



# Determinants of participation of mangrove-dependent communities in mangrove conservation practices



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## ABSTRACT

This article examines the factors that influence conservation practices in the world's largest mangrove forest, the Sundarbans in Bangladesh. It explores the relationship between mangrove density reductions and past and present management practices. It is a cross-sectional study based on a close-ended structured questionnaire ( $n = 412$ ), measuring variables of interest from theory of property rights. Randomly selected cross-section of households in mangrove-dependent communities (MDCs) were interviewed. Results show that MDCs who engage in resource harvesting under the current property rights regime have less participation in, and lower motivation for, the conservation of mangrove resources. Strict management by the Forest Department results in lower commitment by the community to conservation. Conservation of resources could be achieved by the allocation of management roles to MDCs through expanded property rights. With the granting of these rights they would be very willing to engage in conservation management. The results suggest that constructing effective strategies to promote mangrove conservation require these two factors to be addressed if sustainable mangrove management is to be achieved.

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## 1. Introduction

Mangroves are unique ecosystems located between dry land, and shallow marine and brackish water. This natural characteristic introduces complexities to the management of resources due to competing and overlapping interests. It is estimated that more than 50 000 square kilometres of mangrove forest—or nearly one-quarter of its original, global cover—has been lost due to human activity (Roy et al., 2013a). Traditional uses of mangroves are often conflictual. Very often, ambiguities in property rights affect informal understandings and customary rules concerning access and use of mangrove resources by dependent communities (Walters et al., 2008). This customary use by different stakeholders causes conflict and undermines incentives for, and use of, local knowledge for sustainable resource management. Especially in developing countries, researchers have studied local people's perceptions regarding conservation with the assumption that sustainability, more responsibility, and long-term management of forest resources depend

on local residents' support (Triguero-Mas et al., 2010). For successful mangrove conservation, the issue of the allocation of property rights to mangrove-dependent communities (MDCs) is considered vital to allow them to participate in decisions as a part of a shared responsibility for the present and future state of the resources (Kathiresan and Qasim, 2005). Hence, there is a need for better understanding of the factors influencing conservation choices, economic activities and existing conflicts in MDCs.

The world's largest Sundarbans mangrove forest (SMF) in Bangladesh is losing its forest cover rapidly due to degradation. One study cited 50% tree cover reduction of this forest in past 20 years (Kabir and Hossain, 2008). This is now facing high anthropogenic pressure as it provides livelihood support to 3.5 million local mangrove-dependent people living in its surrounding villages (Kabir and Hossain, 2008). The mangrove forest is managed by the Bangladesh Forest Department (BFD) under conservation policies. They allow MDCs to harvest certain resources only under strictly prescribed rules by issuing permits to MDCs. Although harvesting rights are restricted, MDCs regularly collect various resources, such as timber, fuel-wood, stretching materials and fodder, legally or illegally. Consequently, MDCs use *de facto* rights with illegal entrance as well as their *de jure* rights established through permits. Although the BFD exercises exclusive rights to monitor and manage

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resource harvesting, they fail to ensure sustainable harvesting of mangrove resources through merging *de facto* and *de jure* rights in the case of the SMF.

The central policy goals are to keep intact the biodiversity of the SMF through integrated resource management (GOB, 1994). The policy, thus, advocated a common property rights regime for “the active partnership of the local people” (GOB, 1994) to attain sustained conservation. However, this policy is violated by the non-implementation of an active partnership with MDCs through allocating appropriate levels of property rights. MDCs have made their livelihoods for generations from the SMF with or without permits from the BFD. No government, present or past, has allocated relevant property rights for their participation in management or policy making.

Attitudes of forest department staff and perceptions of conservation practices affect coastal community attitudes towards sustainability. For instance, MDCs' conflicts with the forest department staff on resource harvesting allowances, strict rules on access, and rude behaviour or harassment by the forest department staff generates negative attitudes towards conservation. The lack of MDC involvement in decision-making and management are vital determinants of negative attitudes towards conservation (Badola et al., 2012; Datta et al., 2012). Thus, it is hypothesised that lack of involvement of local people and their customary knowledge in management has a significant negative impact on mangrove resource sustainability. Although there is a large body of research analysing local people's attitudes towards conservation, an analysis in the context of the SMF is absent. To address this gap, this study aims to assess MDCs' perceptions about property rights regimes and conservation practices. This will enable greater understanding of the link between MDCs' participation in management and policy-making and sustainable use of the mangrove resources. Mangrove conservation policy and management need an understanding of the impact of factors influencing conservation choices, economic activities and existing conflicts between MDCs' actions and conservation practices. These are important as a means of transition towards a green economy through improving human well being and simultaneously reducing environmental risks and ecological scarcities (UNEP, 2011). This paper initially focuses on an assessment of factors responsible for the existing level of MDCs' participation in mangrove conservation. In spite of strict control by the BFD, a more inclusive approach needs to be implemented if sustainable management is to be achieved. To achieve conservation through co-management, the second aim of the study is to identify factors that could influence the conservation practices of MDCs. Thus, this study addresses the following research question: How do the communities' perceptions of property rights regime impact the current conservation regime?

