[RESEARCH PROPOSAL]

Economic Valuation of Conserving Soyang Lake and Its Catchment

Presentation @ TERRECO Workshop

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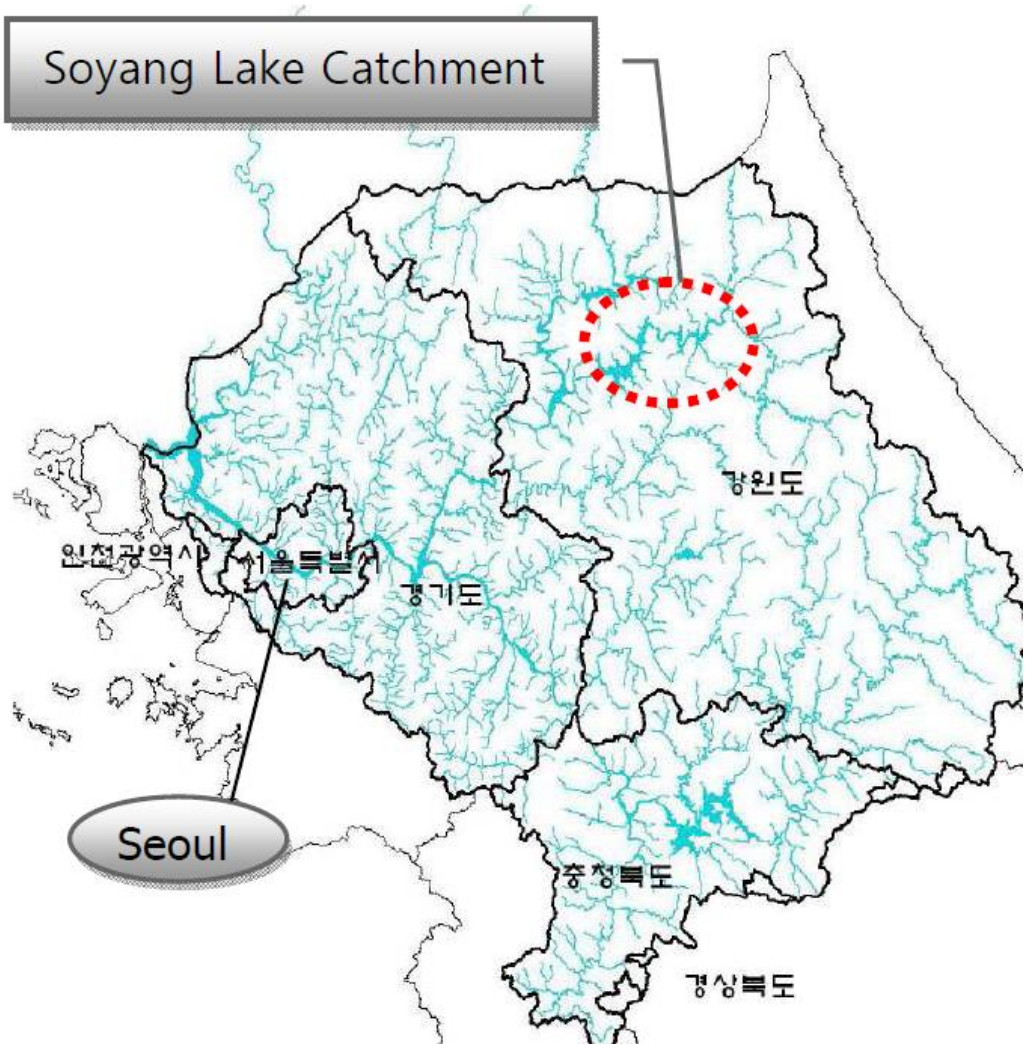
1. Soyang Lake Catchment and the Communities

