

Japan's Experience in Providing Positive Incentives

Economic Valuation of Biodiversity, Ecosystems and
Ecosystem Services, and Policy Measures

Kentaro Yoshida

Professor, Nagasaki University, Japan

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Case Studies on Valuation & Positive Incentives

- Valuation and incentive measures at **national level**
 - The total economic value of agriculture, forestry and fisheries, and the process incorporating into **the basic law and direct payments program for sustainable use**
- Valuation and incentive measures at **regional and local level**
 - Riverhead forests and watershed conservation by **local forest environmental tax**
- **TEEB cases** on protected areas and payment for ecosystem services
 - Oku-Aizu forest ecosystem reserve, **protected area**
 - Kabukuri-numa, Ramsar-site wetland and surrounding paddy fields
 - **PES and labeling, trust of abandoned paddy and reconversion to wetland**
- On-going and future research activities and policy needs

TEEB's Tiered Approach

- Putting the tiered approach into practice
 - Valuation for policy & decision making
- **Recognizing values**
 - Identifying issues and assessing services
 - The full range of ES affected and stakeholders involved
- **Demonstrating values**
 - Using appropriate methods. Linkages over scale and time, e.g., local to global, current vs. future use, upstream to downstream, urban to local
- **Capturing values** (and finding solutions)
 - To overcome undervaluation, using economically informed policy instruments

Japan's experience at national level

**Recognizing, Demonstrating, and Capturing
Ecosystem Services from Agriculture,
Forestry and Fisheries**

Economic valuation and agri-environmental policy

- ES from agriculture, e.g., flood regulation, water supply and purification, cultural landscape, have been drawing attentions as important benefits for human well-being since the early 1970s
- Nationwide studies of economic valuation of ES from agriculture was one of the popular approaches to make people recognize their values
- Estimating practices by replacement cost and CV was one of the major driving forces to make national agri-environmental policy measures, and then positive incentives for **sustainable agriculture** were provided
 - The Basic Law on Food, Agriculture and Rural Areas in 1999
 - Direct payments for paddy- and upland-field farming in hilly and mountainous areas in 2001 (808,467ha)
 - Direct payments for flat farming areas in 2007 (1,425,000ha)
 - Total area of farmland: 4,609,000ha (2009)

Economic Valuation of ES from Agriculture and Rural Areas

Year	Type of goods	Methods	Estimated value/year (billion yen)
1982	Farmland	Replacement cost	12,170
1991	Rice paddy field	Replacement cost	4,704
1991	a) Rice paddy field b) Upland field c) Pasture	Hedonic pricing	a) 11,867 b) 14,215 c) 4,492
1995	a) Rice paddy field b) Upland field	Replacement cost	a) 4,628 b) 2,026
1996	Agriculture & agri. villages	Contingent valuation (Willingness to pay)	4,107
1998	Agriculture & agri. villages in hilly & mountain	Replacement cost	3,032
1998	Agriculture & rural areas in hilly & mountain	Contingent valuation (Willingness to pay)	3,248
2001	Agricultural & agri. villages	Replacement cost	8,223

