

# Designing SCP from Sufficiency Perspective

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# Background of the study

- ❑ Growing attention of **Sufficiency Approach** – its thinking is explicitly or implicitly reflected in international policy processes: e.g. SDGs, Paris Agreement, G7 Toyama Framework
- ❑ Focus of SCP policy is shifting from end-of-pipe, product based, and technical-fix solution to **systemic changes in lifestyles and provision systems** with socio-physical infrastructure.
- ❑ **Collaboration between qualitative and quantitative analysis** is essential for analyzing systematic change towards SCP.
- ❑ This research is in the 2<sup>nd</sup> year of total 5 years research.

## Sufficiency Approach in this study

An approach contributing to techno-social systems development controlling overall energy and resource consumption through decarbonisation and resource saving (including a shift in needs itself) keeping within resource and environmental constraints such as planetary boundaries, while maintaining or increasing well-being of the society as a whole

# 1. Repacking SCP policies into a framework

## Limitation of Conventional Policy Typology

- Assuming conventional externality such as **pollutions and life cycle impact of product**
- Not covering the **broader sustainability policy areas** (ex. Lifestyles, Sustainable infrastructure)
- Not integrating **ambitions towards long-term/mid-term targets** (ex. decarbonisation)
- Not dynamic enough to analyze **policy mix** for sustainability transition

