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Study of Coastal Mangrove Conservation in the World

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Abstract

Coastal areas are the crucial interface between the two major elements that cover our planet. They provide ground for various ecosystems and biodiversity. In developing countries, many coastal communities live in close vicinity of these areas and rely on the resources of marine and coastal ecosystems to secure food and income. Ecosystems close to shore are however greatly under pressure from varying economic interests and development needs. A common approach to mangrove conservation, as with conservation of many ecosystems, involves establishing protected areas that reduce anthropogenic pressures.

Keywords: Coastal, Mangrove, Conservation

Introduction

Mangrove forests are home to a large variety of fish, crab, shrimp, and mollusk species. These fisheries form an essential source of food for thousands of coastal communities around the world. The forests also serve as nurseries for many fish species, including coral reef fish. A study on the Mesoamerican reef, for example, showed that there are as many as 25 times more fish of some species on reefs close to mangrove areas than in areas where mangroves have been cut down. This makes mangrove forests vitally important to coral reef and commercial fisheries as well (Morgan and Williams, 1995; Hermon *et al*., 2017; Hermon, 2017; Hermon *et al*., 2018).

Mangrove wood is resistant to rot and insects, making it extremely valuable. Many coastal and indigenous communities rely on this wood for construction material as well as for fuel. These communities also collect medicinal plants from mangrove ecosystems and use mangrove leaves as animal fodder. Recently, the forests have also been commercially harvested for pulp, wood chip, and charcoal production. The dense root systems of mangrove forests trap sediments flowing down rivers and off the land. This helps stabilizes the coastline and prevents erosion from waves and storms. In areas where mangroves have been cleared, coastal damage from hurricanes and typhoons is much more severe. By filtering out sediments, the forests also protect coral reefs and seagrass meadows from being smothered in sediment.

Given the diversity of life inhabiting mangrove systems, and their proximity in many cases to other tourist attractions such as coral reefs and sandy beaches, it is perhaps surprising that only a few countries have started to tap into the tourism potential of their mangrove forests. Places as diverse as Bonaire and offer snorkelling expeditions in and around mangroves to witness a marvellous variety of baby fish, jellyfish, and urchins against a magical background of interwoven roots delving deep into the sandy substrate. Great potential exists elsewhere for revenue generation in this manner, which values the mangroves intact and as they stand (Morgaan *et al*., 1996; Morgan *et al*., 2000).

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Method

The method in this research is literature study. In addition, data collection techniques were conducted with observations on mangrove habitats spread across Bangladesh, Indonesia, Thailand and South Africa. Documentation is done to analyze spread and conservation that is done globally. Common policy approaches for conserving mangroves include assessing existing policies and regulations for their adequacy in promoting sustainable management of coastal forests, bridging gaps between existing policies and implementation, development of forest rehabilitation plans, clarifying tenure and jurisdictions over mangrove areas, developing guidelines on incorporating forestry into coastal disaster management strategies and promoting best practices in collaborative coastal forest protection. For more information on the importance of policy measures in adaptation.

Results and Discussion

Mangroves are trees or large shrubs which are salt-tolerant and grow in intertidal zones in tropical and subtropical regions. They form dense forests along many tropical and subtropical coasts, are found in 123 countries and territories and are estimated to cover over 150,000 square kilometres globally. Mangroves form two groups known as true mangroves and associate mangroves. True mangroves are highly adapted to the intertidal zone where all or part of them are regularly submerged in saltwater. The length of inundation tolerated varies between true mangrove species. Globally, there are 69 species in 27 genera, belonging to 20 families that are considered as true mangrove species. Plant species other than the true mangroves are known as associate mangroves and include species such as *Hibiscus tiliaceus* (Var/Cotton Tree) or *Acrostichum aureum* (fouzer lanmar/mangrove fern). These are species found in mangrove forests and should be included as mangrove species for the purposes of conservation management and can greatly increase the potential of mangrove forests as an ecosystem-based adaptation (EBA) approach. They are also highly adapted to salty conditions, but less so than true mangroves, and will only tolerate infrequent inundation by saltwater during extremely high tides or wave run-up due to storm events.