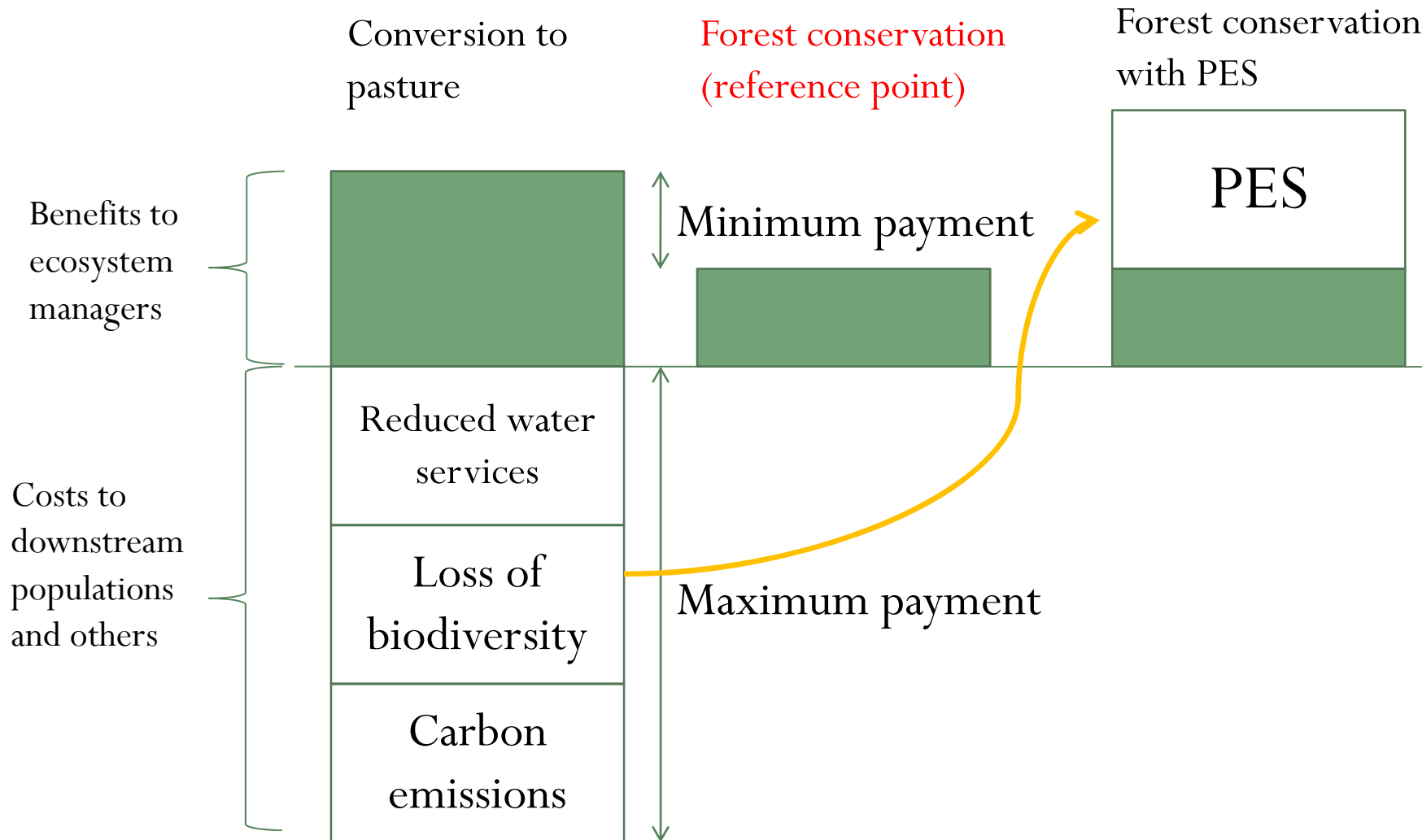
Economic Valuation of ES from Forests

- ES from Forests : 70,264 billion yen (2001)
 - CO₂ absorption, erosion and landslide prevention, flood mitigation, fostering water resources, water purification, recreation & amenity
 - Replacement cost method have been used for economic valuation of ES from Japan's forests since 1972
- The valuation results led to various forest conservation measures and activities, e.g. **conservation forest, protected forest, forest ecosystem reserve, and direct payment program**
- “**Conservation forest**” is particularly important for providing public benefits, such as securing water resource and preventing disasters
 - The total area of **conservation forest** is 48% of total forest area, **32% of total land area in Japan**

Economic Valuation of Marine Ecosystems and ES from Fisheries

- ES from fishery & fishing villages: 10,742 billion yen (2003)
 - Material cycle promotion, ecosystem conservation, life & property protection, disaster prevention & rescue, relaxation & education, etc.
- Economic valuation and implementation of direct payment programs in agriculture and forestry, stimulated Fishery Agencies and Japan fisheries cooperatives
- They also started direct payments for communities in fishing villages of solitary islands. For this policy-making purpose, the value of ES from fishery & fishing villages was estimated by replacement cost method

Payment for Ecosystem Services (Engel et al. 2008)





Japan's experience at regional and local level

**Valuation and policy, positive incentives to
conserve biodiversity and ecosystems**

Estimated economic values of biodiversity/ecosystem services in Japan (Yoshida & Hayashi)

