Series 2 – Social Pillar: Environment, Water, Sanitation and Regional Development

Mangrove Degradation: Reversing the Trend through Community Engagement

Virginia W. Wang'ondu

Key Messages

Community Sensitisation on growth characteristics of mangrove species to understand implications of over-utilisation

Development of holistic mangrove reforestation programme inclusive of all species

Funding of research that promotes biotechnological improvement of mangroves

*Mongroves Trees
(Photo: Karthik Easvur CC BY-SA.jpg)*

Context

Mangrove forests in Kenya cover approximately 61,271 hectares along a 536 km coastline supporting the livelihood of approximately 3 million Kenyans. The Lamu County coastline accounts for 61 per cent of mangrove forest cover (GoK, 2017), while Mombasa and Kwale Counties account for the remaining 29 per cent. Mangroves protect the shoreline and provide habitat and shelter for marine fish and other organisms that are a source of food. The wood from the trees are also utilized by communities for house construction, boat building and furniture making; and as a source of medicine, dye, firewood, charcoal and fencing poles. Mangroves are also very important in protecting the shoreline from erosion and excessive damage by floods, hurricanes and tsunamis. Thus, they are critical in sheltering and maintaining habitats and breeding grounds vital for growth, survival and reproduction of marine animals and fish. The trees also absorb carbon dioxide from the atmosphere thus contributing to climate change mitigation. The increase in levels of carbon dioxide has led to global warming resulting in unpredictable changing weather conditions being experienced in different parts of the world including prolonged droughts, unusually heavy rains, flooding, hurricanes, and tsunamis.

More than 3,000 fish species, crabs, shrimps, prawns, molluscs, oysters, among others live, shelter and breed in the mangrove forests. Marine fishing is an important economic activity and a major income earner producing 8,000 tons of marine fish, generating KES 100 million annually, and contributing approximately 0.5 per cent of all the goods and services produced in the country. Marine fish is also an important protein source for inland and coastal communities. Destruction and clearance of mangrove forests through logging and over-harvesting directly affects inshore and offshore commercial fisheries through lack of food, and loss of shelter and breeding grounds for most fish, threatening their survival. Also, the decline in fish numbers causes a loss of vital income and a much-needed protein source resulting in malnutrition and food insecurity. In Kenya, the loses are estimated at KES 582 million every year for inshore fisheries within the mangroves.