- Han River Catchment

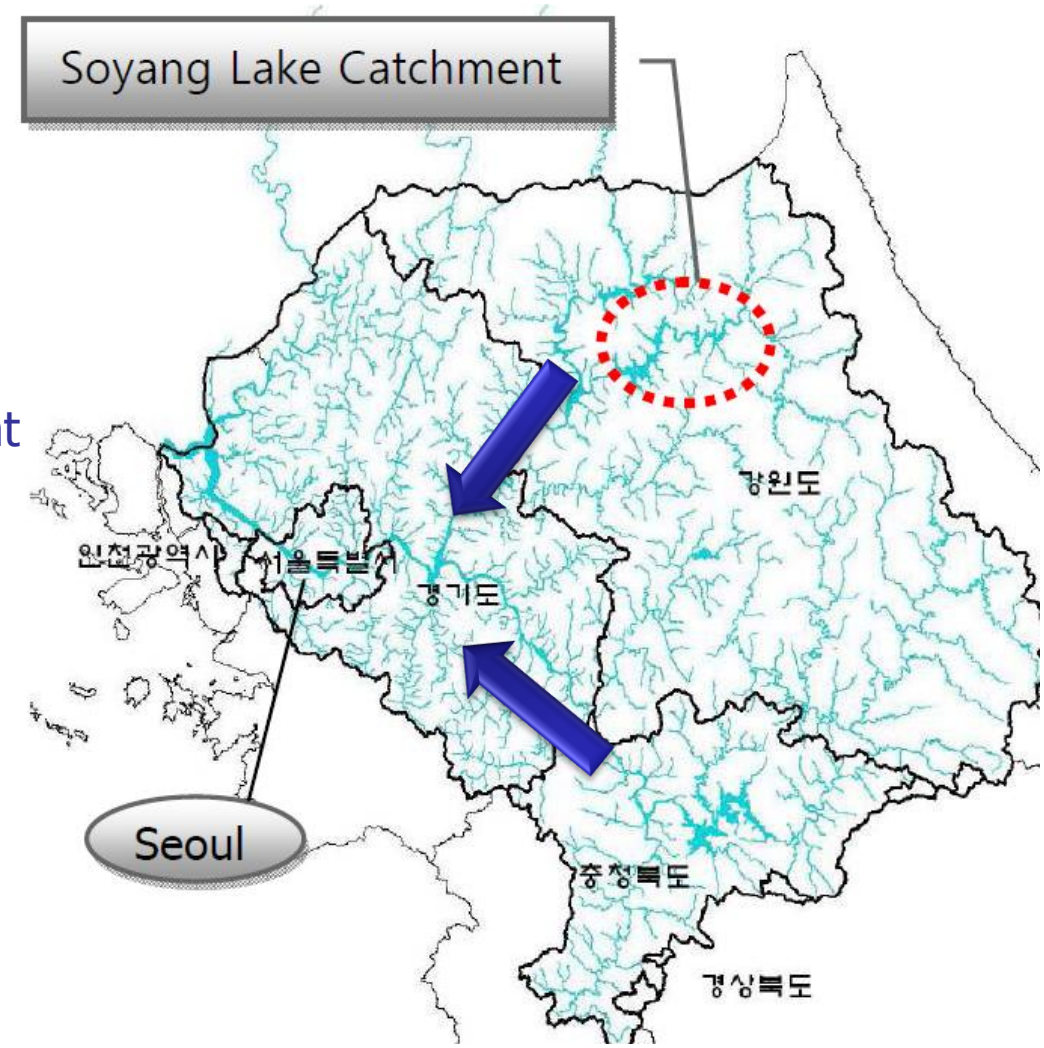
Regions	Area (㎢)	Population (1,000)
Seoul	289	10,026
Incheon	188	1,331
Kyonggi	7,503	8,284
Gangwon	**12,377**	**888**
Chungbuk	4,043	484
Kyongbuk	181	1
Total	24,581	21,014



2. Water Conservation Levy (1/3)

- Upstream vs. downstream
- The Han River Act
  - ➔ Han River Catchment Mgmt Fund, 1999)
- Water Conservation Levy
  - ➔ $0.13/ton in 2008