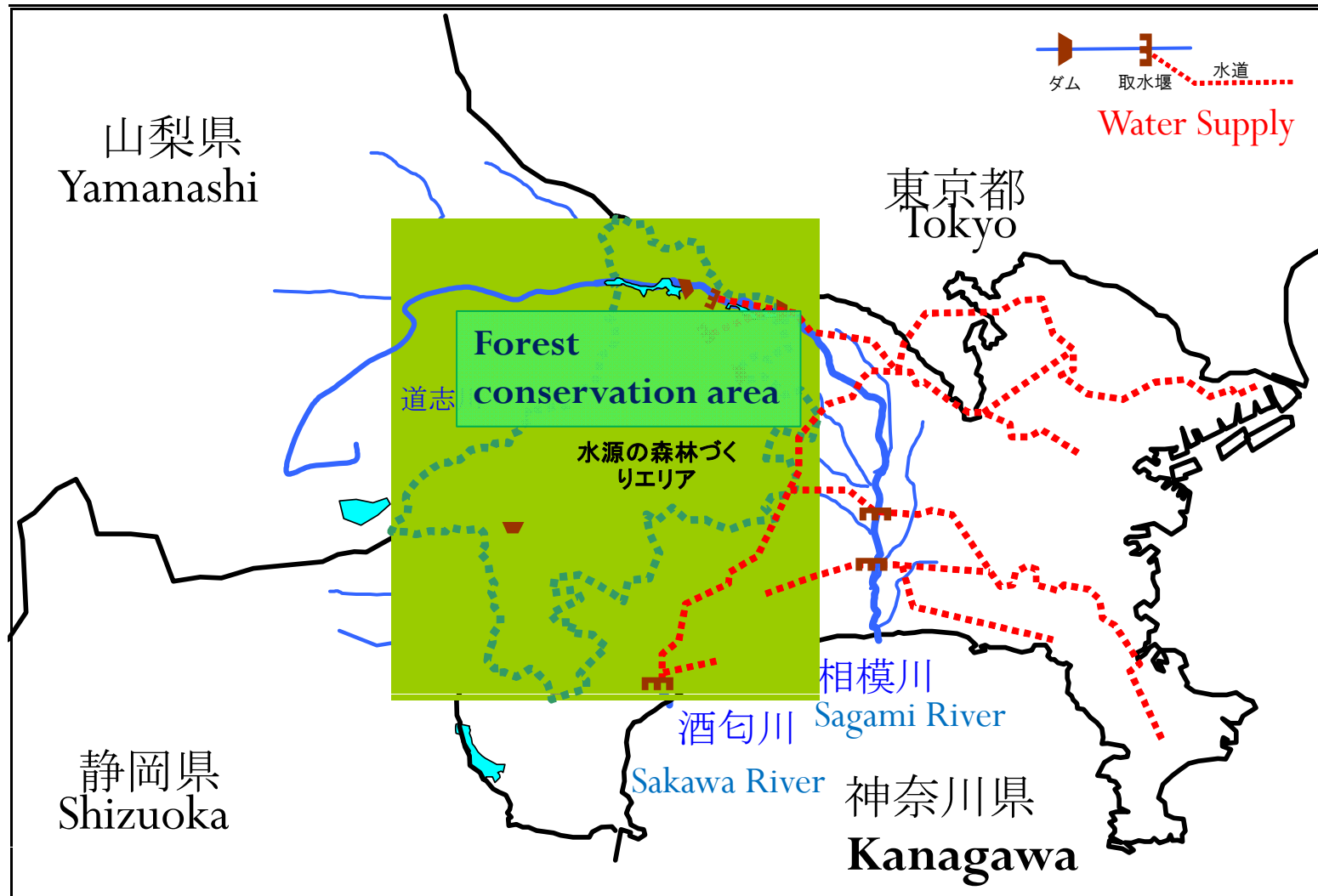
Valuation subject	Value of benefits	Valuation method	Author (year)
Water source area, water quality in forest and dams	306-397 yen per household/month 163-259 yen per household/month	CVM Conjoint analysis	Yoshida (2003)
Recreational benefits in satoyama, transfer of benefits	1,272-1,617 yen per household/year 293-459 yen per capita/year	CVM	Fujimoto et al. (2006)
Groundwater recharge from rice paddies, PES	1,045-2,287 yen per household/year	CVM	Yamane et al. (2003)
Forest biodiversity conservation, zoning	767 yen/%/year	Conjoint analysis	Kuriyama et al. (2006)
Landscape and ecosystem of Yaku Island, world heritage	1,566-5,655 yen per capita	CVM	Kuriyama et al. (1999)
Recreational benefits of forest parks	2,633 yen per capita	Travel cost method	Nakatani & Demura (1997)
Public functions of forests (bird species)	29 yen per species household/year	Conjoint analysis	Tsuge (2001)
Ecosystem loss induced by exotic species	1,850 yen per household/year	CVM	Nishizawa et al. (2006)
Wetland restoration of Kushiro Wetland	N.A.	Conjoint analysis	Ito et al. (2009)
Restoration of rare lake species	1,600-6,800 yen per capita/year	Conjoint analysis	Mitani et al. (2008)
Introduction of endemic species to forest parks	61 yen per household/year	Conjoint analysis	Yoshida & Nakanishi (2009)
Forest environment taxes	2,209-2,817 yen per household/year	CVM, conjoint analysis	Yoshida & Demura (2006)
Restoration of lake environments by environment-friendly agricultural methods	752-1,789 yen per household/year	CVM, conjoint analysis	Yabe & Yoshida (2006)

Forest Conservation Tax

- **Local environmental tax**
 - Payments for Ecosystem Services (PES) based on Beneficiaries Pay Principle
 - Raising a fund for forest conservation to maintain stable water supply, etc.
 - Operated by a prefecture government (30/47 prefectures)
 - Kochi Prefecture implemented in 2002, and imposed 500 yen/taxpayer
 - Additional water charge vs. new local tax
- **Background**
 - Needs for better management of abandoned afforested areas
 - Loss of ecosystem services, e.g., regulating & provisioning services
 - Budgetary constraint of prefecture government
- **A case study of Kanagawa Prefecture**
 - The result of a willingness-to-pay survey supported decision-making process about the tax rate/amount
 - Contingent valuation method and conjoint analysis were used to elicit WTP

Catchment Basin in Kanagawa Prefecture

流域全体図(相模川・酒匂川)



