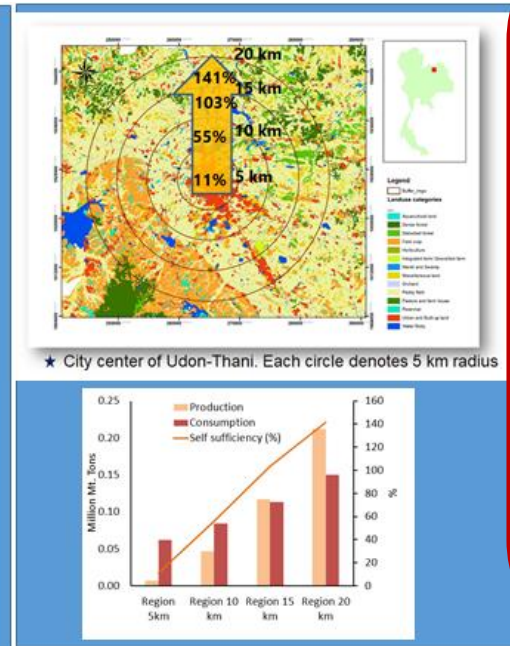
Punakha, Bhutan



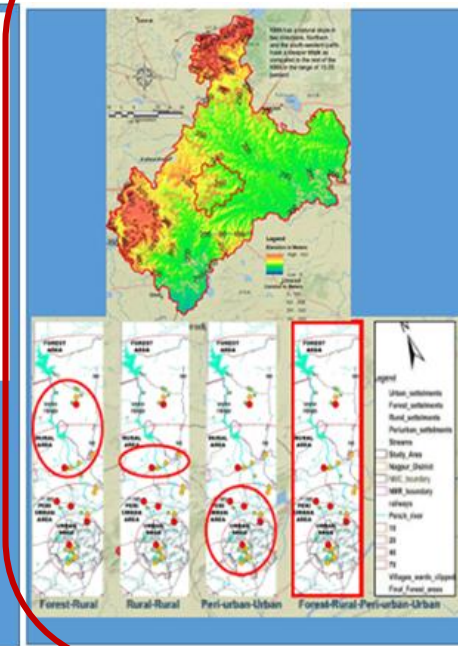
Pokhara, Nepal



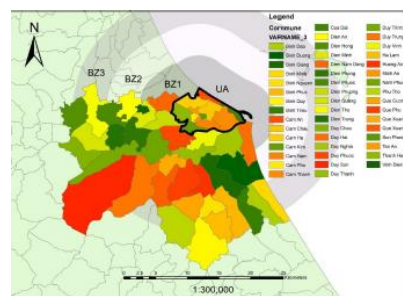
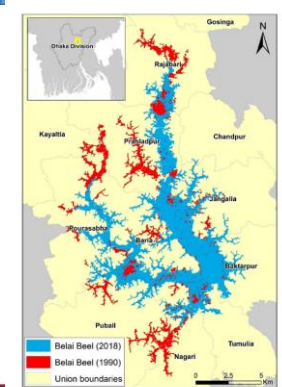
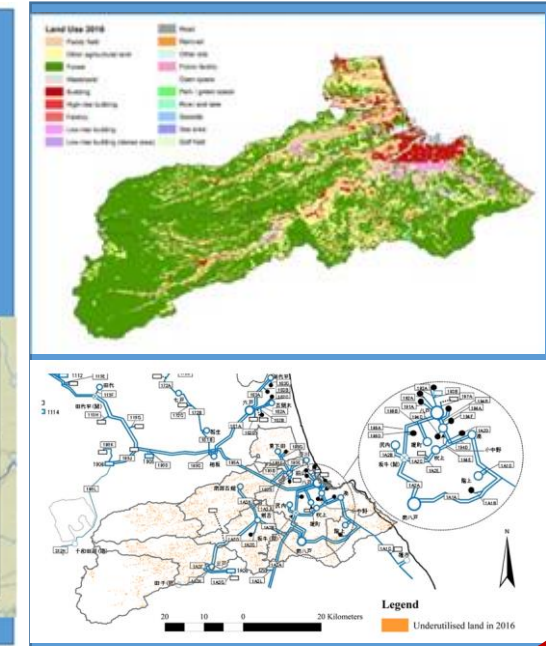
Udon Thani, Thailand