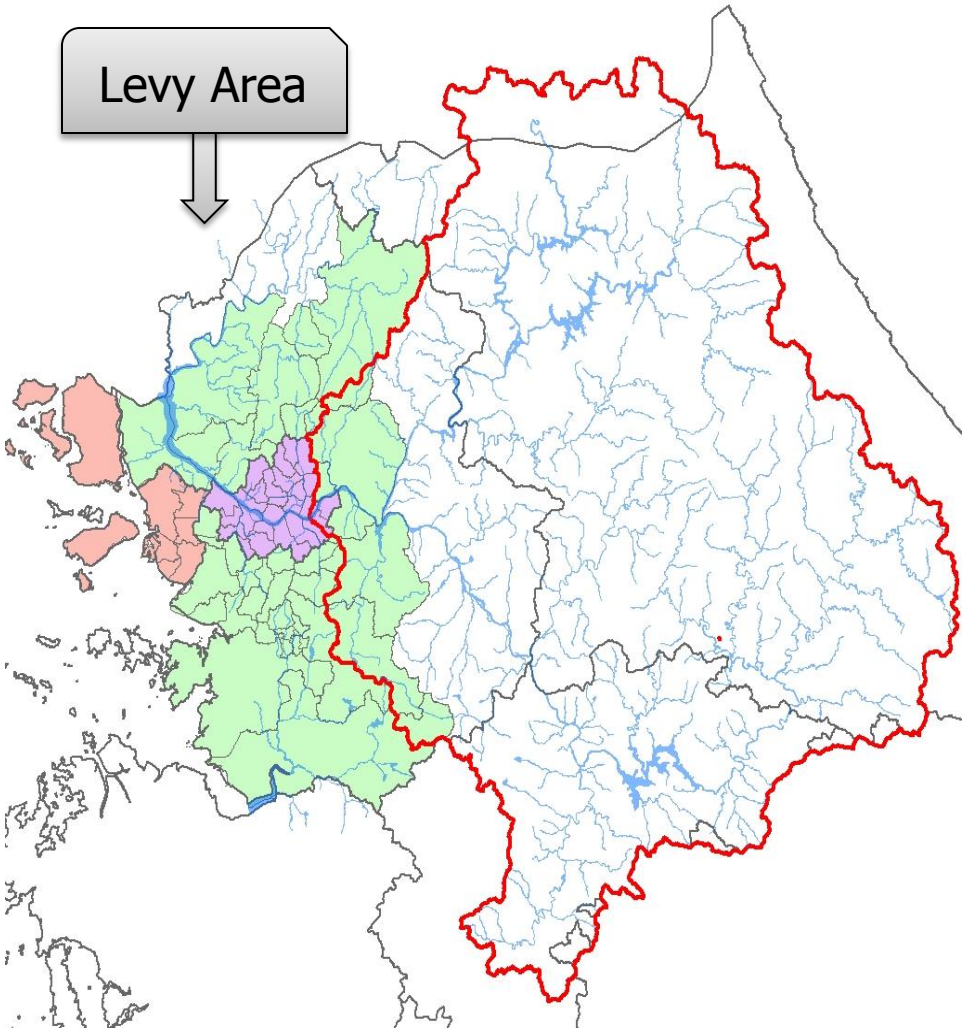
Optimal Rate?



2. Water Conservation Levy (2/3)

Region	Population (1,000)
Seoul	10,026
Incheon	2,596
Kyeonggi	8,284

Year	Levy rate ($/ton)	Revenue ($, Million)
2000	0.07	147.43
2001	0.09	197.49
2002	0.09	212.02
2003	0.10	230.01
2004	0.10	240.51
2005	0.11	261.34
2006	0.12	287.10
2007	0.13	311.14
2008	**0.13**	**333.82**



2. Water Conservation Levy (3/3)

Yearly Allocation (2008)	Amount ($, Million)	%
Residents Support	**0.53**	**24.43**
Env. Treatment Facilities	**0.96**	**44.26**
Water Quality	0.22	9.96
Land Mgmt	0.41	19.02
Nonpoint Sources	0.01	0.65
Total Quantity Control	0.00	0.22
Operation	0.03	1.45
Total	**2.17**	

Appropriate Allocation?c

3. Objectives

- To estimate economic values of ecosystem services and water quality gained or lost in the Soyang Lake Catchment