Local Environmental Tax of Kanagawa Prefecture

- Purpose: conservation and management of the source of rivers for better drinking water supply
- Prefectural Government of Kanagawa and Yoshida (2003) conducted WTP survey to assess an appropriate tax amount/rate
- Median WTP: 3,600 yen/year/person
- Kanagawa Prefecture finally decided to collect 950 yen (/year/taxpayer) in average
 - The amount varies with one's income
 - An estimated result of a WTP function revealed positive income elasticity. Higher income, higher payment
- In 2008, total amount of tax collected was 4 billion yen

TEEB Cases on Economic Valuation and PA in Japan

A) Conservation of Oku-Aizu forest ecosystem reserve

- Choice experiments, TEEBD2 case study
- Protection of forest ecosystems and sustainable use by local
- The largest forest ecosystem reserve

B) Kabukuri-numa and the surrounding rice paddies, Ramsar site

- Contingent valuation and choice experiments
- Collective action of farmers, NGOs and governments



Economic Valuation of Ecosystem Reserves

Authors: Kentaro Yoshida

Short title: Valuing forests for different protection strategies, Japan

Key Message: The total economic value for the Oku-Aizu forest ecosystem reserve shows strong willingness to pay for the conservation of the forest.

Suggested citation: TEEBcase by K. Yoshida (2010) Valuing forests for different protection strategies, Japan, available at: TEEBweb.org



An explanatory meeting with local residents, Tadami
Courtesy: Kentaro Yoshida



Picki
Courtesy: Kentaro Yoshida

1. What is the problem?

Oku-Aizu is the name of region including four small towns a region. It is located in the Southwest of Fukushima Prefecture. The total area of Oku-Aizu forest ecosystem reserve is 83,892 ha. There are 29 forest ecosystem reserves in Japan, including world heritage sites.



Restoring agricultural wetlands benefits both farmers and geese

Author: Hiroshi Nishimiya

Short title: Flooding rice paddies for migrating birds, Japan

Key Message: The Kabukuri-numa wetlands have been restored as agricultural wetlands and the goose population has increased because of paddy field flooding in the winter.

Suggested citation: TEEBcase by Hiroshi Nishimiya (2010) Flooding rice paddies for migrating birds, Japan, available at: TEEBweb.org.



Picture 1: Geese in Kabukuri-numa
Courtesy: Kiichiro Hayashi

What is the problem?

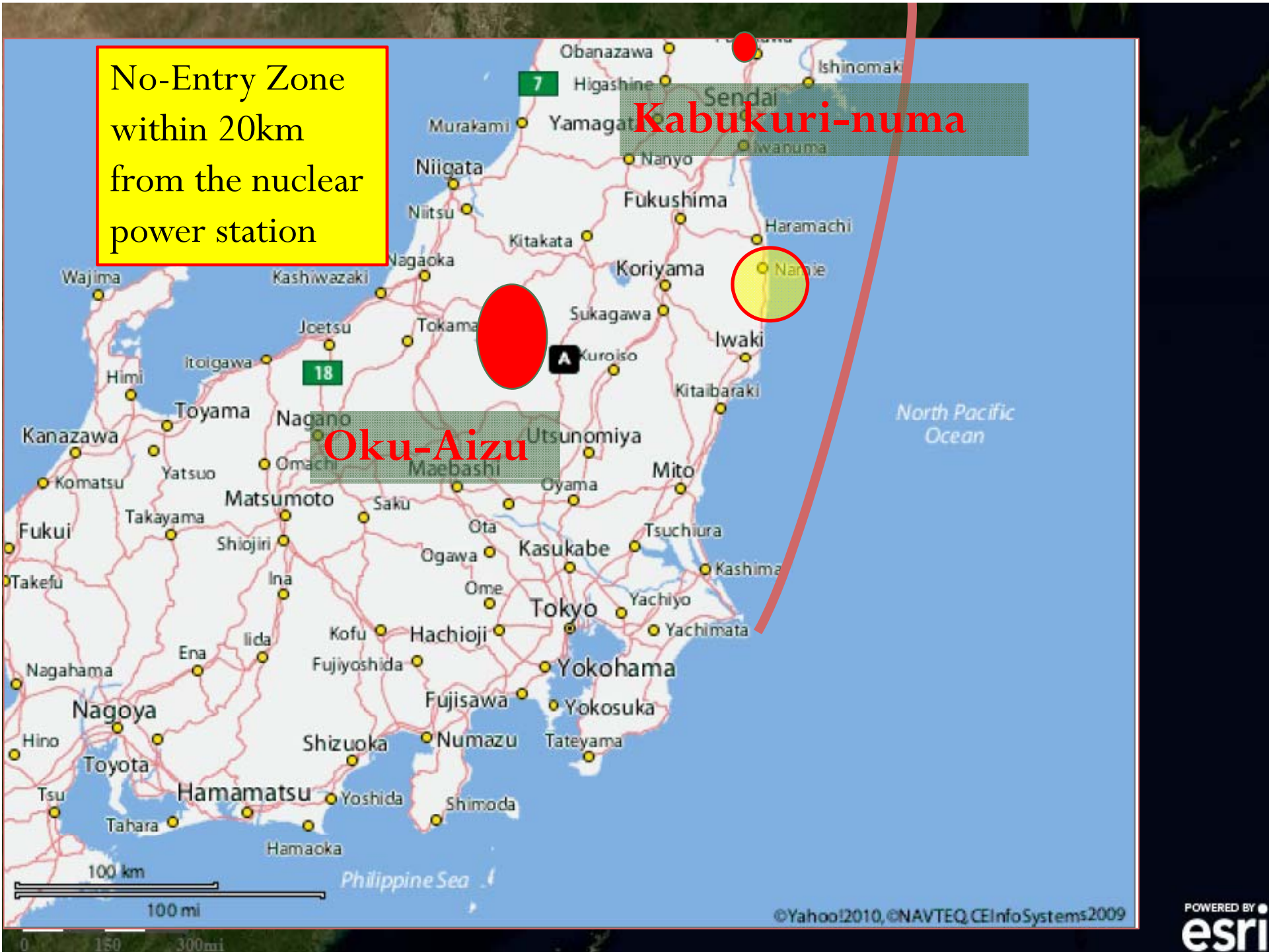
Since the beginning of the 20th century, most Japanese wetlands have been converted to rice paddies (Kurechi, 2010). Historically, this change involved converting wetlands to wet paddy farms. However, over time, dry paddies have gradually become the norm – due to the influence of new civil engineering technologies. Recently, however, restoration of wetland habitat through wet-paddy rice farming is occurring. In the Kabukuri-numa wetland and surrounding paddies in the Miyagi prefecture in the northern part of the country, 423ha of paddies have been registered as protected wetlands under the Ramsar Convention in 2005.

