Special Project by the Ministry of Environment, Japan (2014-2018)
S-13
Development of Coastal Management Method to Realize the Sustainable Coastal Sea

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Development of Coastal Management Method to Realize the Sustainable Coastal Sea (2014-2018)
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Theme 1

1. Seto Inland Sea

Decrease of fish catch
High biodiversity and production
Control of nutrients concentration

Theme 2

2. Sanriku coastal sea

Recovery from Tsunami-damage
Satoumi creation
Material flux from forest to coastal sea

Theme 3

3. Japan Sea coastal area

Intergovernmental management
Spillover effect of MPA
Future forecast of ecosystem

Theme 4

4. Social and Human sciences

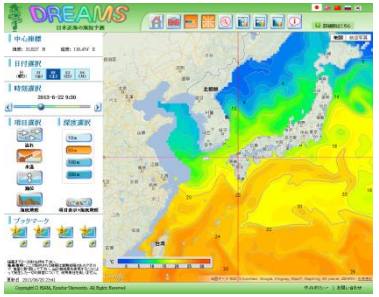
Economic value of ecosystem service
MPA and fisheries
Satoumi story for citizen

Theme 5

Integrated numerical model development

Synthesis

Philosophy for coastal sea management
Measures for establishment of sustainable coastal sea area
Integrated model as a support tool for policy makers