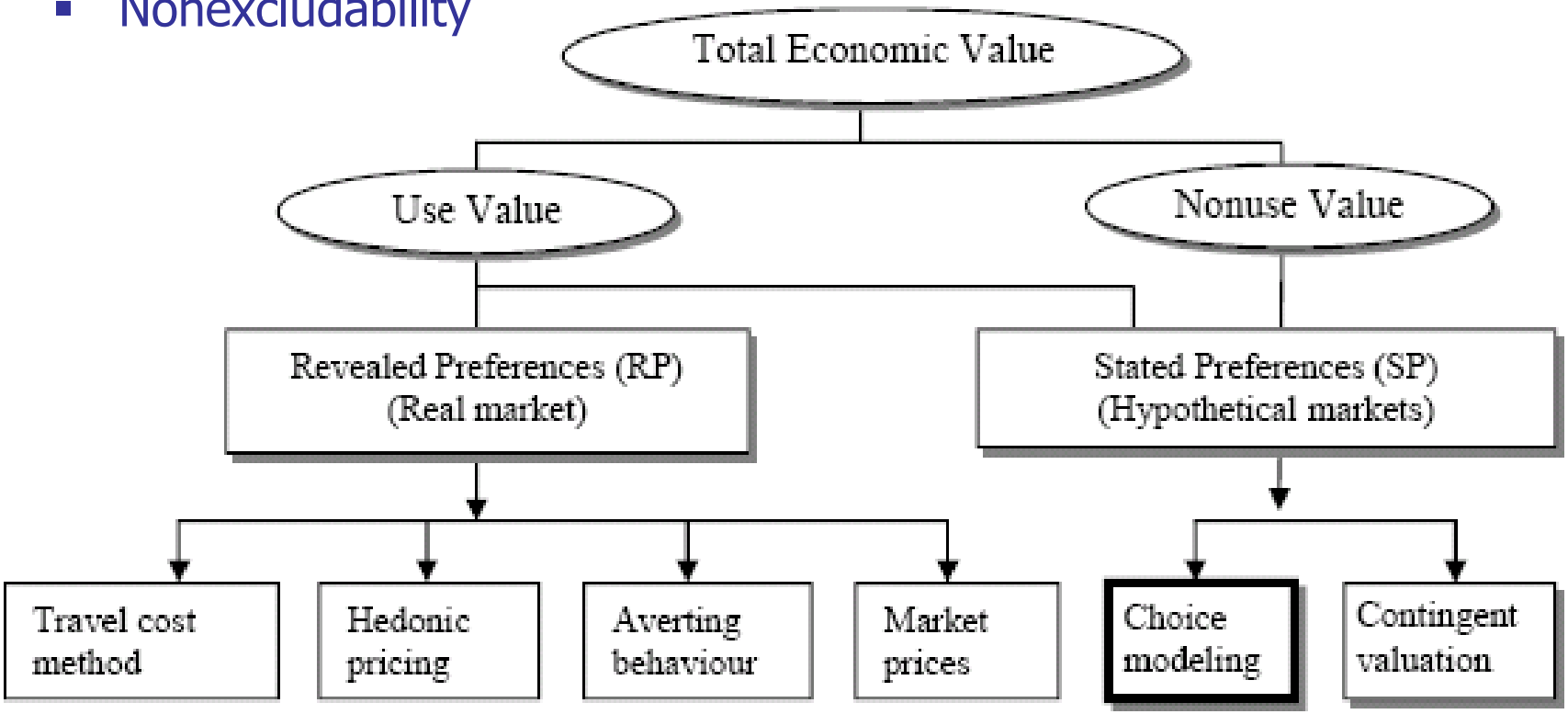
➔ To identify socially acceptable level of the levy rate

➔ To find out appropriate allocations of the Fund

Communities' Preferences?