Modern rice production methods that keep rice paddies dry during winter (in pursuit of higher productivity and efficiency), seriously impact many wetland-dependent species (Kurechi, 2010).¹ Restoration, therefore, involves flooding rice paddies during winter. In this particular

No-Entry Zone
within 20km
from the nuclear
power station

Kabukuri-numa

Oku-Aizu





Economic Valuation of Oku-Aizu Forest Reserve

ons, each with differing levels of ecosystem services and differing costs. Each set has three or more alternatives, one of which has a known monetary value. Some sets may have non-monetary values (social, cultural, spiritual). Respondents **choose between different choice sets**. Implicitly, as they choose, they make **trade-offs** between the attributes

PARTICIPATORY VALUATION

Participatory valuation is often carried out after a focus group exercise where stakeholders voice concerns and table issues to **infer values indirectly**. For instance, participants may be asked to use counters

Box 3.5 Oku-Aizu Forest Ecosystem Reserve in Japan

There are 29 forest ecosystem reserves in Japan, including world heritage sites designated by the Forestry Agency. The Oku-Aizu forest ecosystem reserve is the largest. However, in comparison with other forest ecosystem reserves in Japan, its buffer zone is larger to allow for the use of forest ecosystem services by locals (mushroom and wild plant harvesting, for example).

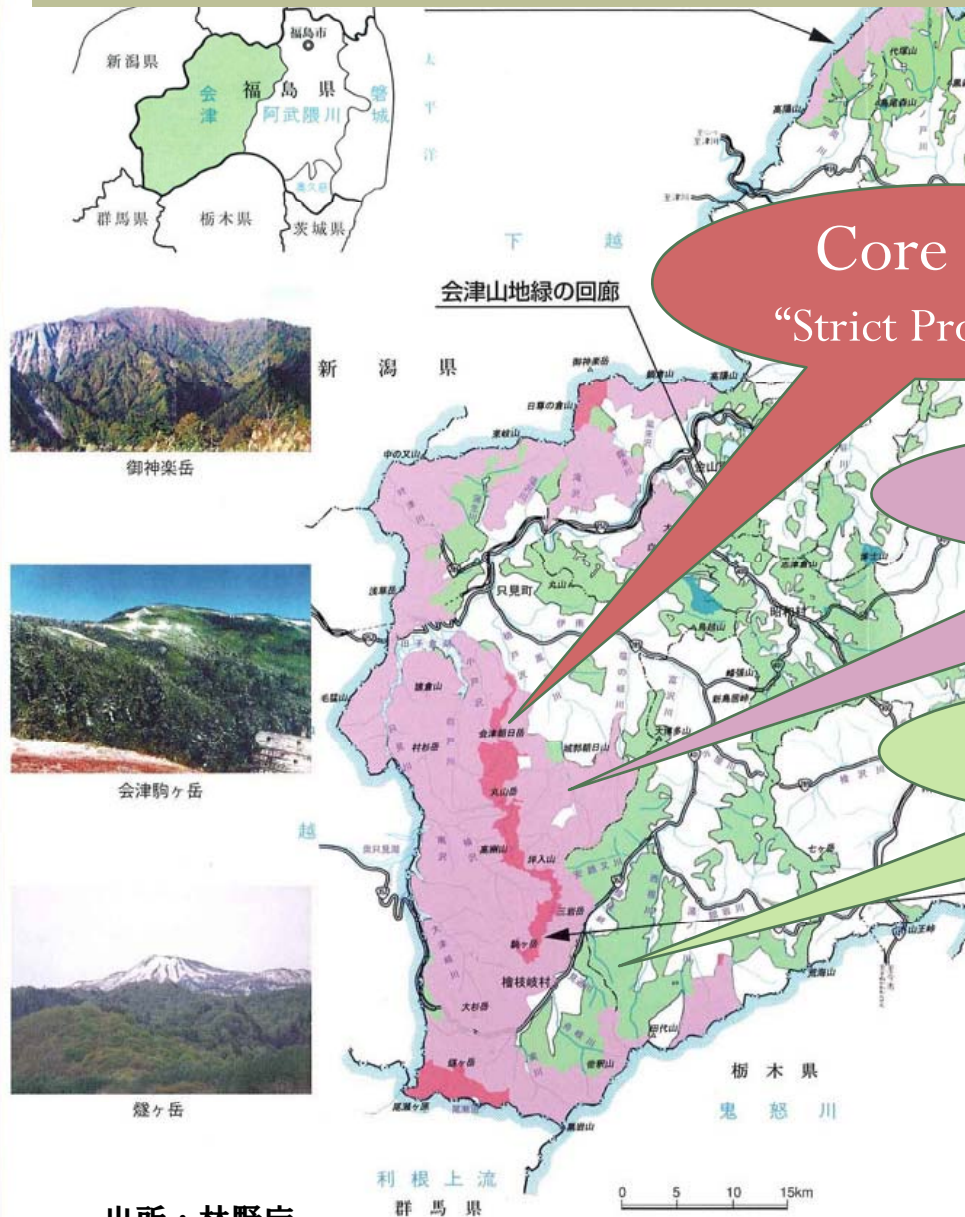
Choice experiments were used to estimate the economic value of Oku-Aizu forest ecosystem reserve. A choice set consisted of three profiles (hypothetical protected area) and one status-quo scenario (keeping things as they are). Each profile had four area attributes and one price attribute.