Integrated Coastal Sea Model

visualization

Environmental Policy

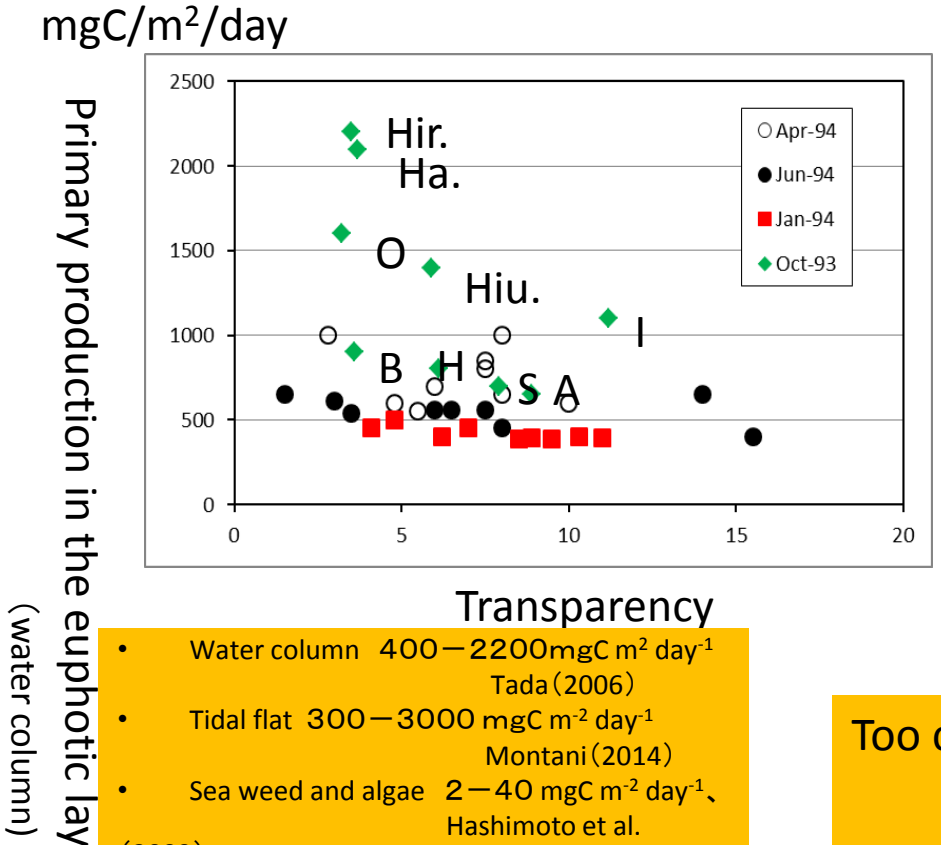
Committee（Three types）

1.5 million US$/year

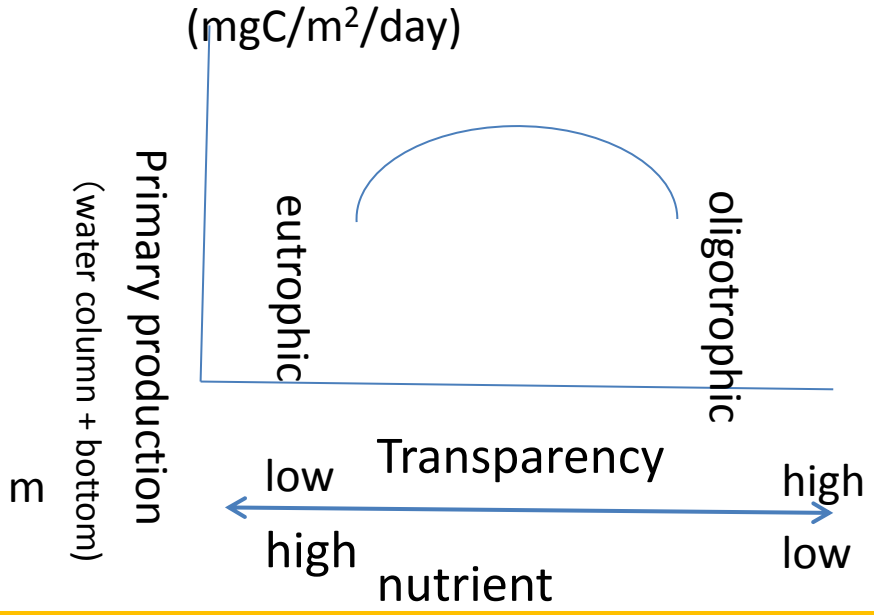
Realize clean, productive and prosperous coastal sea (Satoumi)

Global dispatching

Clean and productive coastal sea (1)



- Water column 400－2200mgC m² day⁻¹ Tada（2006）
- Tidal flat 300－3000 mgC m⁻² day⁻¹ Montani（2014）
- Sea weed and algae 2－40 mgC m⁻² day⁻¹、Hashimoto et al.（2009）



Too clean water → few fish
→dirty water = few fish
→ clean water = many fish

High biodiversity：habitat arrangement, stop transfer to climax of flora = thick, ling and smooth material cycling

Clean and productive coastal sea (2)

