

Mangrove management in Northern Sri Lanka: A Social Network Perspective

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In the context of accelerating global environmental change, sustainable management of tropical coastal social-ecological systems requires some form(s) of collaboration between a wide range of stakeholders. Mangrove forests provide multiple ecosystem services to local communities (e.g. timber, fuelwood) and beyond (e.g. carbon sequestration). Yet, research on collaborative stakeholder networks and their linkages with sustainable mangrove management strategies is lacking. Through social network analysis (SNA), we analyzed mangrove management stakeholders' perspectives and their informal and formal relationships in the Northern Province of Sri Lanka. Questionnaire surveys were carried out with 19 different stakeholders who were closely related to mangrove management in Sri Lanka's Northern Province. Our findings indicate that the government departments mandated to conserve mangroves are not only formally appointed key stakeholders but are also perceived as central by other stakeholders in the reality of day-to-day mangrove management. Private organizations are perceived to play a less important role, despite existing resource extraction. Communication barriers, lack of awareness regarding the importance of mangroves, and shortages in staff and resources for mangrove conservation were highlighted as major constraints that need to be addressed in future mangrove management plans. We recommend that the inclusion of a bridging entity to connect all stakeholders such as the universities along with the development of a common platform (e.g. websites) to exchange ideas can help to improve the networks and foster mangrove conservation.

References

- Bodin, Ö., 2017. Collaborative environmental governance: achieving collective action in social-ecological systems. *Science* 357 <https://doi.org/10.1126/science.aan1114>.
- Bodin, Ö., Tengö, M., 2012. Disentangling intangible social-ecological systems. *Global Environmental Change* 22, 430-439 <https://doi.org/10.1016/j.gloenvcha.2012.01.005>.
- Borgatti, S.P., Everett, M.G., 1996. Models of core/periphery structures. *Sunbelt International Social Networks Conference*, Charleston, SC.

Keywords: Collaborative governance; Mangrove management; Stakeholders; Stakeholder Network Analysis; Sri Lanka