The data were collected through two identical surveys – a regional mail survey and a nationwide internet survey. After analysis, the results showed a higher willingness-to-pay (US\$ 89/year) for stricter protection of the ecosystem as compared with maintaining the status quo (US\$ 12/year).

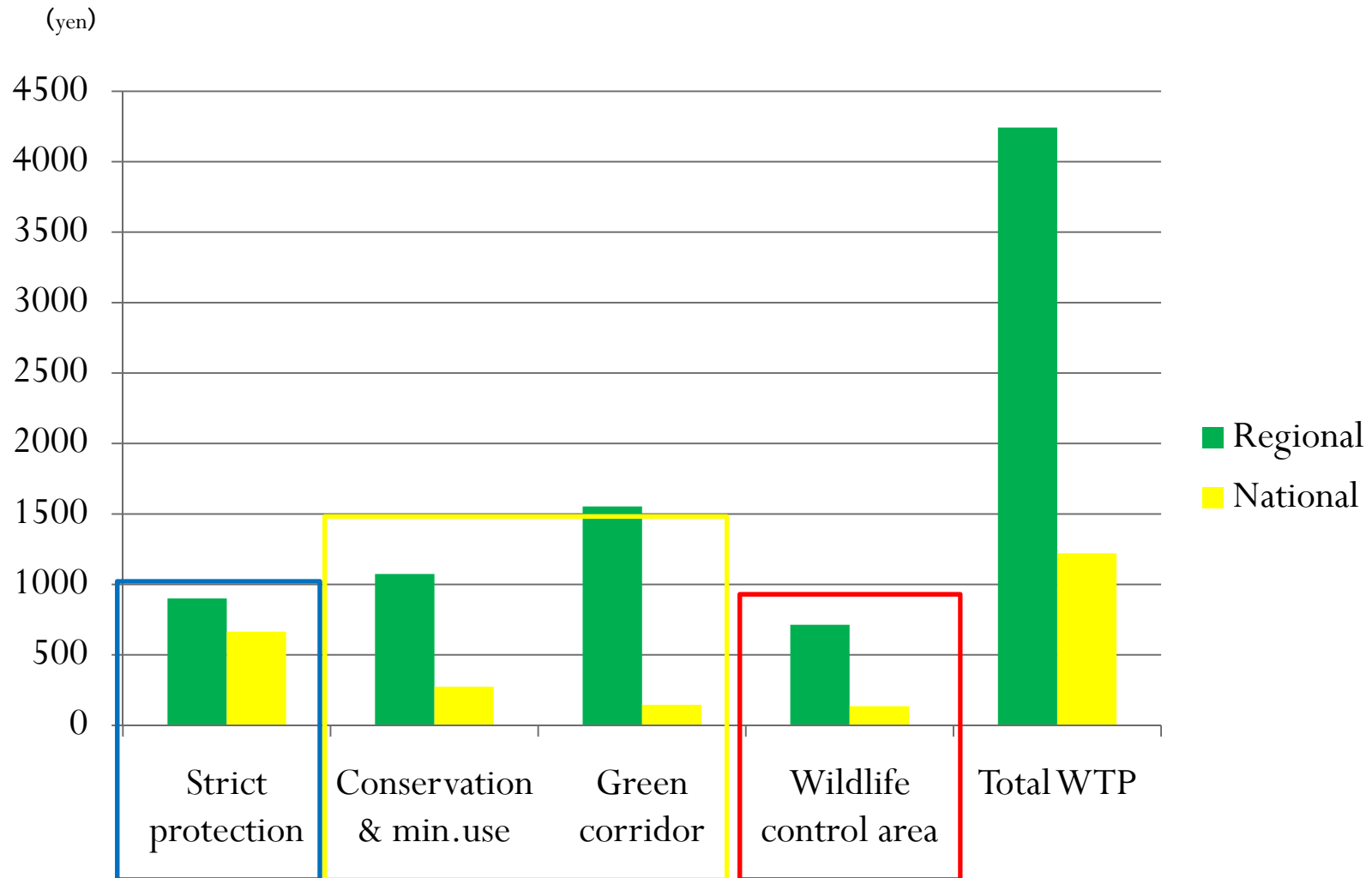
Source: Valuing forests for different protection strategies, Japan, TEEBcase based on Kentaro Yoshida (see TEEBweb.org)