1. Public Goods

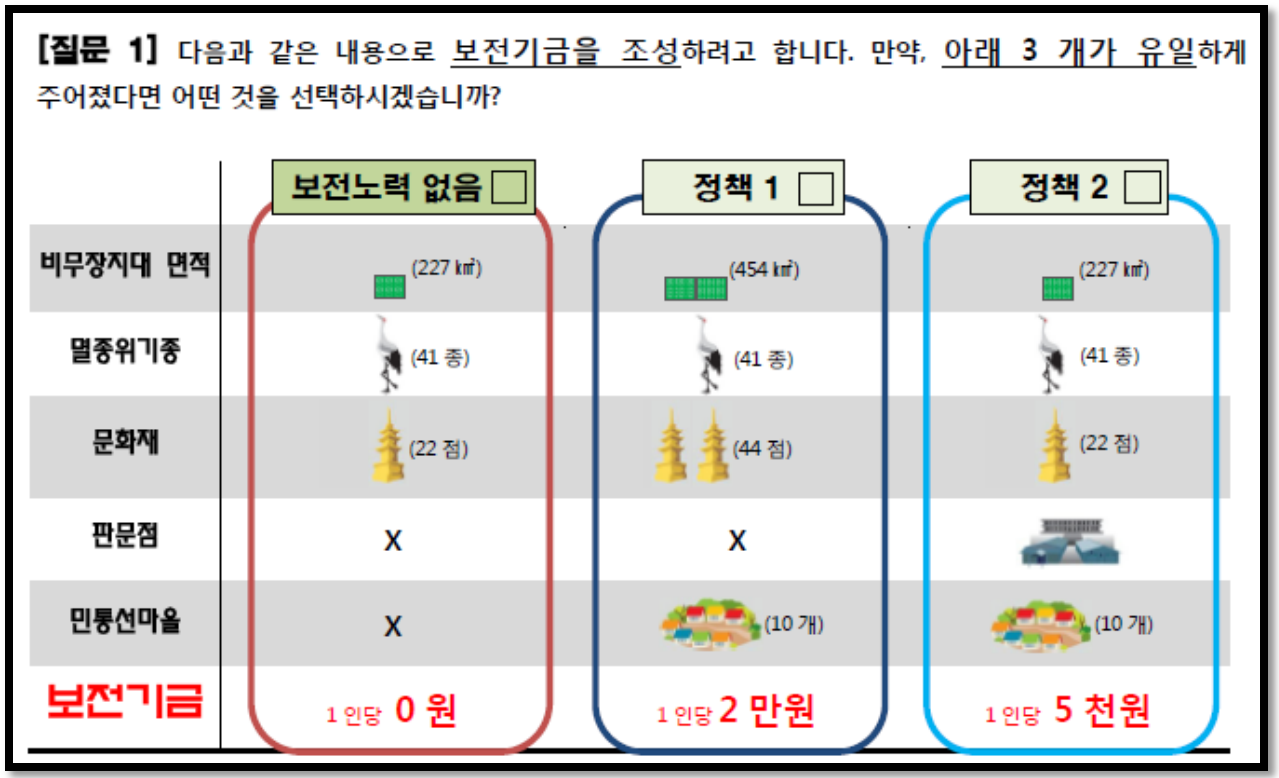
- Nonrivalry
- Nonexcludability



Source: Modified from Figure 1.4 of Bateman et al. (2002:30).

2. Choice Modeling

- Target goods as a bundle of attributes
- Respondents make choices, expressing 'trade-offs'
- Willingness-to-pay estimated using RUM



3. Random Utility Maximization Models (RUM)

$$U_{iq} = V_{iq} + \varepsilon_{iq}$$

Matter of Probability!

$$p_{iq} = \frac{1}{\sum_{j-1}^{J} \exp -\left(V_{iq} - V_{ij}\right)} = \frac{\exp V_{iq}}{\sum_{j-1}^{J} \exp V_{jq}}$$

