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# Future socio-ecological systems and human well-being in Japan: questionnaire surveys for participatory scenarios

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## Abstract

Scenario planning is increasingly recognized as useful tool for exploring plausible future paths of the human society. Strengthening local context is regarded as an important aspect for capturing the socio-ecological dynamics of biodiversity and ecosystem services, and recently more attention has fallen on participatory tools and processes that can bridge the information on drivers and the knowledge systems in scenario building processes. To understand general trends and people's perceptions of possible drivers that might impact on the biodiversity, social-ecological systems and human well-being, we conducted questionnaire surveys in Japan, targeting both general public and experts from universities, research institutes, the government, business sectors, and NGOs/NPOs throughout Japan. From web questionnaire survey of the public (n=3,093) and experts (n=101), we found that both the public and experts tended to perceive natural disasters (especially earthquake/tsunami, flood/typhoon, and intensification of natural disasters under climate change) and the issues in population and cities (population outflow from rural area/marginalized community, aging society with fewer children, and regional disparities in development) as more likely drivers that affect social and ecosystem changes by 2050. On the other hand, compared with the public, the experts tended to perceive changes in economy/resources, policy/governance, life style/value system/perspective on nature (especially diversification/globalization and loss of traditional knowledge), technological innovation, and regional conflicts/religious conflicts/war, may occur with higher uncertainty, but the impact will be considerably higher if they actually change significantly by 2050.

To understand the linkage between ecosystem services and human-wellbeing, we conducted questionnaire surveys of public (high school students and their families) in urban area (Tokyo; n=591) and rural area (Noto Peninsula, Ishikawa prefecture; n=418) about their preference of the services. We found that, generally, people preferred nature-oriented services than techno-oriented services (e.g. feeling sacredness in real nature vs. feeling sacredness from video, photos or virtual nature). However, people in urban area tended to prefer more techno-oriented services than nature-oriented services, compared with people in rural area. These results indicate the importance of developing bottom-up, diverse and multi-special scale scenarios to engage with the diversity of local context.

In conclusion, we discuss key factors on the Japan's future society that were identified in our questionnaire surveys, and provide basis for formulating potential future scenarios in Japan, indicating the need for raising public awareness and developing capacity to promote the participatory processes.

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**Keywords:** Ecosystem services, biodiversity, future society, drivers, value system, stakeholders