Nagpur, India

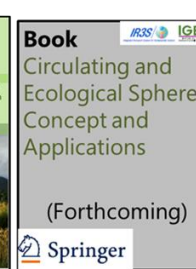


Hachinohe, Japan



Knowledge generation

- Joshi, S.; Morey, B.; Deshkar, S.; Mitra, B.K. Applying Circulating and Ecological Sphere (CES) Concept for Post-Pandemic Development: A Case of Hingna Tahsil, Nagpur (India). Sustainability 2022, 14, 9386. <https://doi.org/10.3390/su14159386>
- Morey, B.; Deshkar, S.; Sukhwani, V.; Mitra, P.; Shaw, R.; Mitra, B.K.; Sharma, D.; Rahman, M.A.; Dasgupta, R.; Das, A.K. Towards Circulating and Ecological Sphere in Urban Areas: An Indicator-Based Framework for Food-Energy-Water Security Assessment in Nagpur, India. Sustainability 2022, 14, 8123. <https://doi.org/10.3390/su14138123>
- Wijitbusaba Marome, Pimnara Rodkul, Bijon Kumer Mitra, Rajarshi Dasgupta, Yatsuka Kataoka. 2022. Towards a more sustainable and resilient future: Applying the Regional Circulating and Ecological Sphere (R-CES) concept to Udon Thani City Region, Thailand, Progress in Disaster Science, Volume 14



Exploring Entry points for CES Application in Hachinohe: Stakeholder consultations and evidence based knowledge generation



Energy dominant scenario

Electricity generation

Electricity generation compared to consumption

Agriculture-energy combination scenario

Electricity generation

Electricity generation compared to consumption

	Hachinohe city	Oirase town	Sannohe town	Gonohe town	Takko town	Nanbu town	Hashikami town	Shingou village
Electricity generation (GWh)	534.05	103.16	490.62	558.67	291.40	387.36	259.76	342.69
Electricity generation compared to consumption (%)	36.92%	65.52%	828.87%	532.45%	907.26%	354.87%	298.79%	2320.61%
Electricity generation (GWh)	400.54	77.37	367.96	419.01	218.55	290.52	194.82	257.02
Electricity generation compared to consumption (%)	27.69%	49.14%	621.65%	399.34%	680.45%	266.16%	224.09%	1740.46%

Shingou village

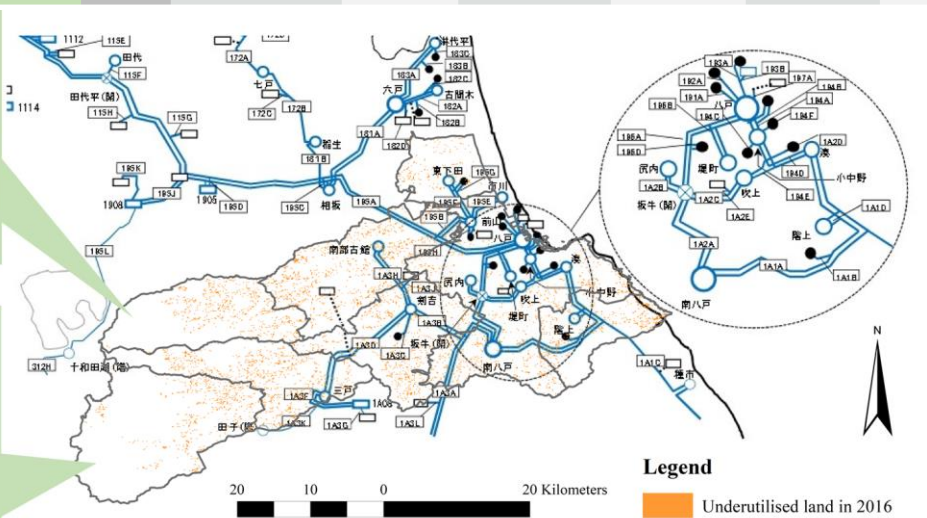
Elec. generation compared to consumption

Energy dominant	2320.61%
Agri.-energy combination	1740.46%

Takko town

Elec. generation compared to consumption

Energy dominant	907.26%
Agri.-energy combination	680.45%



2006 to 2016 Agriculture land became vacant 60.24km²



Assessment of alternative land resource utilization towards Net-Zero and regional revitalisation through the circulating and ecological sphere in depopulated city regions in Japan: a case study of Hachinohe City Region

