Measuring sustainability:
The overall impacts, synergies and trade-offs

Local Land Use Scenarios and their Ecosystem Service Assessments

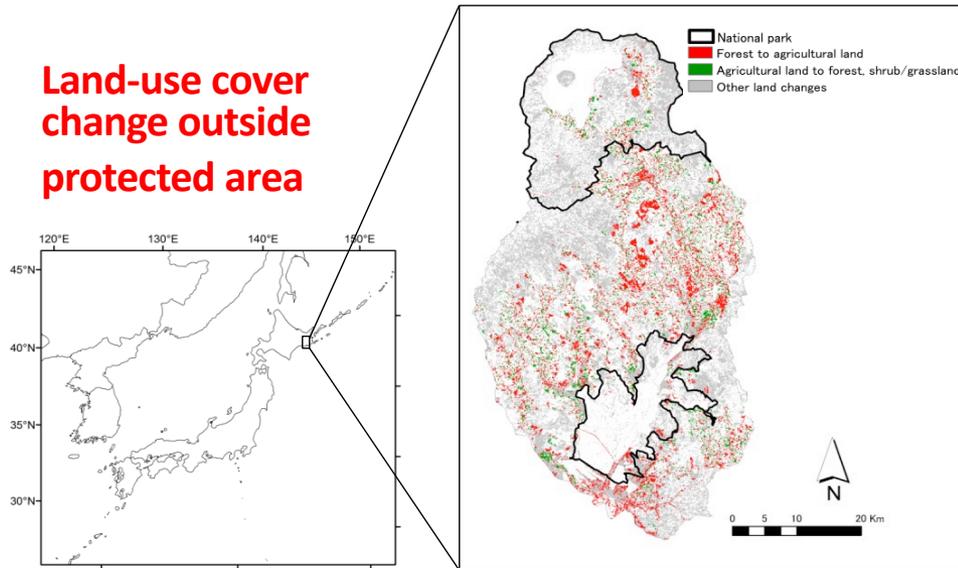## Head of GCP Tsukuba International Office

Yoshiki Yamagata

Center for Global Environmental Research,
National Institute for Environmental Studies, Japan

Scenario analysis：Kushiro watershed

Land-use cover change outside protected area

Shoyama K., Yamagata Y., (2014) Predicting land-use change for biodiversity conservation and climate-change mitigation and its effect on ecosystem services in a watershed in northern Japan. Ecosystem services

Fig. 1. Map of the Kushiro watershed showing land-use changes that occurred between 1977 and 2011

Scenario development

BAU(Trend)	Biodiversity conservation	Climate change mitigation
Agriculture	**+ Tourism**	**+Bioenergy**

Social aspect: Public preference on scenarios
From qualitative approach to quantitative approach

	OPTION A	OPTION B	BASE LINE
HABITAT QUALITY	−10%	NO CHANGE	+20%
	LESS WILDLIFE	DECREASING TREND	MAINTAIN WILDLIFE
	EX) More 1084 sp. in Red list	EX)1084 sp. in Red list	EX) Less 1084 sp. in Red list
CARBON SEQUESTRATION	−3%	NO CHANGE	+5%
	LESS CARBON SEQUESTRATION	MAINTAIN CARBON SEQUESTRATION	MORE CARBON SEQUESTRATION
	EX) Offset emissions from less than 300 thousand household	EX) Offset emissions from 300 thousand household	EX) Offset emissions from more than 300 thousand household
TIMBER PRODUCTION	−40%	NO CHANGE	+50%
	LESS TIMBER PRODUCTION	MAINTAIN TIMBER PRODUCTION	MORE TIMBER PRODUCTION
	EX) Annual supply: 2,100,000 m³	EX)Annual supply: 3,600,000 m³	EX)A
WATER PROVISION	−5%	NO CHANGE	
	LESS WATER	MAINTAIN WATER	
	EX) Annual water resources: 90.2 million m³/person	EX) Annual water resources: 95 million m³/ person	EX)
YEARS	MEASURES HAS AN EFFECT AFTER 10/50/100 Y		
COST PER YEARS (FOR 10YEARS)	500/1000/2000/5000 JPY		