$$U_{iq} > U_{jq} \qquad j \neq i \in A$$

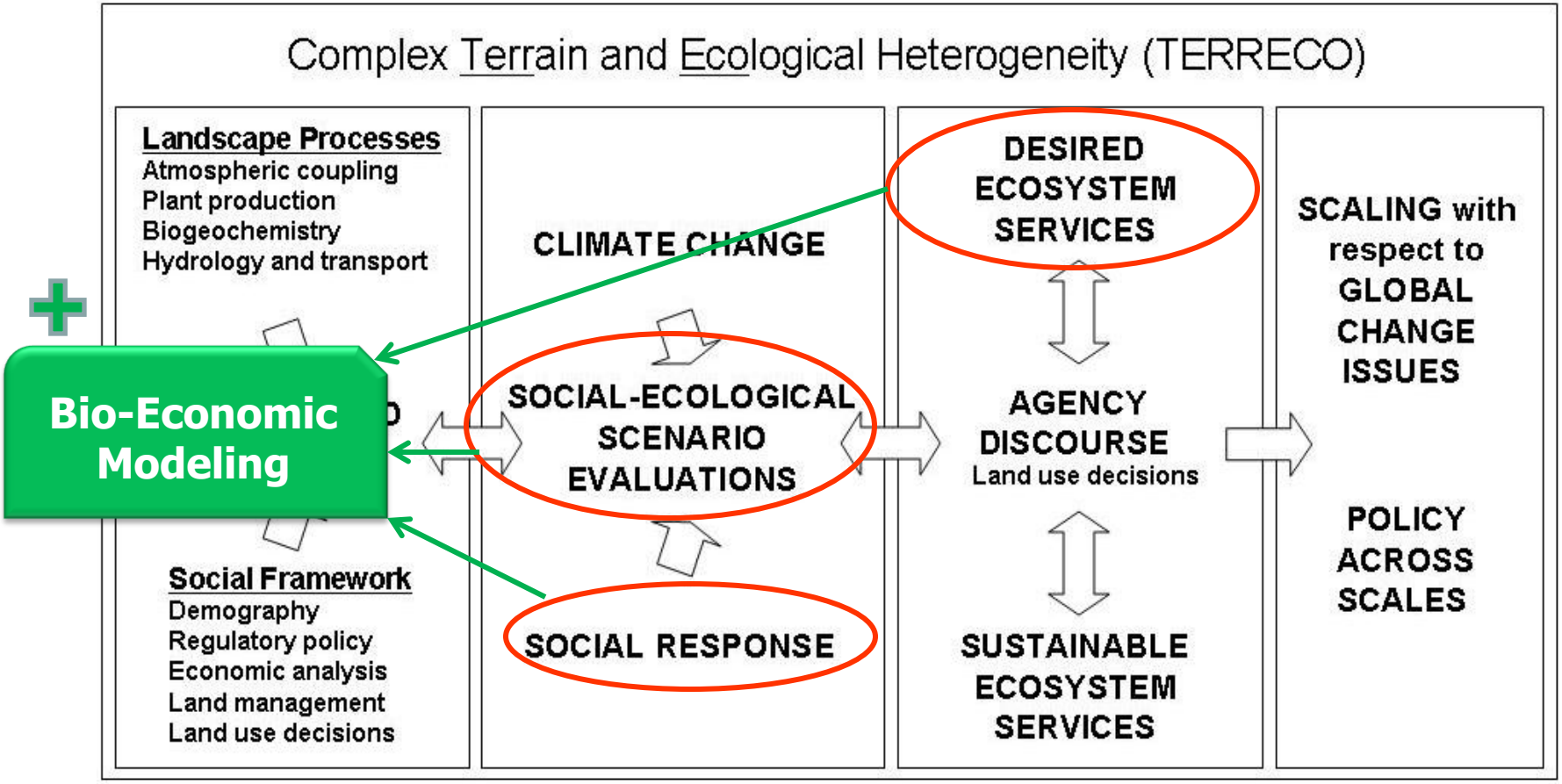
$$\left(V_{iq} + \varepsilon_{iq}\right) > \left(V_{jq} + \varepsilon_{jq}\right)$$

$$\left(V_{iq} - V_{jq}\right) > \left(\varepsilon_{jq} - \varepsilon_{iq}\right)$$

$$P_{iq} = P\left(i \middle| i, j \in A\right) = P\left[\left(V_{iq} - V_{jq}\right) > \left(\varepsilon_{jq} - \varepsilon_{iq}\right)\right]$$

$$P\left(\varepsilon_j \leq \varepsilon\right) = \exp\left(-\exp -\varepsilon\right) = e^{-e^{-\varepsilon}}$$