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Received 18 November 2022 | Accepted 3 July 2023

Abstract
The circulating and ecological sphere (CES) concept promotes a self-reliant decentralised society by utilising regional resources to achieve decarbonisation. The concept is particularly relevant to depopulated areas across Japan facing a continuous increase of underutilised agricultural land that brings environmental, social and economic challenges. This study investigates such land as a locally available resource to be utilised under the CES framework and mitigate losses in a depopulating community. Using the case of the Hachinohe City Region in Japan, this paper explores alternative land use scenarios and identifies policy interventions to implement a desirable scenario that would contribute to the localisation of Net-Zero and regional revitalisation. The scenario developed based on land use change analysis, policy reviews and stakeholder interviews were: (1) an energy-dominant scenario (installing a photovoltaic system) and (2) an agriculture-energy combination scenario (installing an aquaponic system). The analysis shows that under both scenarios, Hachinohe City Region can achieve 100% renewable energy. There are other benefits, including job creation and, in the case of the agriculture-energy combination scenario, contribution to domestic food supply resilience. The study recommends three policy interventions: (i) collaboration among the members of the city region to achieve its own carbon-neutral electricity supply; (ii) investment for areas without transmission lines to fully benefit from their regional resources; and (iii) support for local initiatives who local communities co-manage the resources and co-benefit from them. Based on the results, the paper further highlights the potential of the CES approach to deliver just transition from a spatial perspective.

Keywords: Net-Zero; Circulating and ecological sphere; Revitalisation; Depopulation; Alternative land use; Hachinohe City Region

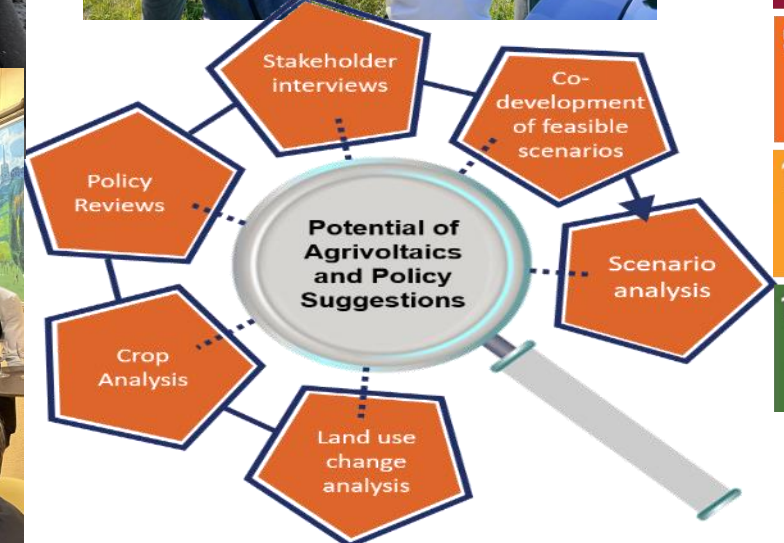
Introduction
In Japan, depopulation is a major trend expected to continue for the next several decades. According to one projection, the population will decrease by 13–15 million by 2065 compared to 2015 (National Institute of Population and Social Security Research 2017). This trend is especially evident outside of the three metropolitan areas of Tokyo, Osaka and Nagoya. Even amidst a national-scale population decline, these urban areas are still growing. Meanwhile, other areas are seeing a national population decline as a result of the decline attributable to net migration (Ministry of the Environment 2017).
Some studies argue that the depopulation trend is beneficial for sustainability, because shrinkage could alleviate human-induced pressures on the environment by lowering total consumption (Kishimoto et al. 2019; Landolt et al. 2011). Mastrandrea (2017) uses the term “depopulation dividend” to refer to the potential gains from depopulation and contends that depopulating rural areas have a chance to establish a sustainable post-growth society. Nevertheless, the contention is that depopulation triggers various losses, and the opportunity cost of depopulation is not negligible as an opportunity

Published online 09 August 2023

Leveraging Co-benefits for A Healthy Net Zero Transition: Long-term partnership with Hachinohe City