A common approach to mangrove conservation, as with conservation of many ecosystems, involves establishing protected areas that reduce anthropogenic pressures. Mangrove restoration often involves reforestation using appropriate species, for example red mangrove *Rhizophora spp.* It usually follows three main stages: sorting propagules, supplying propagules to planters and planting. More details on the broader range of issues that can affect success are presented below. There is good evidence that, in the right circumstances, mangroves can help to reduce vulnerability to climate-related coastal hazards. As a result, mangrove restoration has been used as an ecosystem-based disaster risk reduction and adaptation measure, particularly following the 2004 Asian Tsunami, when many affected countries embarked on ambitious replanting programs. The structural diversity of mangrove roots and their position at the interface between land and sea gives mangroves an important role as habitats for numerous species. Mangroves provide habitats for threatened species, including the endangered Bengal tiger which occurs in the Sundarban mangrove ecosystem shared by India and Bangladesh and the critically endangered hawksbill turtle. Mangroves have also been found to act as a refuge for corals from ocean acidification (Hermon, 2012a; Hermon, 2012b; Hermon, 2014a; Hermon, 2014b; Hermon, 2017).

In addition, mangroves provide a number of important benefits for surrounding habitats contributing to water quality and nutrient transfer. Mangroves filter and trap sediment from run-off and river water before it reaches adjacent ecosystems, reducing the turbidity of the water and allowing essential light to reach ecosystems. Mangroves therefore contribute to the survival of these adjacent ecosystems and the species they support.

On average, the carbon stock of one hectare of mangroves, including soil carbon, is approximately 1,000 tonnes, more than twice the carbon storage of upland forests and five times that of savannah, meaning that mangroves are among the most carbon-rich forests in the tropics. Therefore, despite mangroves constituting less than 1% of the area of tropical forests globally, deforestation in these systems releases a disproportionate amount of carbon into the atmosphere as the carbon protected by mangroves is released. As a result, it is estimated that mangroves may be responsible for as much as 10% of all emissions from deforestation globally. Conservation and restoration of mangroves can therefore contribute significantly to climate change

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mitigation. Their ability to trap organic sediment and thus store carbon is why mangroves, among other systems, are referred to as 'blue carbon' sinks. It should be recognized that older stands of mangroves generally have accumulated large amounts of peat below them and thus store more carbon, therefore providing greater climate change mitigation benefits. In addition, as mangroves age, they store proportionally more carbon in their biomass because of higher productivity. Protection of mangroves should, where possible, priority older stands (Hermon, 2015; Hermon, 2016a; Hermon, 2016b).

Approximately one quarter of the world's mangrove cover has been destroyed and the rate of mangrove loss is still very high, estimated to be around 2 to 5 times higher than the average rate of loss for all forests. Human activities, including conversion to aquaculture, coastal development, overexploitation of timber and pollution, have been the primary causes of mangrove loss. A variety of climate change related pressures are likely to affect mangroves, including increased storm frequency and severity, sea level rise and changes in species distributions with sea level rise potentially being one of the greatest climate related threats. This threat is exacerbated if there is development directly inland of mangroves, as it is impossible for the system to move inland with sea level rise (Nelson *et al*., 2000).

Mangrove forest width is an important determinant of the likely effectiveness of the system for EBA. While narrow bands of mangrove forests, between 40 and 80m, can slow storm surge water flows, relatively wide bands of mangroves (several hundred meters or wider) are needed to significantly reduce storm surge flooding. The protection received also depends on the structure of the mangrove forest with denser structures needed to support protection by these relatively narrow bands of mangroves. In areas with gently sloping topography, even a small reduction in water level can result in a relatively large reduction in flood area. More information can be found in Spalding *et al*. 2014 in the Useful resources and materials section at the bottom of this page (Hermon, 2012a; Hermon, 2012b; Hermon *et al*., 2018a; Hermon *et al*., 2018b)

Conclusion

Coastal ecosystem in an integrated and community based. That is to improve coastal ecosystem is very important people involved turn, can improve the welfare of coastal communities. It also implies that the concepts of local (indigenous) on the ecosystem and its preservation should be fostered and promoted back as far as it can support this program.

