Environmental Valuation of Biodiversity in Japan

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Introduction

- Why Valuing Biodiversity?
 - No price of biodiversity
- Economic Values of Biodiversity
 - Use-value and non-use value
- Empirical Studies in Japan
 - Contingent valuation studies
- Policy Implication
 - Economic incentives for conservation

Why Valuing Biodiversity?

- Cost of biodiversity conservation
 - US\$22 billion per year

Benefit of biodiversity conservation

- No price
- No profit to protect biodiversity

Problems of conservation

- Cost benefit of conservation
- Monetary benefit of conservation

Economic Values of Biodiversity



Replacement Cost

Forest Value of Japan	Billion	\$ / year
Water conservation	36	11%
Preventing landslides	69	21%
Recreational use	65	20%
Biodiversity and wildlife habitat	6	2%
Cleaning air	156	47%
Total value	332	100%

Source: Forestry Agency (1993) Note: Estimated by the replacement cost method, US\$1 = 118 yen in 1993.

Valuation of Biodiversity

- Characteristics of biodiversity value
 - No market price
 - No substitution goods
 - Non-use value

Contingent Valuation (CV)

– How much to pay for biodiversity conservation?

Case Study Yakushima World Heritage Site

- World Heritage List since 1993
- Yakusugi cedar
 - More than 1,000 years old
- Biodiversity
 - More than 1,900 spiecies
- Increasing tourists
- Conflicts
 - Biodiversity conservation?
 - Tourism development?

Vegetation Distribution



CV Question (Biodiversity Protection Scenario)



 Would you pay *** yen for protecting biodiversity in Yakusima World Heritage site?

Double-bounded CV



CV Question (Tourism Development Scenario)



 Would you pay *** yen for protecting biodiversity in Yakusima World Heritage site?

Data

- CV survey of Yakusima World Heritage Area
 - Double-bounded CV
- Split-sample CV Scenario
 - Biodiversity conservation
 - Tourism development scenario
- In-person interview survey
 - 821 sample
 - response rate 68.4%

Estimation of Willingness-to-Pay



Estimation Results

Scenario	WTP (\$ / household)	Aggregated Value (million dollar)
Biodiversity Conservation	48.0	2,109
Tourism Development	29.2	1,283
Difference	18.8	826

Note: Market Value 1,461 million dollars

Valuation Function



Case Study Kabukuri Marsh

- Kabukuri marsh
- Rice paddies
 - Habitat for the wild goose
 - 423ha area was inscribed as a registered wetlands under the Ramsar Convention

Winter-Flooded Rice Paddies

- Ramsar area
 - Including rice paddies
- Management for waterbirds habitat

Population of Wild Goose



Choice Experiment

	Plan 1	Plan 2	Plan 3
Marsh	62ha	150ha	62ha
Rice paddies	0ha	50ha	22ha
Birdwatching Site	Yes	No	No
Payment	\$10	\$5	\$0
	\downarrow	\downarrow	\downarrow
	1	2	3

Willingness-to-pay



WTP Distribution (Ecotourism)



WTP Distribution (Marsh Conservation)



Summary

- Need for valuing biodiversity
 - No market price of biodiversity
 - Market failure
- Contingent valuation
 - How much to pay for conservation?
- WTP of biodiversity
 - Ecotourism: Local resident
 - Ecosystem: National resident
 - Heterogeneity in preference of biodiversity

Policy Implication

- Cost share of biodiversity conservation
 - Beneficiary pays principle
 - Payment scheme with heterogeneity
- Conservation with private capital
 - Limits of government subsidies
 - Economic incentives to conserve biodiversity
 - Valuing biodiversity