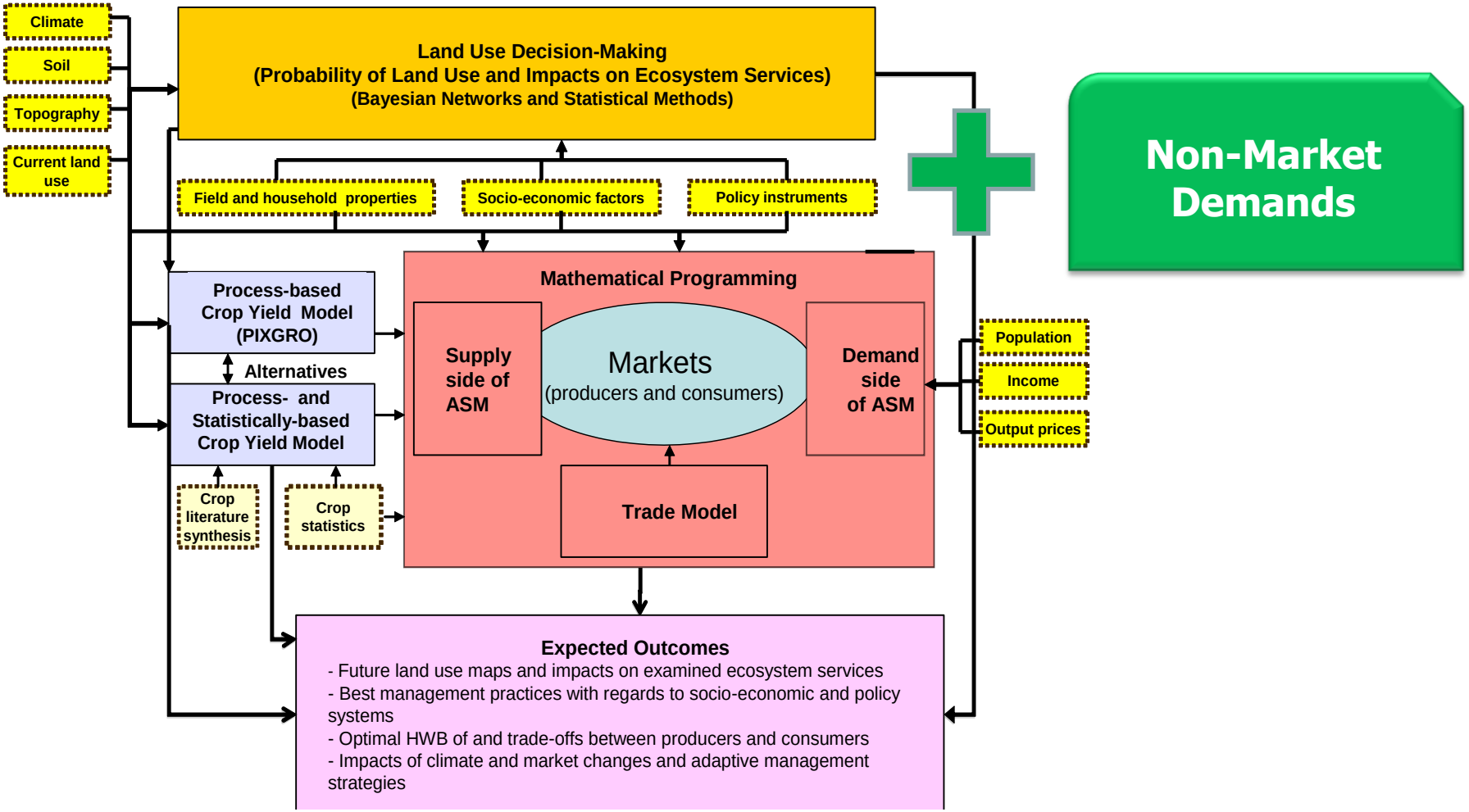
1. TERRECO & This Proposal (1/2)



Source: Tenhunen, John (2010)

Figure 1. Information flows

1. TERRECO & This Proposal (2/2)



Source: Tenhunen, John (2010)

Figure 2. Conceptual relationships

2. Future Discussion

1. Proposal evaluation and decision making (This workshop)
2. Project team formation (This workshop)
3. Detailed project plan (April ~ June, 2010)
4. Project implementation (As planned)

- ➔ The impact of socio-economic land-use decisions on ecosystem services in small catchments (Patrick Poppenborg and Thomas Koellner)
- ➔ Quantifying and evaluating trade-offs between multiple ecosystem services in Haean Catchment (Thomas Koellner et al.)


THANK
YOU