Oku-Aizu Forest Reserve and

全国の森林生態系保護地域



WTP for Forest Ecosystem Reserve



Note: Wildlife control area is a part of hypothetical scenario to mitigate severe damages from wild animals

Paddy Fields as Wetlands

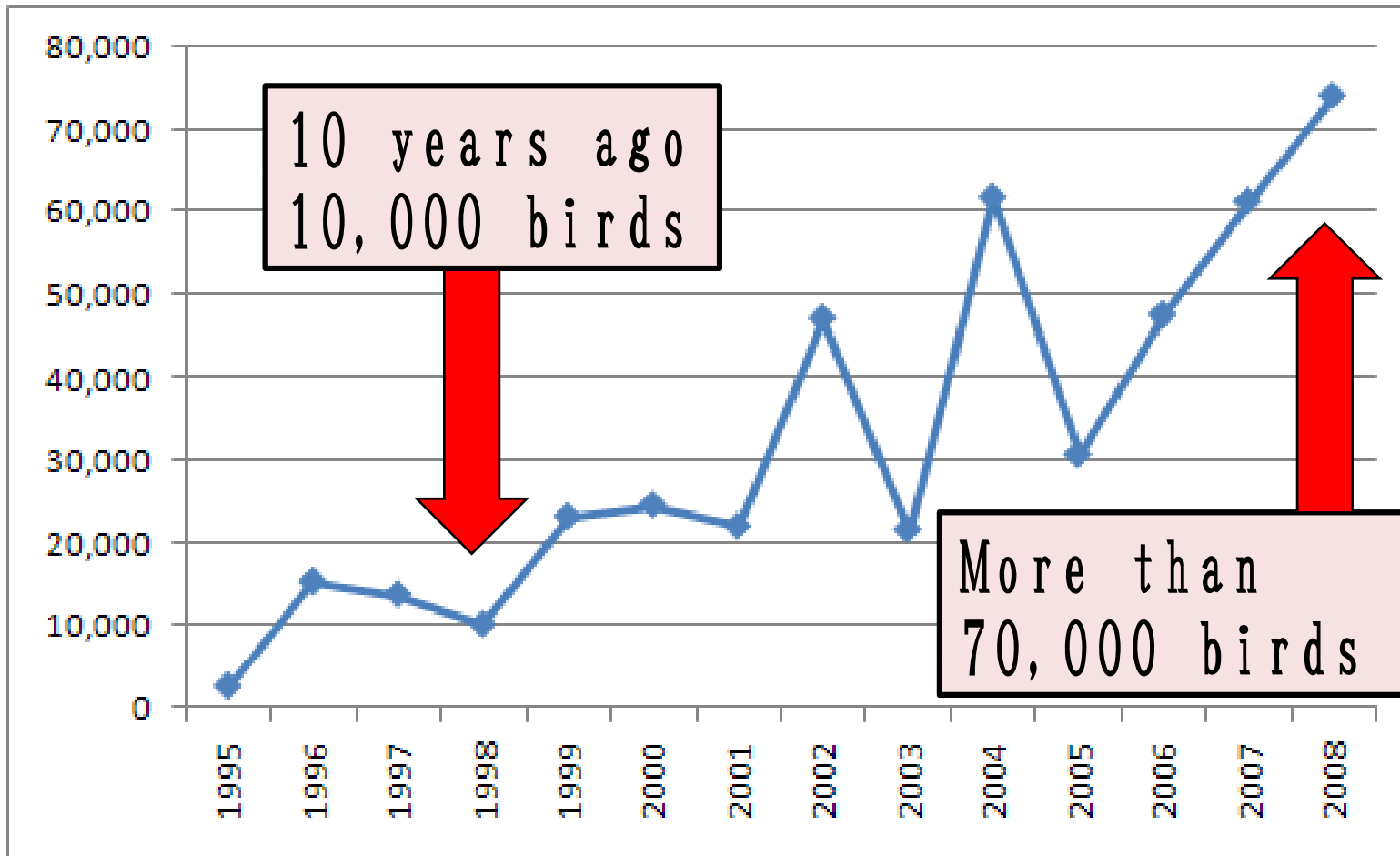
Kabukuri-numa and the surrounding rice paddies