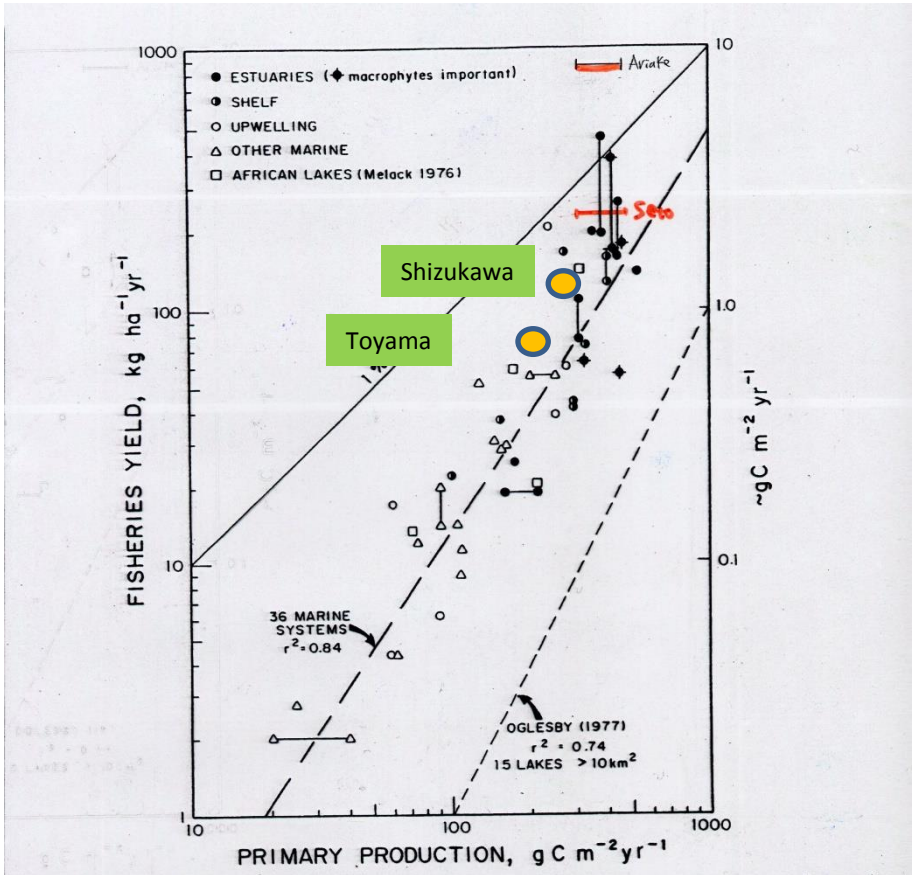


Fig. 6. Fisheries yield (FY) per unit area as a function of primary production (PP) per unit area in a variety of estuarine and marine systems compared with the regression obtained by Oglesby (1977) for large lakes. Regression line for the marine systems is ln FY = 1.55 ln PP − 4.49. A summary of regressions relating gross plankton production from O_2 changes to fish harvests from various intensively managed ponds is given by Liang et al. (1981). The fisheries landings have been converted to carbon assuming C is 10% of fresh weight (Gulland 1970). Data sources for marine systems given by Nixon (1982) and Nixon et al. (1986*b*).

Nixon (1988)