Strategies &  
action plans

Regulatory  
instruments

Economic  
instruments

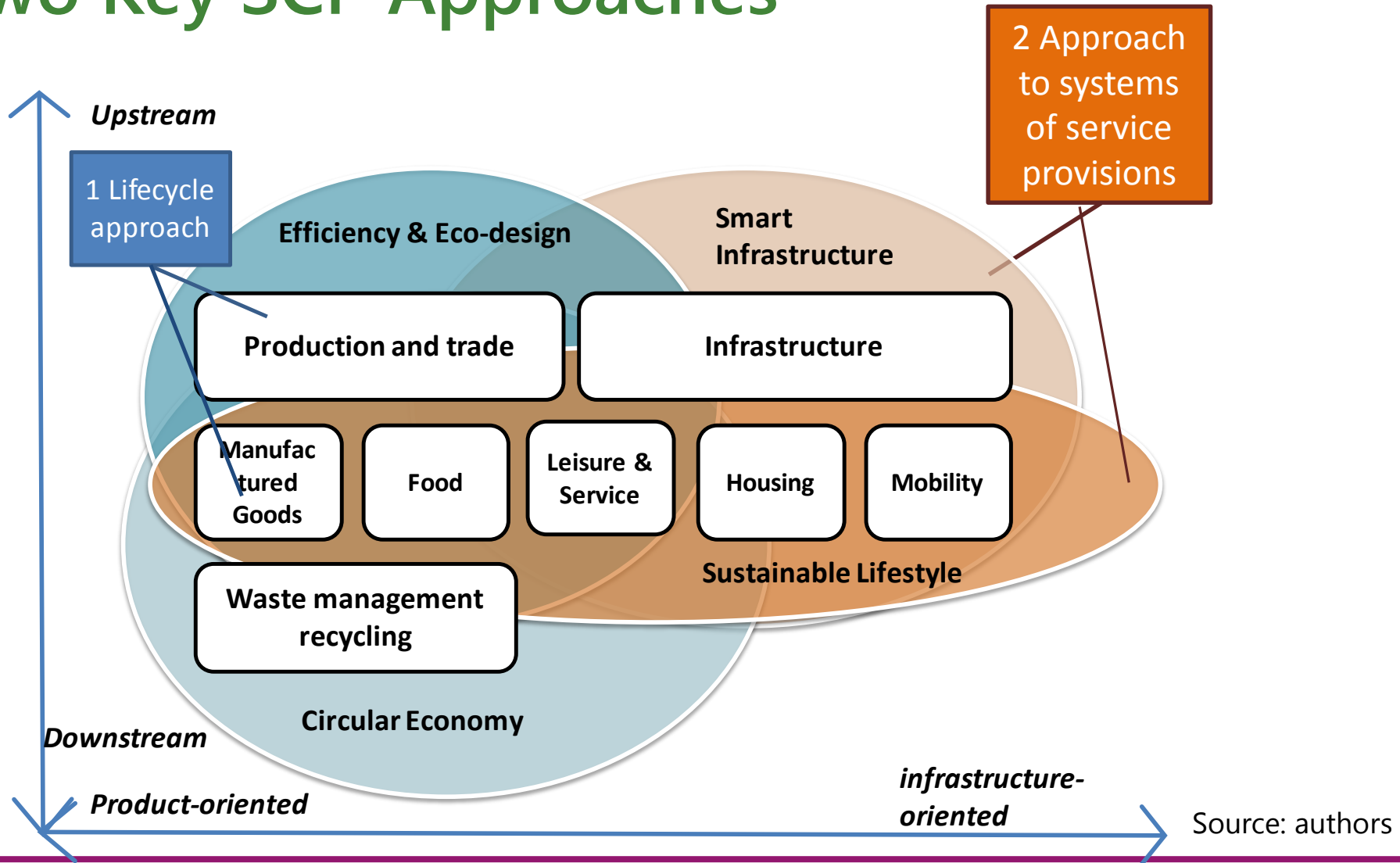
Information  
-based  
instruments

Voluntary  
instruments

Source: Hansen et al 2014

# 1. Repacking SCP policies into a framework

## Two Key SCP Approaches



# 1. Repacking SCP policies into a framework

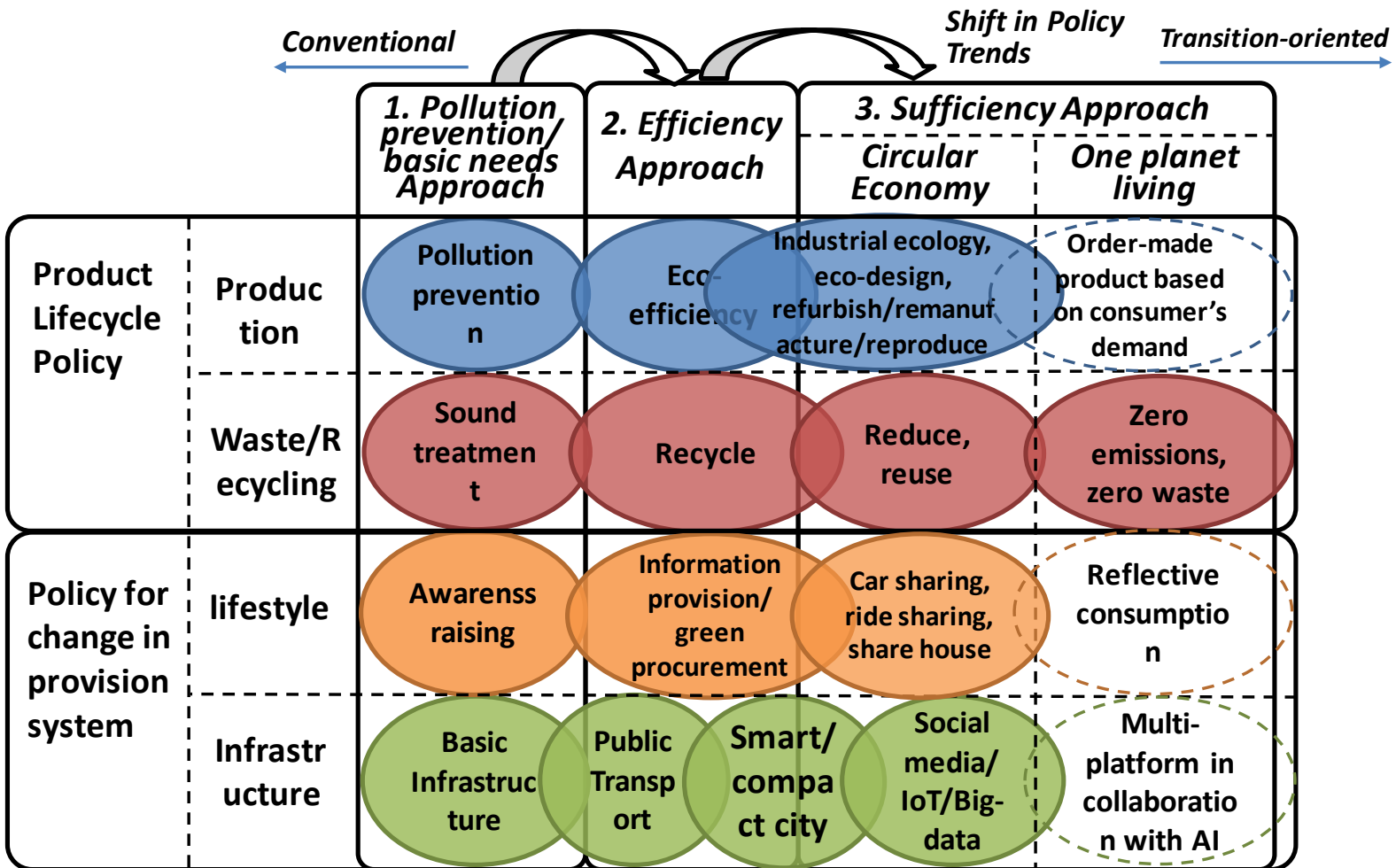
## Sustainability policy discourse (1970s-2010s)

