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Assessment of synergies and trade-offs among ecosystem-based adaptation, biodiversity conservation and community forestry in Ayeyarwady Delta, Myanmar

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Multiple disaster risks are interconnected and are commonly caused by ecosystem degradation. Ecosystem degradation also drives many of the world's major problems, including biodiversity loss, climate change, and poverty. Ecosystem-based solutions such as ecosystem-based adaptation, biodiversity conservation, and community forestry are increasingly implemented in various contexts. However, little is known about possible interlinkages, synergies, and trade-offs among those ecosystem-based responses and potential barriers to their integration. This study explores spatial and conceptual synergies and trade-offs among ecosystem-based adaptation, biodiversity conservation, and community forestry and the barriers to implementing integrated actions.

The study was located in Ayeyarwady Delta, Myanmar. The research first used a comprehensive socio-ecological risk assessment framework and multi-risk impact chains to understand high-risk areas and identify potential areas for ecosystem-based adaptation. Potential areas for biodiversity conservation and community forestry respectively were then identified using criteria developed based on a literature review. At this point, spatial autocorrelations were tested, and a modified t-test was used to identify spatial relationships among them. Finally, qualitative expert interviews were conducted, and content analysis was used to understand conceptual synergies, trade-offs, and potential barriers for integrated action.

Results show potential for both social and ecological synergies. Ecosystem-based adaptation and biodiversity conservation show synergies with community forestry in the areas of local governance, and the relevance of social factors such as multi-stakeholder awareness, indigenous knowledge, land tenure security, community rule-making and ownership, and biodiversity-friendly livelihoods. Synergies between ecosystem-based adaptation and biodiversity conservation are mostly related to ecological factors such as benefits for biodiversity, ecosystem health, and corridor and buffer functions. Moreover, significant spatial synergies were observed between community forestry and biodiversity conservation areas.

Despite synergies, trade-offs exist and are mainly linked to social inequalities and the use of biodiversity-damaging practices. Spatial trade-offs occur between ecosystem-based adaptation

and community forestry due to a lack of land tenure security in high-risk townships. Conceptual trade-offs between ecosystem-based adaptation and community forestry are mainly linked to inequality, lack of access, local power relations, and land tenure insecurity. Trade-offs between biodiversity and the other two are observed due to the use of monocultures, exotic species, and clear-cutting practices. Legal, social, and financial barriers have been identified for the implementation of synergetic actions, while proper facilitation, community rule-making, and biodiversity-friendly livelihoods are key enabling factors in achieving sustainable ecosystem restoration.

This research argues that ecosystem-based adaptation, biodiversity conservation, and community forestry benefit each other, highlighting that fostering those synergies is key for ecosystem restoration and conservation in the face of climate change, biodiversity loss, and poverty. Furthermore, the research stresses the need to consider community governance and biodiversity aspects in ecosystem-based adaptation to address societal challenges.