Primary production and fish catch

High transfer efficiency
（e.g. no hypoxia）
High biodiversity
：thick, long and smooth material cycling

Include aquaculture without bait

Sustainable fisheries and coastal community

Synthesis
including integrated numerical model

- Philosophy for coastal management（human and sea, use and conservation, food security…）

  Natural, social and human sciences
- Parameters for the sustainable coastal sea area（transparency, bottom DO, area of tidal flat and sea weed, nutrients concentration……）

  Field survey, modeling
- Governance for realizing the measures

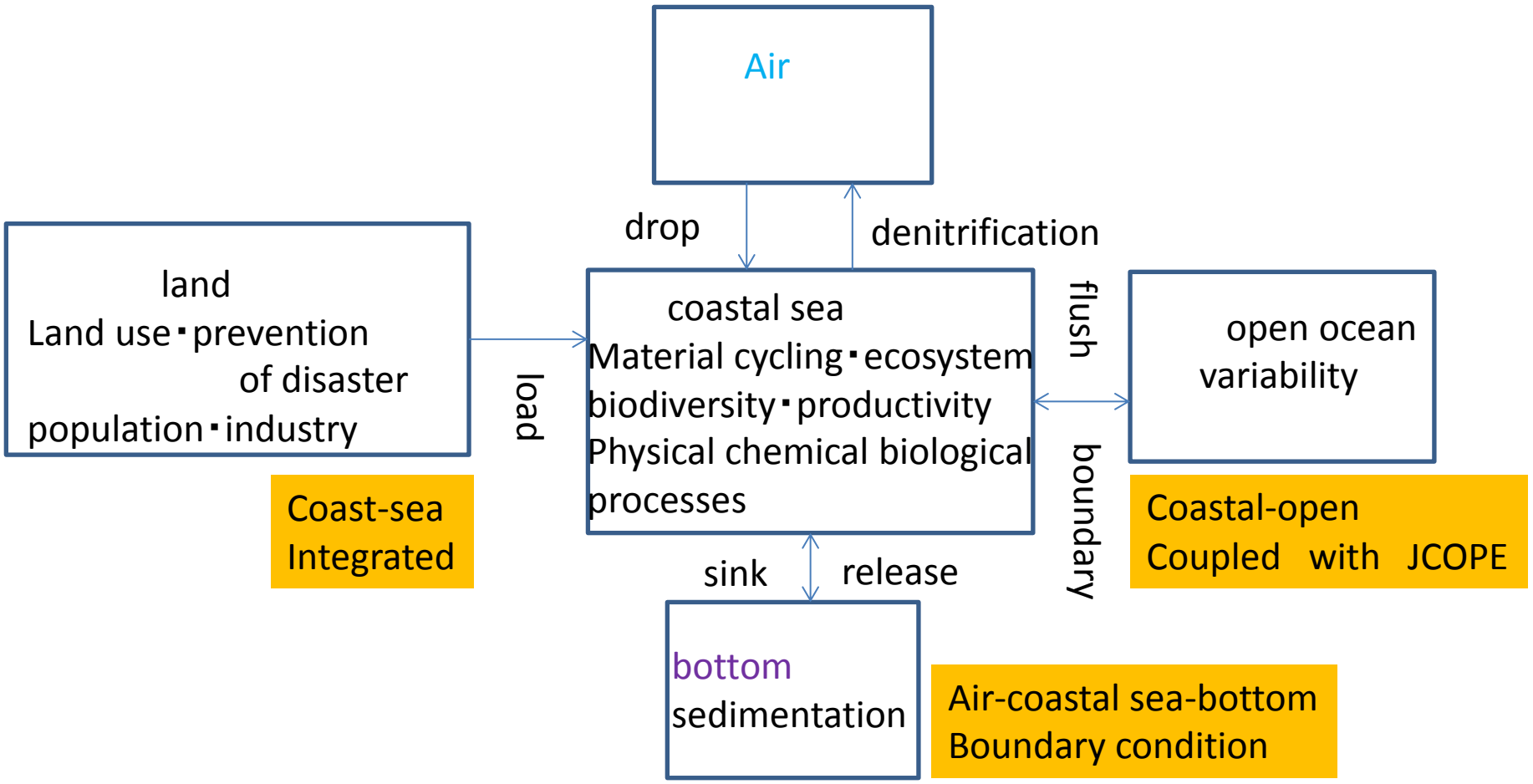
  Committee, visualization of model results
- Parameters of sustainability