	Pollution prevention	Efficiency	Sufficiency (Responding to rebound effect)	
			Circular & Share	One planet living
	1970s	1990s	2010s	2010s (After SDGs & Paris Agreement)
Major concepts	<b>Pollution prevention</b>	<b>Cleaner production</b> , zero emissions, industrial ecology	<b>Circular economy, sharing economy, Dematerialization</b>	<b>One planet living, Sufficiency, Decarbonization</b>
Key issues	<b>Industrial pollution</b>	<b>Climate change, waste, environmental issues</b> associated with consumption	<b>Well-being, lifestyle</b>	<b>Socio-technical system of service provisions</b>
Environment-economy relationship	Separate, contradictory, confrontational	Compatible, industrialization can be harmonized with environmental conservation	Inclusion of social consideration	Sustainability is a key for next socio-technical innovation
Approaches	Installation of end of pipe technologies	Increasing material and energy efficiency	Innovation, new business model, ICT	Consensus building, change in systems of service provision
Major actors/stakeholders	Government v.s. Industry	Collaboration of government & market agents	Business model, social entrepreneurship	Multi-stakeholder, lifestyle
Attitude of policy	React and cure	Anticipate and prevent	Create and communicate	Long-term goal setting, investment, creating business model for sufficiency business

Source: authors referring to Weale (1992), Jänicke & Weidner (1995), Hajer 1995, Dryzek (1997)

# 1. Repacking SCP policies into a framework

## A new SCP policy framework



## 2. Community Level SCP Initiatives

### Three patterns of community-level SCP initiatives

Pattern

Leading actor

Stakeholder collaboration

Synergies among initiatives

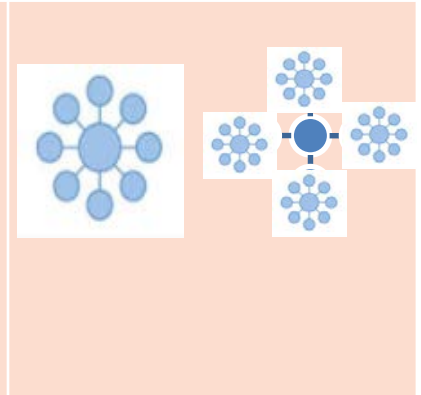
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Pattern 1  
Local collaborative model

Government-led/Active community

Collaborative

Existing

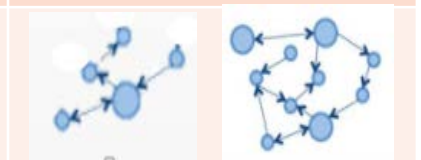


Pattern 2  
Social business model

Citizen-led

Collaborative

Existing-limited

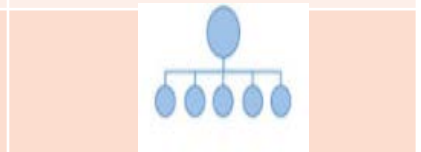


Pattern 3  
Pilot model

Government-led

Limited

Limited



## 2. Community Level SCP Initiatives

### Cases studied

Patterns	Cases
Pattern 1-A Matured Collaboration	<ul style="list-style-type: none"><li>- Higasi-Omi “Nano-hana (Rape Blossms) Project”</li><li>- Oki-town “Local resource circulation of kitchen waste and excrements from household”</li></ul>
Pattern 1-B Collaboration under development	<ul style="list-style-type: none"><li>- Surabaya “Household organic waste composting”</li><li>- Khon Kaen “Organic farming and green market”</li><li>- Khon Kaen “Waste cooking oil collection and recycling”</li></ul>
Pattern 2-B Social business model	<ul style="list-style-type: none"><li>- Surabaya “Mangrove restoration and business development</li><li>- Ogawa-town “Organic farming”</li></ul>
Pattern 2-B Niche social business development in very early stage	<ul style="list-style-type: none"><li>- Da Nang “100% Renewable Energy House”</li><li>- Da Nang “Food waste to Pig feeding”</li><li>- Higashi-Omi “Niche industry of youth”</li><li>- Surabaya “Town walk proposed by youth”</li></ul>
Pattern 3 Pilot model	<ul style="list-style-type: none"><li>- Lao PDR “Development and promotion of energy saving stove”</li><li>- Chaing Rai “Organic farming promotion, idle land use”</li><li>- Chaing Rai “Mechanical sorting of waste”</li></ul>



## 2. Community Level SCP Initiatives

### Observations from successful initiatives

1. Direct connection to **local life issues**
2. Local initiatives should be analyzed through **local utilization and loop-making of “materials”, “human”, “financial”, and “information” resources** rather than life-cycle and supply chain of products
3. **Platform is a key** for the loop-making, strengthening collaboration of stakeholder through information sharing and consensus building.
4. **Collaboration and participation** existing from planning stage. **Reframing** to adjust initiatives to fit to local and emerging needs
5. Once Social **business model** is established, it can expanded in a decentralized manner.
6. Need to embed initiatives related to lifestyle as a **social practice** as a part of daily life
7. **Collaboration with outside stakeholders** or international collaboration can empower the initiative through synergetic effect.

## 2. Community Level SCP Initiatives

### Initial Key Messages

- Transition to SCP at local level may be possible by identifying and nurturing **bottom-up initiatives**.
- It should be linked to **solutions of local life concerns** (such as decreasing population in Japan).
- However, there are **huge gap between global agenda/national agenda** (long-term and mid-term goals) and local concerns. Thus, it is necessary to consider “different way” of upgrading/upscaling.
- **Networking (not upscaling but keeping diversity)** of these different local initiatives may be possible through more localized network of logistics, information, financial resources, and material resources utilizing advanced information technologies.
- It is not efficiency solution by upscaling rather **sufficiency solution to network locally-available resources with external networking**.

