# Exploring ecosystem services assessment and scenario modelling as tools to enhance protected area management and planning in Malampaya Sound Protected Landscape and Seascape (MSPLS), Northwestern Palawan, Philippines

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## Abstract

Areas that are important for biodiversity conservation or those of high conservation values provide significant benefits to people. They can be regarded as socio-ecological production landscapes and seascapes (SEPLS). These landscapes and seascapes are essential for human well-being as they provide various ecosystem services and in most cases, they are inherently resilient to external shocks and stresses having shaped and strengthened by long-term interactions between nature and people. The Philippines, considered one of the biodiversity hotspots in the world housing diverse types of ecosystems and species, faces biodiversity loss and habitat degradation due to climate change, land-use changes, and other anthropogenic factors. This can ultimately cause changes in the provision of ecosystem services and affect natural capital that many people depend on. Since 1990s, a number of protected areas has been established to safeguard areas that has biologically and ecologically unique features and characteristics, however, the need to transform protected area management system into a more holistic approach remains a challenge. Understanding how people interact with the environment and how different land-use based changes affect the delivery of ecosystem services are important aspects which will help provide better decision basis for protected area managers and policy-makers. This study focused on the Malampaya Sound Protected Landscape and Seascape (MSPLS) located in northwestern Palawan, southwest of the Philippines. MSPLS is a protected area (PA) characterized by diverse marine and terrestrial ecosystems and contains socioeconomically-important marine and forest resources. The sound or the marine zones – subdivided into (a) shallow brackish "inner sound" and (b) deep saltwater "outer sound" – play a critical role in the livelihood and well-being of the adjacent local communities. In the preliminary research activities conducted at the inner sound (Site 1), we used the Toolkit for the Indicators of Resilience in SEPLS developed by UNU-IAS and

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the International Partnership for Satoyama Initiative to identify elements of socio-ecological resilience that are strongly interrelated and we conducted participatory ecosystem services assessment and mapping to understand how changes in ecosystem services influence human well-being. Thirty respondents, representing two villages from the inner sound, participated in a participatory assessment workshop that employed focused group discussions and resilience scoring through guided questionnaires. Among the five elements of socio-ecological resilience, both villages showed high resilience in biodiversity interrelating knowledge and innovation, but low resilience in landscape/seascape diversity and ecosystem protection interrelating livelihoods and well-being. In addition, both obtain a wide range of benefits from MSPLS which they identified into: provisioning services, regulating services and cultural services. Validation and analysis of data collected is ongoing, as well as looking into possible correlation among ecosystem services and changes in the landscape/seascape. The study aims to implement the same field methodology at the outer sound (Site 2) to have a baseline assessment of ecosystem services in MSPLS and to draw insights into developing a participatory scenario. Furthermore, the second phase of this study includes modelling land-use based scenarios to identify trade-offs among key ecosystem services and find synergies between biodiversity conservation and other facets of human well-being.