  population, GNP,… in the coastal sea area

- Integrated numerical model as a support tool for policy makers

  Integrated model of natural, social and human sciences

Integrated numerical model（land＋sea, natural ＋social sciences)



Shizukawa model：aquaculture（oyster・scallop・sea algae・salmon）environmental capacity
Toyama Bay model: change of Tsushima Warm Current and load from land
Seto Inland Sea model：load and nutrients concentration, increase of fish resources

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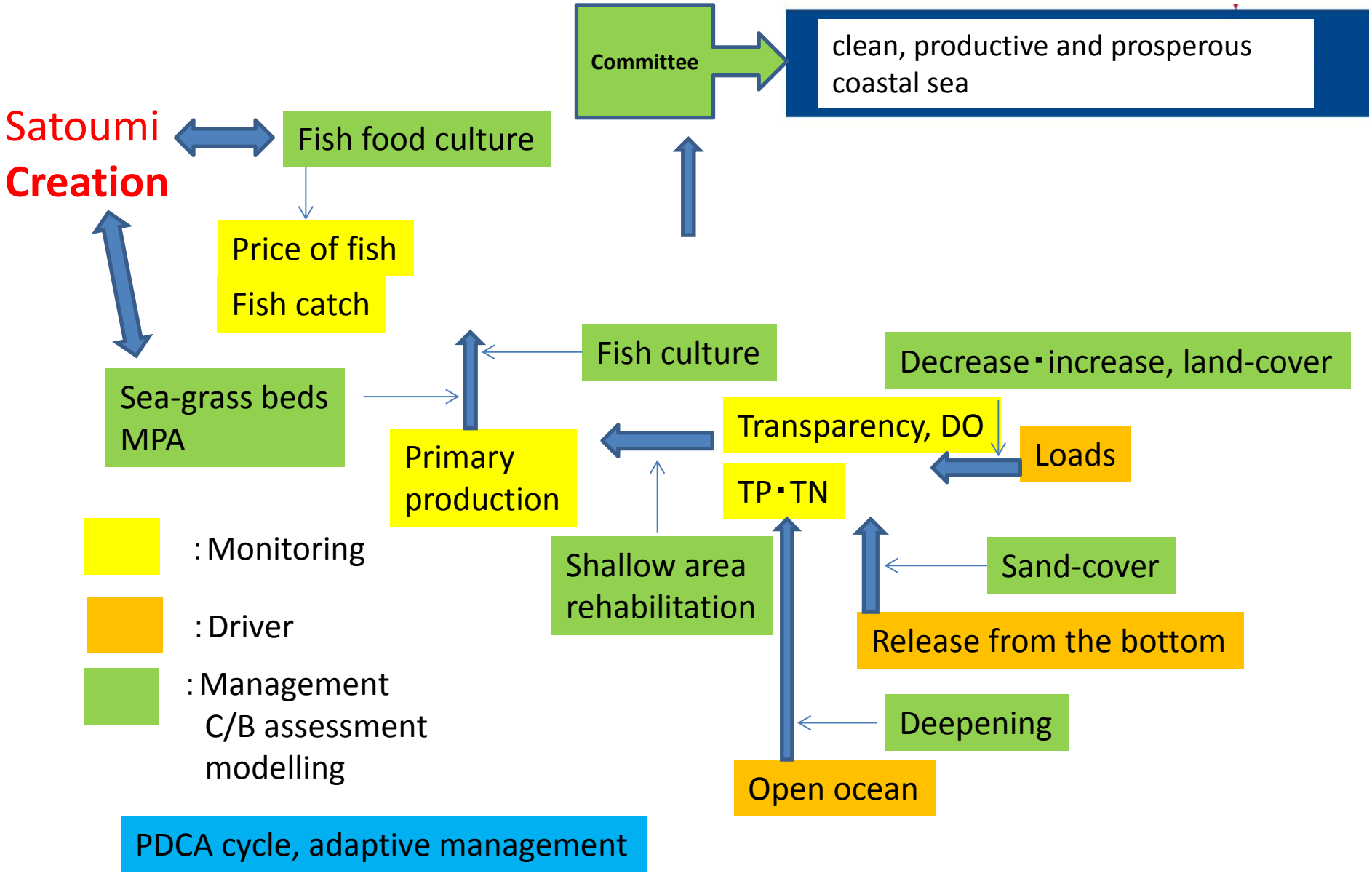
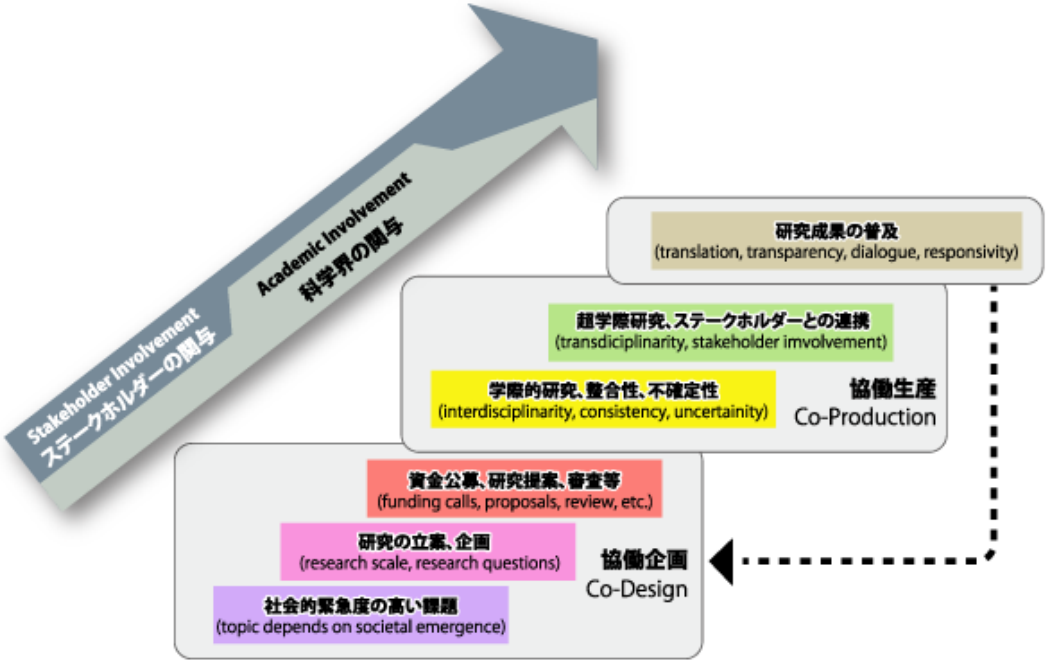


Future Earth (2015-2024) by ICSU



- Sustainability → Future-ability
- Natural, Social and Cultural Sciences → Trans-disciplinary Science → Design Science

"What is the future earth?, future coastal sea?"

- Integrated knowledge scientists, policy makers, stakeholders….