- Web-based survey
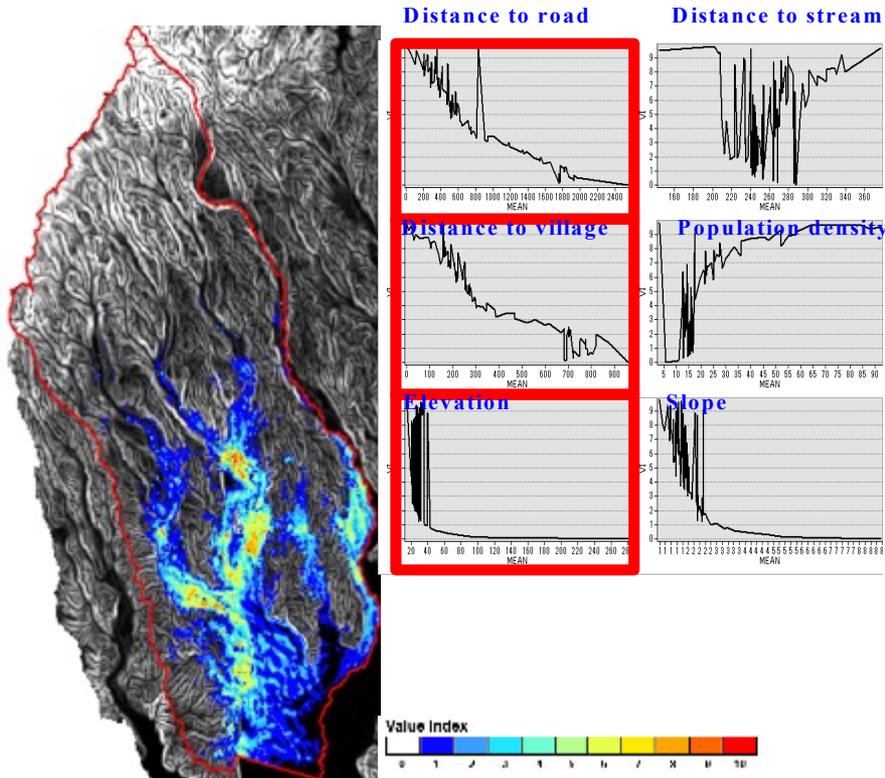- 3848 respondents
  throughout Japan

+

Stakeholder meeting in Tsurui village
(2013 September)

Shoyama K., Managi S., Yamagata Y. (2013) Public preferences for biodiversity conservation and climate-change mitigation: a choice experiment using ecosystem services indicators. Land Use Policy 34: 282-293
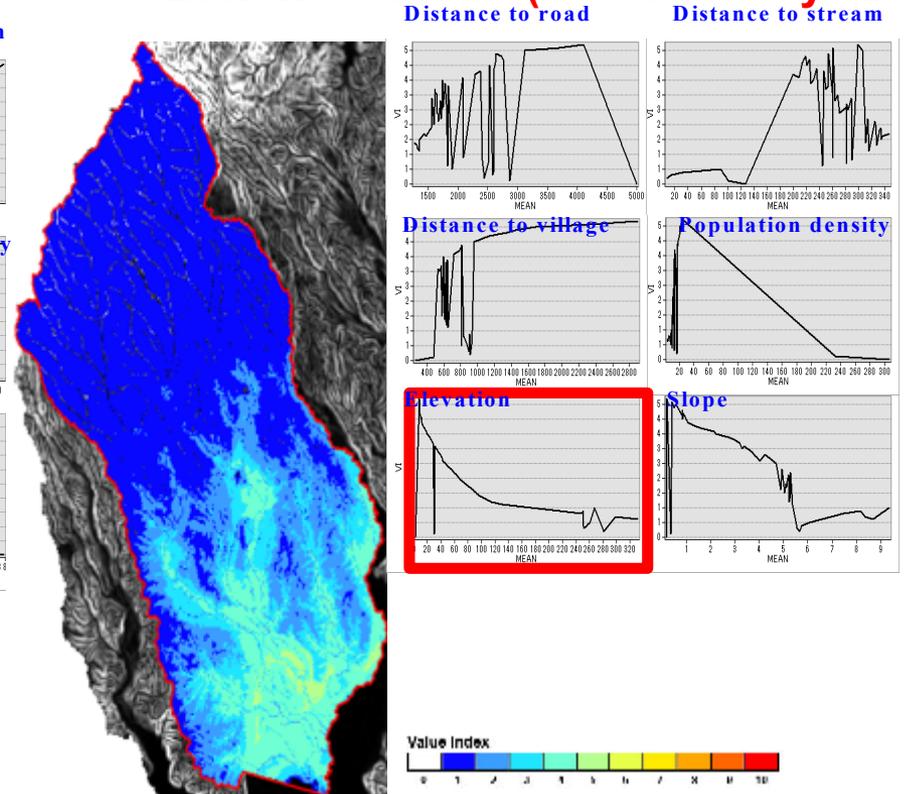
Social aspect: Public preference on scenarios
From qualitative approach to quantitative approach