References

Hermon, D. (2012a). Dinamika Cadangan Karbon berdasarkan Perubahan Tutupan Lahan menjadi Lahan Permukiman di Kota Padang. Forum Geografi. Vol. 26. No. 1: 45-52

Hermon, D. (2012b). Mitigasi Bencana Hidrometeorologi: Banjir, Longsor, Degradasi Lahan, Ekologi, Kekeringan, dan Puting Beliung. UNP Press.

Hermon, D. (2014a). Impact of Land Cover Change on Climate Change Trend in Padang, Indonesia. Indonesia Journal of Geography. Vol. 46. No. 2: 138-142.

Hermon, D. (2014b). Geografi Bencana Alam. Radjawali Press.

Hermon, D. (2015). Estimate of Changes in Carbon Stocks on Land Cover Change in the Leuser Ecosystem Area. Forum Geografi. Indonesia Journal of Spatial and Regional Analysis. Vol. 29. Issue 2: 187-196.

Hermon, D. (2016a). The Changes of Carbon Stocks and CO_2 Emission as The Result of Land Cover Change for Tin Mining and Settlement in Belitung Island Indonesia. Journal of Geography and Earth Sciences. Vol. 4: 17-30.

Hermon, D. (2016b). The Changes of Carbon Stocks and CO_2 Emission as the Result of Land Cover Change for Tin Mining and Settlement in Belitung Island, Indonesia. Journal of Geography and Earth Science. Vol. 4. No. 1: 17-30.

Hermon, D., P. Iskarni., O. Oktorie., and R. Wilis. (2017). The Model of Land Cover Change into Settlement Area and Tin Mining and its Affecting Factors in Belitung Island, Indonesia. Journal of Environment and Earth Science. Vo;. 7. No. 6: 32-39.

Hermon, D. (2017). Climate Change Mitigation. Rajawali Pers (Radjagrafindo). Jakarta.

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Hermon, D., A. Putra., and O. Oktorie. (2018a). Suitability Evaluation of Space Utilization Based on Enviromental Sustainability at The Coastal Area of Bungus Bay in Padang City, Indonesia. Vol. 14, Issu 41: 193-202.

Hermon, D., Ganefri., A. Putra., and O. Oktorie. (2018b). The Model of Mangrove Land Cover Change for the Estimation of Blue Carbon Stock Change in Belitung Island-Indonesia. International Journal of Applied Environmental Sciences. Vol. 13. Number 2: 191-202.

Morgan, R. and A.T. Williams. (1995). Socio-Demographic Parameters and User Priorities at Gower Beaches, UK. In: Healy, M.G. and Doody, J.P. (eds.), Directions in European Coastal Management. Cardigan: EUCC and Samara Publishing: 83-90.

Morgan, R., E. Gatell., R. Junyant., A. Micallef., E. Ozhan., and A. T. Williams. (1996). Pilot Studies of Mediterranean Beach User Perceptions. In: Ozhan, E. (ed.), ICZM in the Mediterranean and Black Sea: Immediate Needs for Research. Ankara, Turkey: METU: 99-110.

Morgan, R., E. Gatell., R. Junyent., A. Micallef., E. Ozhan., and A.T. Williams. (2000). An Improved Beach User Climate Index. Journal of Coastal Conservation. Vol. 6. No. 1: 41-50.

Nelson, C., R. Morgan., A.T. Williams., and J. Wood. (2000). Beach Awards and Management. Ocean & Coastal Management. Vol. 43: 87-98.