## 3. Developing economic modeling to analyze SCP policy

### Approach

- **Focusing on final demands: housing, mobility, household, energy.**
- Scenario for SCP approach: for each final demands, consider “efficiency approach (increasing product-level efficiency such as energy/material efficiency including waste issues)”, “share-approach (increasing uses of unused product/service/infrastructure)”, and “substitution/transition(change from air transport to walk for example)”
- Focusing on demand shift type (+ infrastructure shift for product and service provision) approach
- **Assess ecological footprint, GHG emission, material footprint**

# 3. Developing economic modeling to analyze SCP policy

## Definition of Ecological Footprint (EF)

- ❑ Global Footprint Network (GFN) estimated nationwide ecological footprint (EF), or national footprint account (NFA), of 232 countries. EF is defined as a summation of 5 types of footprints (e.g. carbon footprint, crop land footprint, etc.).
- ❑ GFN defines production-base EF ( $EF_P$ ) and consumption-base EF ( $EF_C$ ) as follows:
  - $EF_P$ : Ecological footprint from production of goods and services *produced in the referent country*.
  - $EF_C$ : Ecological footprint from production of goods and services *consumed in the referent country*.
$$EF_C = EF_P + EF_{\text{Import}} - EF_{\text{Export}}$$
- ❑ We define final demand-base EF ( $EF_{FD}$ ) as follows:
  - $EF_{FD}$ : Ecological footprint throughout life cycle of goods and services *consumed in the referent country*.

# 3. Developing economic modeling to analyze SCP policy

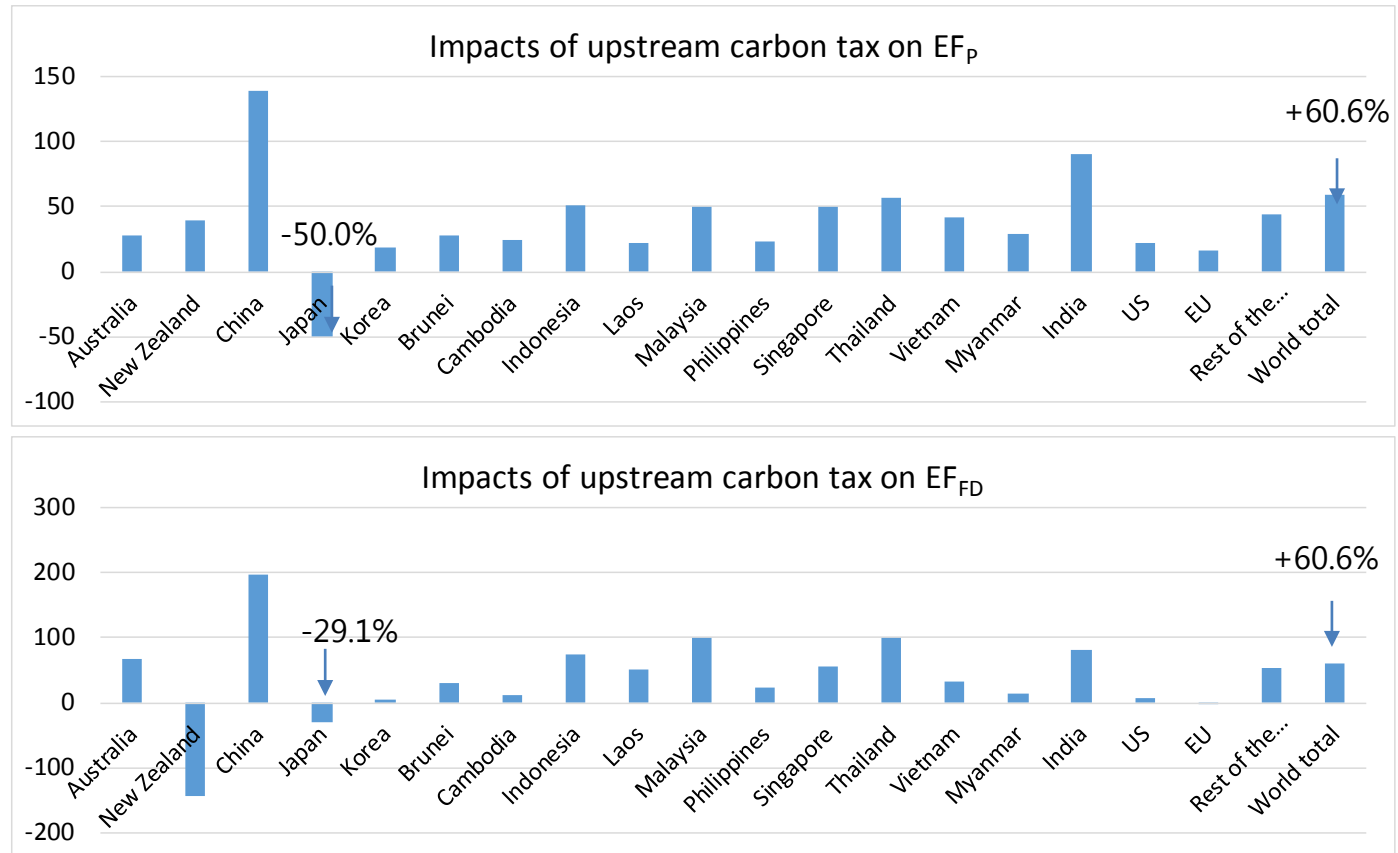
## Policy impact assessment based on sufficiency approach

