Prioritizing nature-based solution locations: comparing human perspectives and model assessments of degradation and ecosystem services

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Abstract

Forest-agricultural mosaic landscapes are areas where ecological and social systems are intertwined. They face increasing degradation due to competing land use pressures. Studies have revealed that nature-based solutions (NBS) like agroforestry, conservation farming, among others offer a promising pathway in the conservation and restoration of degraded areas, while addressing land use competing pressures. However, aligning model-based and human (experts) perspective of land degradation and ecosystem services (ES) towards the identification of NBS priority areas have been given limited attention. Most studies do not directly or critically compare and evaluate model and human-based identified areas of NBS. In most cases, studies focus on either models or stakeholders to capture their perceptions in identifying NBS priority locations, but few have investigated how these approaches align or differ before their integration. Understanding how the two approaches align helps to better recognise the mismatch between technical recommendations and community understanding and preferences in the identification of NBS priority areas.

This study addresses this gap by comparing expert-based land degradation and ES assessment with model-based assessments in the identification of NBS priority locations, using Cagayan Valley and Eastern Visayas regions, Philippines as a case study. The study presents two key objectives: (i)to identify NBS priority locations through the assessment of (a)geospatial model, and (b)expert-based land degradation sensitivity (LDS) and ES supply potentials; and (ii)to identify the differences and similarities between modelled and expert-based identified priority areas in terms of their socio-ecological connections.

The study employs MEDALUS and InVEST for the model-based LDS and ES assessment. Concurrently, a multicriteria approach, geospatial data, and expert scores (n=62) are used for the expert-based assessment. Spatial overlay and a geostatistical analysis are then used to highlight the NBS priority areas from the model- and expert-based identification and compare the two results (model-based, expert-based).

This study presents an approach that aids and advances NBS integration in forest and land use management by triangulating scientific models with localised perspective of ES and land degradation issues. This further provides a holistic basis for optimising NBS

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context-specific strategies that maximises forest conservation, sustaining agricultural production and human well-being.