## 2. Analytical framework

This study uses the theory of property rights to assess bundles of property rights and their association with achieving coastal management. Allocation of property rights is very important to ensure MDC participation in resource management under a co-management structure. This participation also involves social aspects of participation in networks, shared values, understanding and norms (Plummer and FitzGibbon, 2006). Thus, it is hypothesised that conservation can be achieved by maintaining good mangrove conditions with inclusive and participatory coastal conservation policy and management with defined property rights. Coastal conservation policies fail in many countries under the sole bureaucratic management of forest departments (Badola et al., 2012; Stone et al., 2008) which could not allocate property rights to MDCs at an appropriate level (Schlager and Ostrom, 1992). For sustainable conservation to be achieved, these policies and

practices need to focus on the understanding of attitudes, needs and aspirations of local people (Mehta and Heinen, 2001).

‘Classical’ forms of property rights theory pay great attention to historical and institutional contexts (Coase, 1937, 1959, 1960). However, the ‘classical’ theory fails to explain situations where inefficient outcomes persist. For instance, it is unable to link the roles of MDCs to mangrove conservation efforts because of ill-defined property rights (Barbier, 2006; Nugent, 2003). While transaction costs and agency theories of organisation focus on optimistic perspective of equilibrium, classical property rights theory is better placed to handle shared ownership (Kim and Mahoney, 2005).

One of the most important issues regarding resource governance is to explore the relationship between equality of power among stakeholders and governance outcomes (Brockington, 2002). From this perspective, previous studies have applied the theory of property rights to examining sustainable outcomes for resources at the local level (Hayes and Persha, 2010; Irimie and Essmann, 2009). This concern of inequality-related factors shaping outcomes of common-pool resources is addressed in Schlager and Ostrom's (1992) theory of property rights. This theory can show how different mangrove dependent user groups can contribute to sustainable mangrove outcomes without being full owners of mangroves. The theory suggests the allocation of property rights bundles at lower but appropriate levels, such as: access, withdrawal for operational level rights and management, exclusion and alienation for collective level rights (Schlager and Ostrom, 1992) can achieve this same outcome. Schlager and Ostrom (1992) suggest that these rights, irrespective of their *de jure* or *de facto* nature, affect the incentive structure, participation of MDCs and outcomes observed in natural resource management situations.

Theoretical analysis of collective action was originated by Olson (1965) and Hardin (1968) who supported the roles of both government and private property, both of which were necessary conditions to avoid overharvesting. This theory was not challenged until Ostrom (1990) proposed that common property rights with appropriate rights bundles can make self governance likely at the community level, which would avoid the otherwise inevitable deterioration into Hardin's tragedy of commons. In fact, Ostrom proposed that property rights theory needed to link with other resource-based concepts such as co-management and social capital to enable sustainable management to be achieved (Ostrom and Ahn, 2003; Schlager and Ostrom, 1992).

Central to the co-management is the distribution of property rights and responsibilities related to a particular resource to several parties all of whom will gain from exhibiting reciprocal altruism (Plummer and Fennell, 2007; Plummer and Fitzgibbon, 2004). Thus, the co-management approach supports the application of community customary knowledge and joint monitoring to cap illegal harvesting by providing property right bundles to local user groups at an appropriate level (Jentoft, 1989; Matose, 2006). Co-management involves the process of sharing management decisions between centralised government agencies and local user groups (Beem, 2007). In fact, co-management structures involve a range of relationships by conferring a power sharing, decision-making authority, with a people-centred governance approach for problem solving (Berkes, 2009). However, co-management has failed to improve resource condition in cases where limited attention to the nestedness of community-based organisation was made (Brown et al., 2007). Gough et al. (2008) identify improper attention to enhancing community social capital as the underlying reason for such failures. Spellerberg (2001) defines social capital as relationships among actors of individuals, groups and/or organisations that drive the development of mutual benefit or common purpose. In the absence of social capital, cooperative behaviours are

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