- ❑ We developed a methodology to evaluate policy impacts on  $EF_{FD}$ , by combining computable general equilibrium model (CGE) and Input–output model (IO), in collaboration with Global Footprint Network.
  - ✓ Policy impact on  $EF_p$  is estimated based on CGE simulation.
    - BAU scenario: How will  $EF_p$  evolve without policy ?
    - Policy scenario: How will  $EF_p$  evolve with policy ?
  - ✓  $EF_{FD}$  is estimated using Input–output model based on the estimated  $EF_p$  by CGE.
- ❑ Policy assessment is NOT based on the comparison with BAU.
  - ✓ Usually decision criterion is whether policy scenario is better than BAU scenario.
  - ✓ Our decision criterion is whether policy can achieve sufficiency conditions in terms of quality of life given that EF reduction target is achieved.
  - ✓ Setting sufficiency conditions is a challenging task. A preliminary attempt is to set non–declining conditions for GDP or welfare level based on the base year level.

# 3. Developing economic modeling to analyze SCP policy

## Impact of upstream carbon tax on ecological footprint (change from the base year)

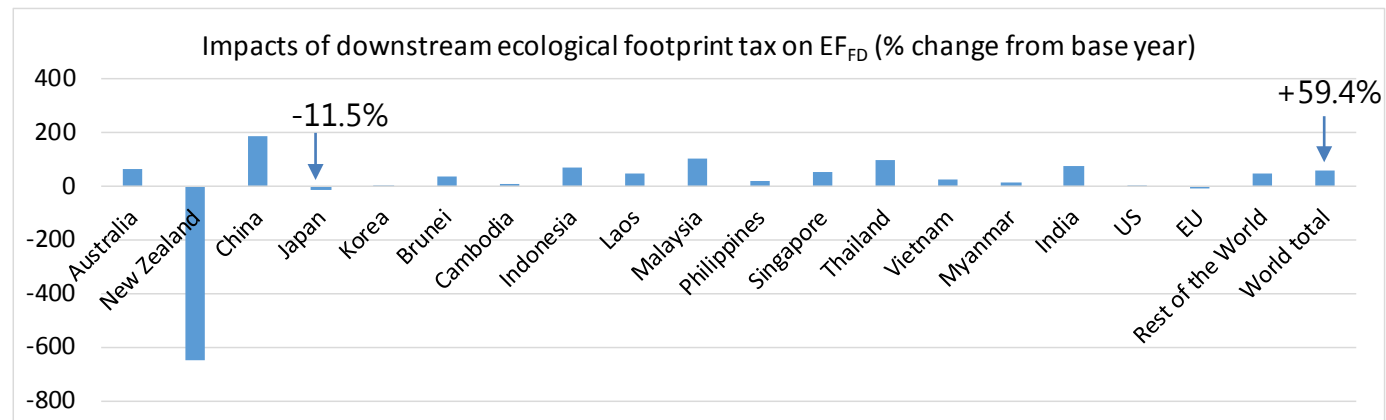
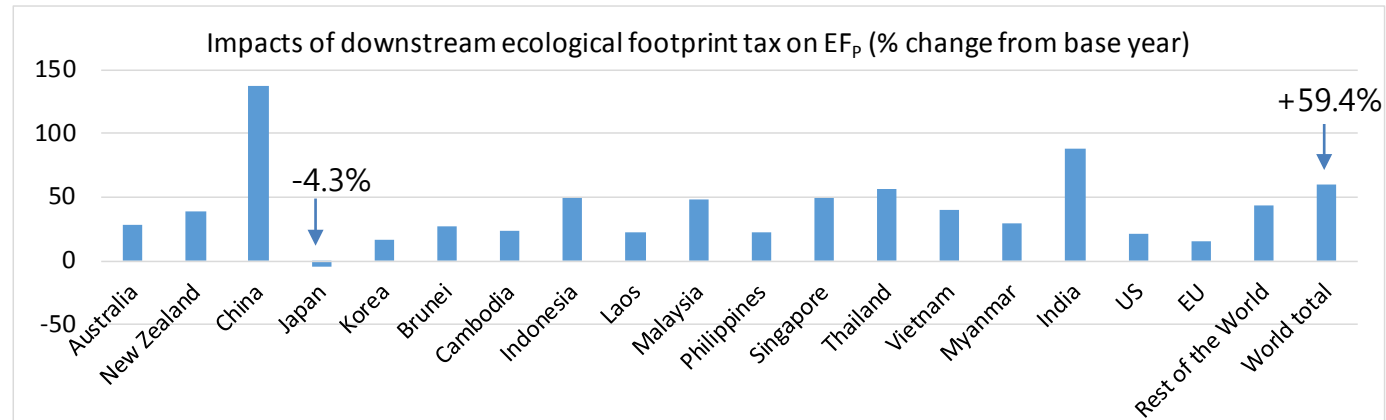
- Carbon tax rate is gradually introduced from 2017 (USD115/t-CO<sub>2</sub>) and increased by 25% a year until 2020 (full rate at USD460/t-CO<sub>2</sub> after 2020). Tax revenue in 2030 reaches around USD170 billion.
- Japanese EF<sub>FD</sub> in 2030 is 29% less than the base year.
- Japanese real GDP increases 18.8% from the base year (from 2030 BAU, 7% reduction)