The Kenya population census carried out in 2009 reported a total coastal human population of 3.04 million (GoK, 2017). As the population has steadily increased, so has the demand for fish and over-exploitation of the mangrove forests for
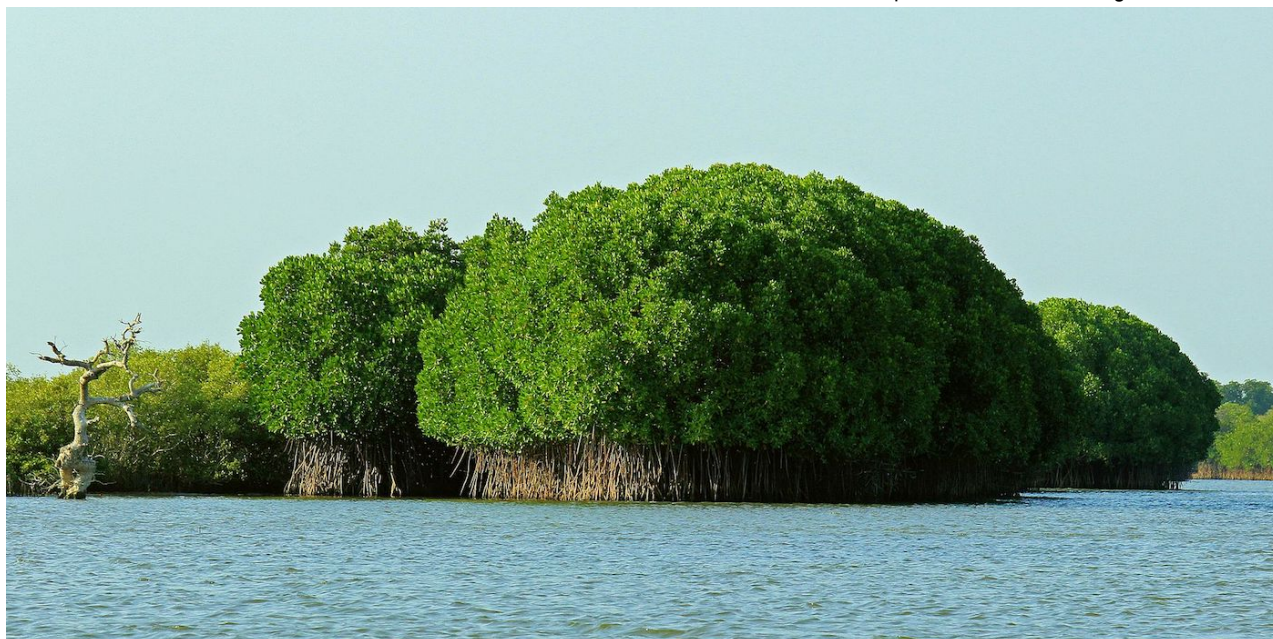
firewood, construction materials, and other resources. Coastal communities have a preference for certain mangrove species because of their likeable attributes and suitability for specific purposes. For example, there is a preference for construction wood from three species namely *Rhizophora mucronata, Ceriops tagal* and *Bruguiera gymnorrhiza* leading to their over-harvesting and over-exploitation.

A mangrove forest cover loss of 20 per cent (450 ha/year) was recorded between 1985 and 2009 of which Mombasa County experienced a 70 per cent loss (Bosire et al., 2013). This puts coastal people who rely directly on mangroves at risk of losing their livelihoods and experiencing increased poverty levels and is likely to escalate if the destruction is not adequately addressed, completely stopped, and urgent restoration of degraded forests and re-afforestation of coastlines initiated and encouraged.
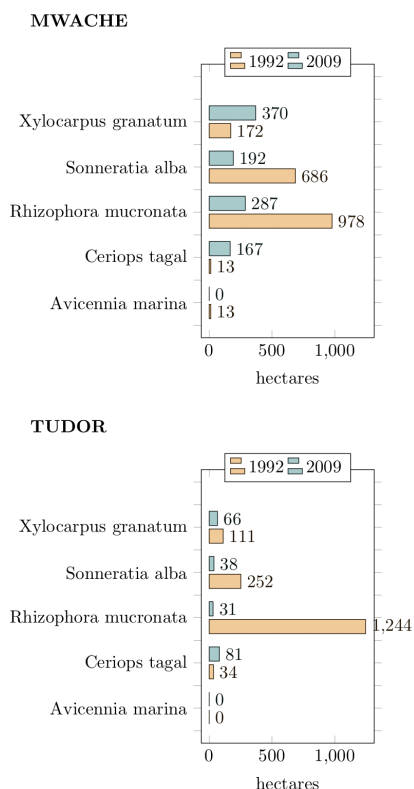
MWACHE

TUDOR

Figure 1 Mangrove species cover change between 1992 to 2009 (Modified from Bosire et al., 2013)

Our Study

This policy brief is based on a study in Mida creek, Watamu Marine National reserve, Kilifi County (a marine protected area) that investigated the effect of open access to mangrove forests on mangrove productivity, benthic (ecological region at the bottom of the rivers/ocean) biodiversity and fish productivity. In Kenya, the coastal communities largely depend on three main mangrove trees types, Rhizophora

mucronata, Ceriops tagal and Bruguiera gymnorrhiza, whose seeds take longer to mature – more than 18 months. The seeds of non-preferred tree types take 4 to 6 months to mature (Wang'ondu et al., 2013). The long maturity of preferred species seeds affects their availability for planting through natural regeneration or reforestation. Besides, these trees take 10 to 15 years before they reach the maturity stage suitable for harvesting. In our study, it was observed that continued cutting of these preferred species before maturity, primarily for house construction, has affected the stand structure of mangroves forests near human habitation (Wang'ondu et al., 2017). This contributes to forest cover loss and seed scarcity for natural regeneration and artificial planting. Old trees that are left are poor seed producers, making seedlings for re-afforestation to be in short supply or unavailable. Also, most of the community nurseries grow one species, R. mucronata, that is easy to grow in the nursery.