IGES and Hachinohe city signed MOU of collaboration



Roadmap for Decarbonization Region

Pathways for Revitalization

Co-benefit Strategy of Net Zero Action Hachinohe

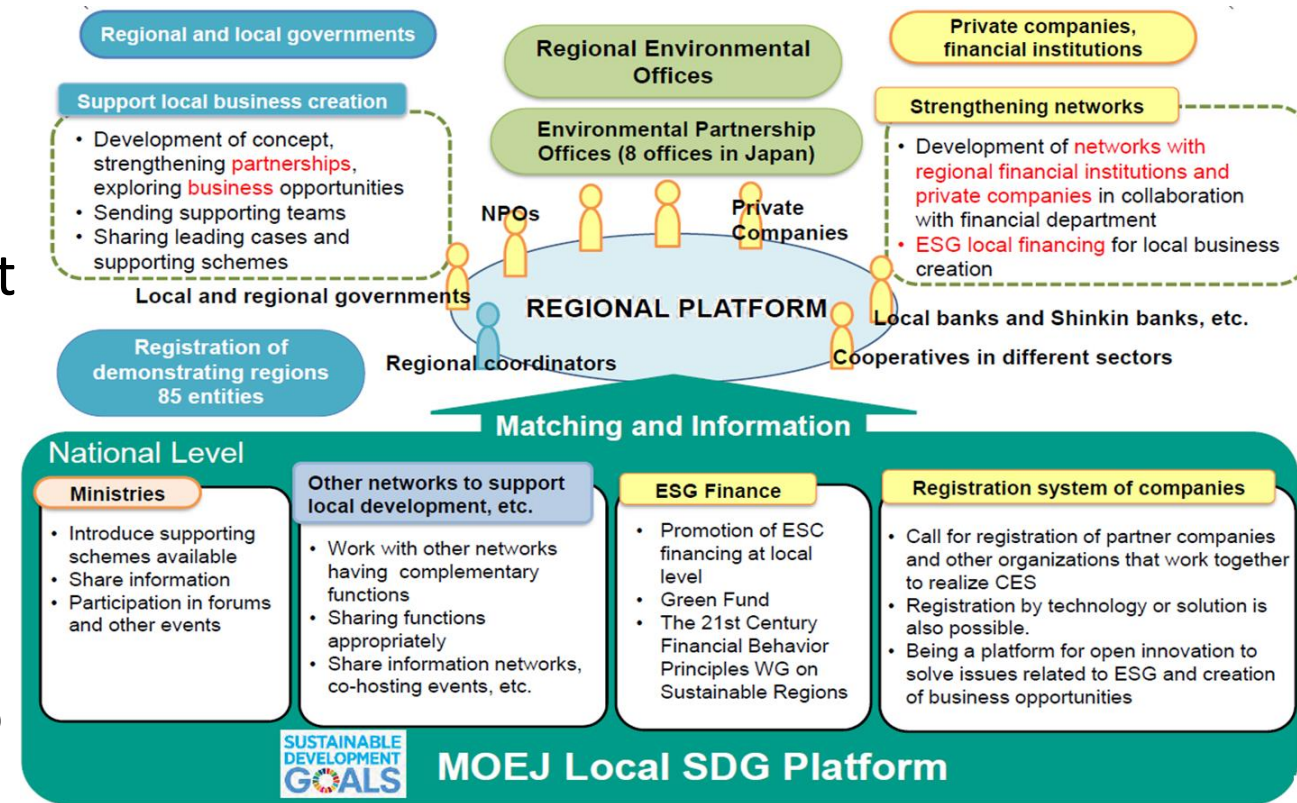
Mid-term and Long-term Master Plan

Challenges for implementation of CES approach

- Lack of information and knowledge on the integrated approach concept
- Lack of understanding of spatial linkages and integration (eg. different approaches between urban and rural settings)
- Need evidence based knowledge generation (eg. Assessment of locally available resources)
- Incompatibility between top-down implementation and local needs.
- Lack of location-based law, regulation, policies (eg. Existing policies are not supportive to urban-rural partnership)
- Obstacles of financial supports, research funds, lack of awareness of Regional-CES among local people, and lack of networking

Enabling environment for implementation of CES approach for integrated localization of SDGS and Climate goals

- Need assessment based knowledge generation
- Co-development and implementation of research with local/regional stakeholders that should have very clear framework of science policy interface
- Long-term partnership and engagement with stakeholders
- Co-development of local solutions in order to give ownership to the stakeholders
- Facilitate collaboration and cross learning through regional platform



Japanese Approach: Platform to connects people, goods, money and skills

ご清聴ありがとうございました。
Thank you very much for your attention.