# 3. Developing economic modeling to analyze SCP policy

## Impacts of downstream ecological footprint (EF) tax on EF (change from the base year)

- Tax rate is set at USD7.7/gha, such that the tax revenue in 2030 is similar to the carbon tax case (i.e. USD170 billion)
- Japanese  $EF_p$  (production EF) reduces 4.3%, while Japanese  $EF_{FD}$  reduces 11.5% in 2030. The magnitude of reduction is smaller than upstream carbon tax, but the relativity between  $EF_p$  and  $EF_{FD}$  reverses.
- Japanese real GDP increases 31.4% from the base year (from 2030 BAU, **2.7% increase**)



# 4. Developing indicators to address sufficiency approach

The following section is based on Tsurumi, T., Kagohashi, K., Managi, S. (2017) "Examining Consumption and Subjective Happiness: Suggestion to Asia" presented at 2017 Conference of SEEPS, Kochi, Japan.



# 4. Developing indicators to address sufficiency approach

## Research question

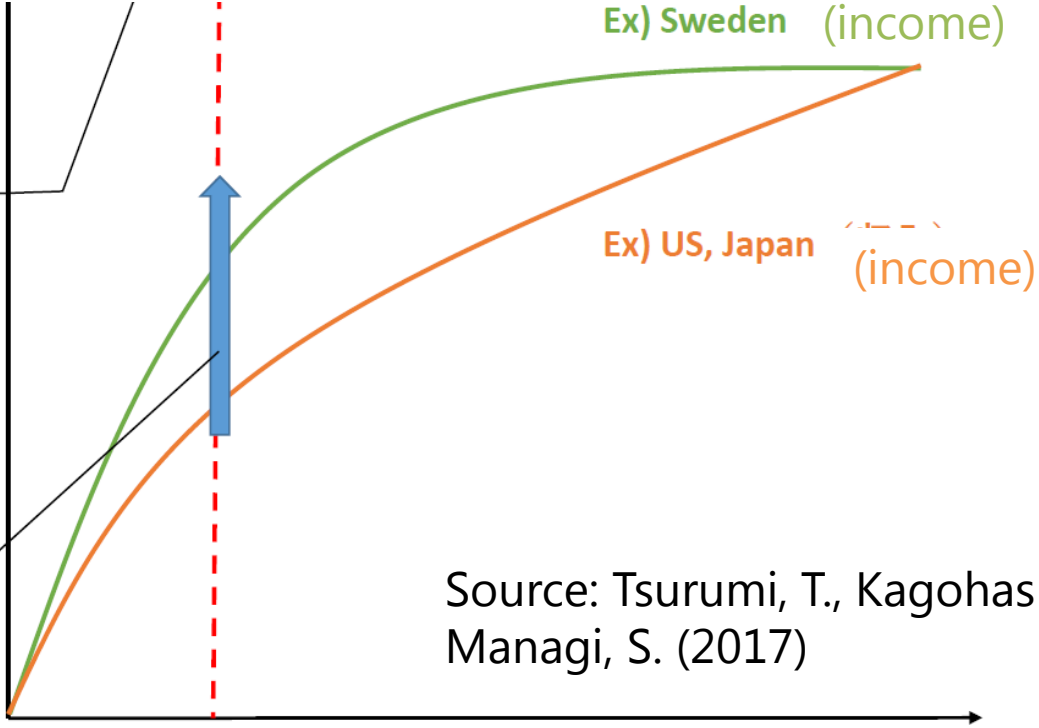
The following section is based on Tsurumi, T., Kagohashi, K., Managi, S. (2017) "Examining Consumption and Subjective Happiness: Suggestion to Asia" presented at 2017 Conference of SEEPS, Kochi, Japan.

Limiting consumption based on planetary boundary

Happiness

Will resource consumption constrains decrease happiness?

What kind of consumption style can increase happiness?