Community Participation

There is, therefore, an urgent need to create awareness, educate and train the communities on sustainable utilization of mangrove trees, conservation of threatened tree species and the need for sustainable seed propagation and re-afforestation efforts to achieve desirable forest cover, restore degraded coastlines, enhance marine animal life and improve community livelihoods through increased incomes and food security. Recently, coastal communities have actively participated in mangrove conservation through community conservation groups. Women, who were not initially allowed to participate in mangrove planting and protection, are spearheading mangrove conservation efforts. This has greatly boosted the number of tree nurseries and trees planted, improving forest management and protection of restored areas.

For example, in Kwale County the Mikoko Pamoja community project has endeavoured to conserve mangrove forest from destruction through a carbon market initiative. The community is financially compensated for conserving mangrove forests. Its duplication in other counties is key, backed by other conservation efforts. In addition, coastal farmers through Community Forest Associations (CFAs), guided by the Kenya Marine Fisheries Research Institute, Kenya Forest Service (KFS), Worldwide Fund for Nature, and other organizations have sought alternative trees, for example, Eucalyptus, Cypress, Casuarina, Mukeu and Mvule, to meet wood and fuel needs. However, since some the value of mangroves cannot be replaced by these trees, more effort needs to be directed toward the increase

mangrove forest cover. It is evident that community participation has and will continue to play a major role in mangrove conservation.

Policy Recommendations

Short-Term
- Ministry of Environment and Forestry through KFS and CFAs to promote utilization of non-preferred mangroves species for certain needs
- Community sensitization by KFS on growth characteristics of mangrove species to understand the implications of over-utilization of certain species.
- KFS to organize training sessions in line with seed development and growth characteristics of mangrove species.

Medium-Term
- Ministry of Environment and Forestry to develop a holistic mangrove reforestation programme which is inclusive of all species.
- Government funding of research that promotes the biotechnological improvement of mangroves whose genetic resource is reduced.

Acknowledgements

References

Bosire, J, O., Kaino J. J., Olagoke A. O., Mwihaki L. M., Ogendi G. M., Jairo J. G., Berger U. & Macharia D. (2013). Mangroves in peril: unprecedented degradation rates of peri-urban mangroves in Kenya. *Biogeosciences*, 10, 16371–16404.

FAO and UNEP (2016). *Valuing coastal ecosystem and economic assets: The importance of mangroves for food security and livelihoods among communities in Kilifi County and the Tana Delta, Kenya*.

Government of Kenya (2017). *National Mangrove Ecosystem Management Plan*. Kenya Forest Service, Nairobi, Kenya.

Wang'ondu, V.W., Kairo J.G., Kinyamario, J. I., Mwaura F. B., Bosire J. O., Dahdouh-Guebas F. & Koedam N. (2013).Vegetative and reproductive phenological traits of Rhizophora mucronata Lamk. and Sonneratia alba Sm. *Flora*, 208: 522-531.

Wang'ondu V. W., Muthumbi, A., Vanruesel, A. & Koedam N. (2017). Phenology of mangroves and its implication on forest management; a case study of Mida Creek, Kenya. *WIO Journal of Marine Science* 16 (2): 41-51.

Author

Virginia W. Wang'ondu
(vwangondu@uonbi.ac.ke)
School of Biological Sciences,
P.O. Box 30197-00100, University of Nairobi, Kenya