Policy Measures and PES

- Kabukuri-numa (wetland) is one of the most important wintering sites of migratory wild birds
- For managing the wintering ground, measures such as water management, clean-ups, channel maintenance and water quality improvement are regularly conducted by collective actions of farmers and NGOs, and local government
- In winter and post-harvest, the rice fields are left flooded for wild birds to winter in the site (winter-water paddy)
- Farmers sell value-added rice (fuyumizu-tambo-mai), organic and wildbird-friendly (labeling)
- Central and local government give direct payments (cross-compliance) to compensate the loss of farmers' income and additional costs incurred by bird-friendly farming practices

The number of wild geese is increasing because of wetland restoration and winter paddy management



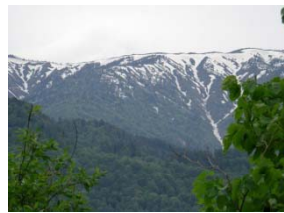
Economic Valuation of Kabukuri-numa and the Surrounding Rice Paddies

- Stated preference willingness-to-pay survey
 - CVM and Choice Experiments
 - Nationwide internet survey
 - Number of samples: 3257 persons
- CVM to elicit individual WTP for conservation of Kabukuri-numa and the surrounding rice paddies
 - Estimated median WTP: 925 yen/household/year
- Choice Experiments
 - Latent class model shows diverse and dispersed distribution
 - local interests in ecotourism promotion and urban interests in conservation (more winter-water paddies and wetlands)

On-going and Future Research/Policy

- Incorporating the value of biodiversity and ecosystem services into **national accounting**
- Linking economic valuation to the comprehensive assessment of biodiversity of Japan
 - Collaborative research of **natural and social scientists**
- Assessing benefits of achieving **Aichi Target** to expand PA
 - Original value estimates and benefits transfer
- Networking international cooperation to **protect endangered species and their habitats**, e.g., migratory birds
 - Reducing risks of habitat degradation and extinction due to bird flu

WTP Survey for Aichi Biodiversity Target: Protected Areas

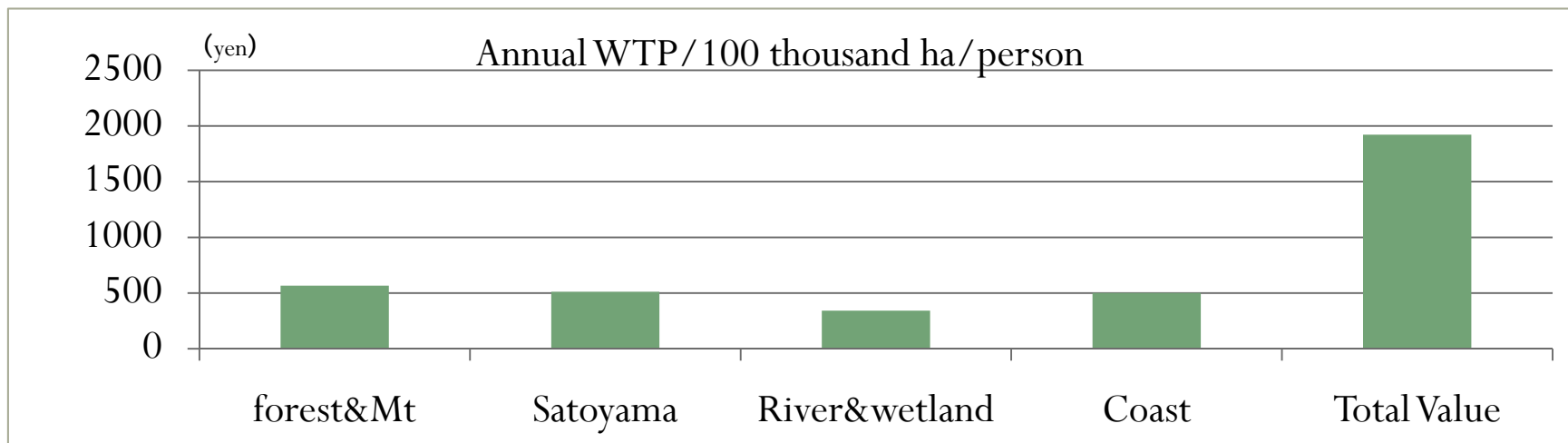


Forest & Mountains

Satoyama & agricultural land

River & wetland

Coast & marine



Nationwide internet survey in Dec. 2010, 1451 samples

Recognizing the values for
setup international
network for protecting
endangered species and
biodiversity

Thank you very much
多謝

Protected area in winter



Feeding by locals