Source: Tsurumi, T., Kagohashi, K., Managi, S. (2017)

消費の研究はNoll and Weick (2015)程度  
(ドイツ (生活満足度) : US, Japan型)

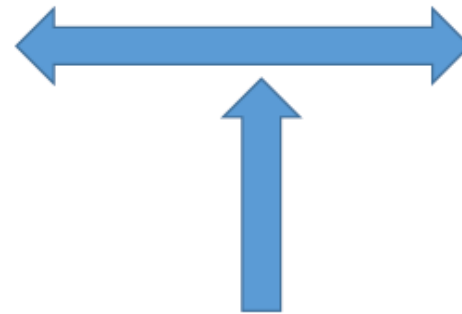
Income / consumption

## 4. Developing indicators to address sufficiency approach

# Indices concerning well-being

### Life evaluation

Cantril ladder  
Life satisfaction  
Eudaimonia



### Emotional well-being

Emotional experiences

Subjective happiness  
Intermediate

Source: Tsurumi, T., Kagohashi, K.,  
Managi, S. (2017)

Questionnaire Survey in Japan (10 thousands samples): **Amount of Goods Consumption (price-based)**

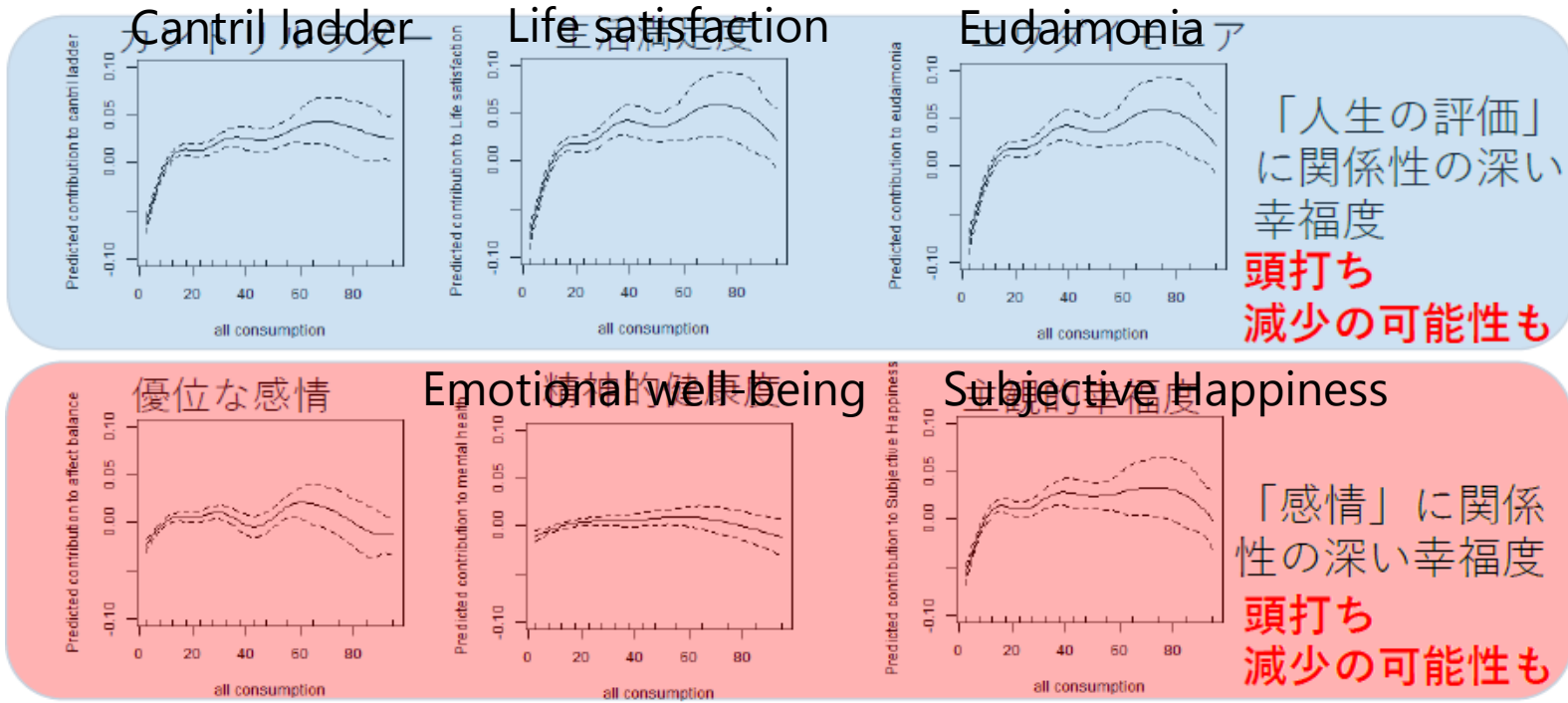


図2 全サンプル（日本）におけるモノ消費と各種主観的福利指標の関係性

Generalized Additive Model (セミパラメトリック回帰) (N=9,635)

横軸：**モノ消費額**（月額（単位：千円））

コントロール変数：**コト消費額**、**資産1**（土地・家（評価額））、**資産2**（車（評価額））、年齢、性別、婚姻状況、子どもの有無、世帯人数、孫の有無、主観的健康、学歴、性格（5大因子）

