

# Do Attitudes Toward Ecosystem Services Determine Agricultural Land Use Practices?

## An Analysis of Farmers' Decision-Making in a South-Korean Watershed

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### Background

Land use practices directly influence the provision of ecosystem services from agrarian landscapes, and are thus key factors for the development of environmental policy programs. This study analyzes farmers' decision-making processes with respect to land use in Haeen Catchment, South Korea.

#### Research questions:

- Which factors influence farmers' crop choice most?
- What role do ecosystem services play in farmers' decision-making?



### Methods:

Based on the *Theory of Planned Behavior* (Ajzen 1991) decisions between cultivation of rice, annual crops, and perennial crops were compared as a function of farmers' i) attitudes towards ecosystem services in biomass production, soil loss reduction, water quality improvement, and biodiversity conservation; ii) perceived behavioral restriction by money availability, skills and knowledge, plot characteristics, and given legislation; iii) appreciation of social referents like household members, fellow farmers, people living downstream outside the watershed, and environmental protection agencies.

### Results

Backward stepwise elimination of insignificant factors in multinomial logistic regression analysis resulted in a final model including biomass production, soil loss reduction, water quality improvement, skills and knowledge, and money availability as significant regression factors for crop choice (Table 1).

|                                     | Rice                   |                                   |     |           | Annual crops           |                                   |     |           |
|-------------------------------------|------------------------|-----------------------------------|-----|-----------|------------------------|-----------------------------------|-----|-----------|
|                                     | $\beta$<br>(std. err.) | Wald's Chi <sup>2</sup><br>(df=1) | p   | $e^\beta$ | $\beta$<br>(std. err.) | Wald's Chi <sup>2</sup><br>(df=1) | p   | $e^\beta$ |
| Intercept                           | 6.7 (0.9)              | 6.7                               | .00 | ---       | 7.0 (0.9)              | 7.1                               | .00 | ---       |
| <b>Attitudes towards behavior</b>   |                        |                                   |     |           |                        |                                   |     |           |
| Biomass production                  | -0.9 (0.1)             | -5.5                              | .00 | 0.4       | -0.5 (0.1)             | -3.5                              | .00 | 0.5       |
| Soil loss reduction                 | -0.2 (0.1)             | -1.8                              | .05 | 0.7       | -0.6 (0.1)             | -4.7                              | .00 | 0.5       |
| Water quality improvement           | 0.1 (0.1)              | 0.7                               | .45 | 1.1       | -0.4 (0.1)             | -2.9                              | .00 | 0.6       |
| <b>Perceived behavioral control</b> |                        |                                   |     |           |                        |                                   |     |           |
| Money availability                  | -0.2 (0.1)             | -2.0                              | .04 | 0.7       | -0.1 (0.1)             | -0.7                              | .46 | 0.9       |
| Skills and knowledge                | -0.9 (0.1)             | -6.6                              | .00 | 0.3       | -0.6 (0.1)             | -5.2                              | .00 | 0.5       |

**Table 1:** Multinomial regression results of the final model for farmers' crop choice. Presented are significant results with the group of perennial crop farmers as a baseline category (Chi<sup>2</sup>=211.35, p<0.001).

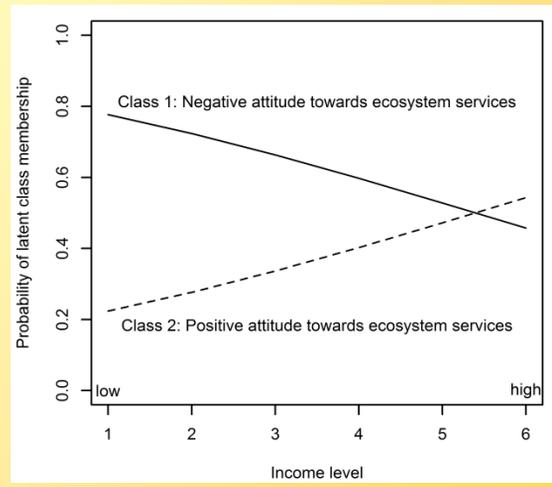
Furthermore, latent class analysis revealed two different groups of farmers: those with negative (class 1), and those with positive attitudes towards ecosystem services (class 2). A strong predictor of membership to these classes turned out to be farmers' income (Figure 1).

### Discussion

Decisions to plant perennial crops are significantly influenced by strong positive attitudes towards protecting ecosystem services. At the same time, however, perennial crop farmers feel most restricted by money availability and required skills and knowledge. In general, high income seems to be a prerequisite for farmers to hold positive over negative attitudes towards the selected ecosystem services.

### Conclusion

Our results indicate that economic rationale are key determinants of farmers' decision-making. Policies trying to influence land use in Haeen Catchment should, therefore, consider providing monetary incentives with schemes such as payments for additional ecosystem services that are supported.



**Figure 1:** Latent class regression model with income as predictor of membership to classes (1) negative attitude, and (2) positive attitude toward the ecosystem services soil loss reduction, improvement of water quality, and conservation of plants and animals.

### References

Ajzen, I., 1991: *The Theory of Planned Behavior*. Organizational Behavior and Human Decision Processes 50, 179-221.  
 Poppenborg, P., Koellner, T. 2012: *Do attitudes towards ecosystem services determine agricultural land use practices? An analysis of farmers' decision-making in a South-Korean watershed*. Land Use Policy (in press)