A. Old-residents (over 30-years)

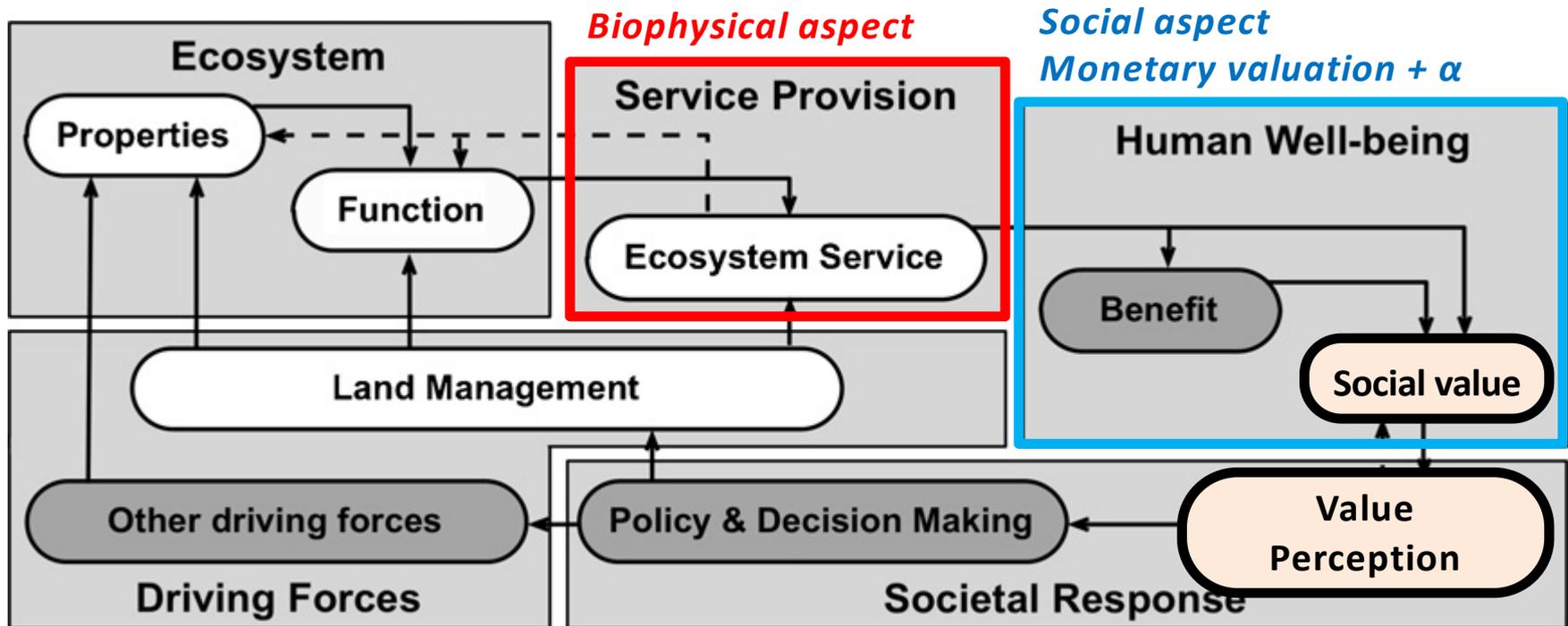## B. New-residents (less than 30-years)

- Mail-based survey
- 585 respondents

In Tsurui village and Shibetya town

Yamagata Y. and Shoyama K. (2014) Can We Make Use of Abandoned Land for Carbon Management and Ecosystem Restoration? AGU Fall meeting.

Linking Biodiversity, Ecosystem Services provision and Human Well-being

(A.P.E. van Oudenhoven et al. 2012)

[Wikipedia]
Well-being or **welfare** is a general term for the condition of an individual or group, for example their social, economic, psychological, spiritual or medical state; high well-being means that, in some sense, the individual or group's experience is positive, while low well-being is associated with negative happenings.

[Oxford English Dictionary] The state of being comfortable, healthy, or happy