※消費額上位5%カット（信頼区間が広いため）

$$SWB_i^k = c_1 + f(mono_i) + \sum_j \alpha_j X_{ij} + \varepsilon$$

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Source: Tsurumi, T., Kagohashi, K., Managi, S. (2017)

Questionnaire Survey in Japan (10 thousands samples): **Amount of Service Consumption (price-based)**

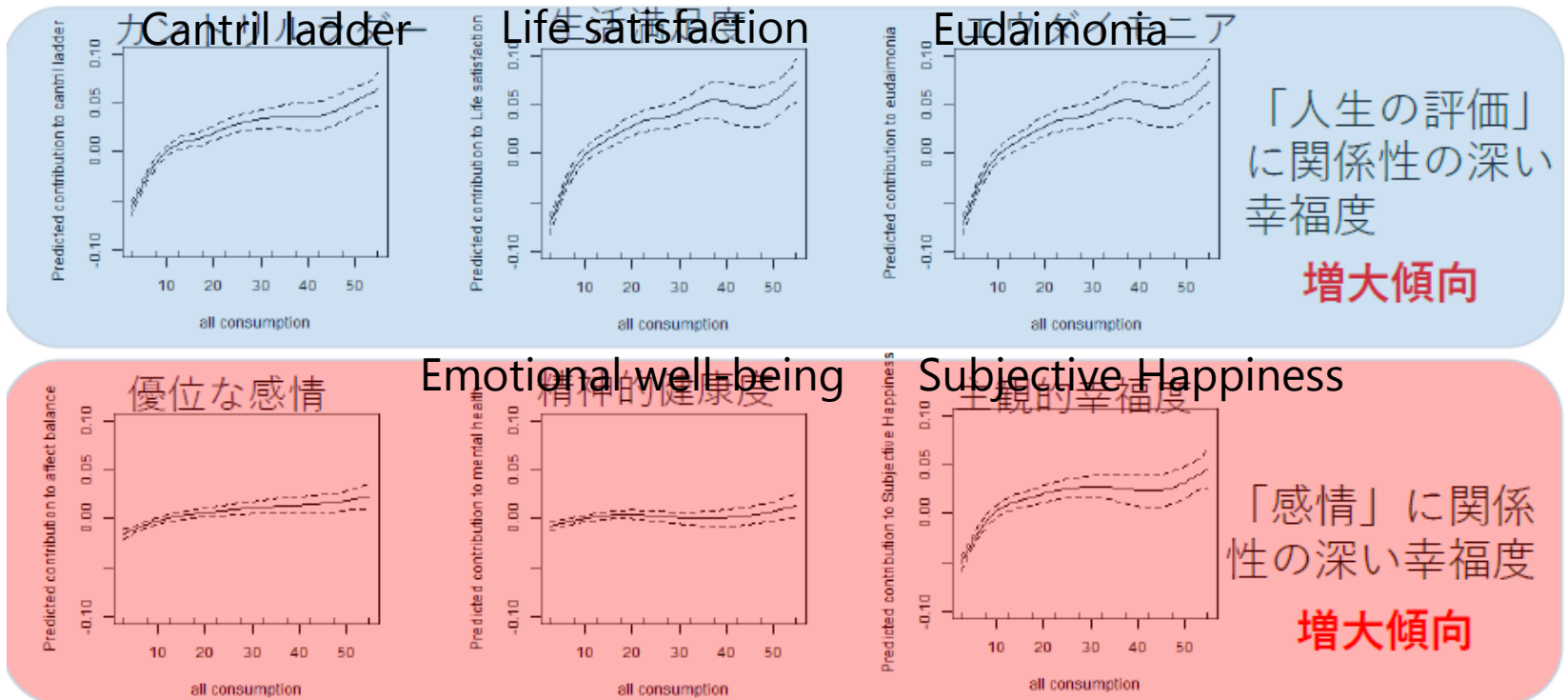


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10

Source: Tsurumi, T., Kagohashi, K., Managi, S. (2017)

## 5. Summary

- It is necessary to develop **a new framework for SCP policy design** in the era of Planetary Boundaries (or SDGs and Paris Agreement). That should be based on the idea of **sufficiency approach** in contrast to efficiency approach.
- The case study suggests that SCP initiatives at local level should not be approached from upscaling/replication approach rather through **networking of diverse local initiatives** through connecting logistics, information, financial resources, and material resources. Advanced information technologies are available now to support such approach.
- We are **currently developing economic modeling for macro-policy analysis to reflect resource constraints**.
- Also, to enable **new evaluation of development under resource constraints**, we are now analyzing the relationship between consumption and well-being.

# Acknowledgement

This research was supported by the Environment Research and Technology Development Fund (S-16) of the Environmental Restoration and Conservation Agency of Japan

**“Policy Design and Evaluation to Ensure Sustainable Consumption and Production Patterns in Asian Region”**



## PECoP-Asia

Policy Design and Evaluation to Ensure Sustainable  
Consumption and Production Patterns in Asian Region

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