

MANGROVE FOREST ECOSYSTEM UTILIZATION FOR SUSTAINABLE LIVELIHOOD

Anosike, Q.C.,* Nwafor, O.E., Olubumi-Koyejo, A. and Okpara, I.G.

Forestry Research Institute of Nigeria
Eastern Research Station Umuahia

Abstract

This paper examines sustainable utilization of the mangrove forest ecosystem for livelihood. The mangrove forest ecosystem plays a very vital role in livelihood sustainability. The ecosystem harbours several resources, which are beneficial to man. Mangrove forest are coastal plant communities, which are part of a large coastal ecosystem that typically include mudflat, sea grass, meadows, tidal marshes, salt barrens and even coastal upland forest and fresh water wetland (i.e peat land), fresh stream and river . In more tropical climates coral reefs may also be part of this ecosystem. They are critical habitat for many species of fish and wildlife, serve as coastal fish and shellfish nursery and produce large quantities of leaf material that becomes the basis for a detritus food web .Mangrove forest plays ecological, economic and social roles, which are germane to sustainable livelihood. The way and manner the mangrove forest is being exploited and utilized is of great concern vice the sustainability and stability of the mangrove forest.

Keywords: Mangrove, Forest, Ecosystem, Utilization.

*queendarl2015@gmail.com

Introduction

Mangrove forest is a tropical coastal vegetation community, dominated by several species of mangrove tree that can grow and develop in the muddy tidal beach (Bengen, 2000). The utility of the mangrove forest ecosystem directly by consumers of associated resources, is without any doubt very high. The importance of these direct functions that the mangrove forest ecosystem renders defines its critical position in the rural community livelihood. The higher the perceived value of the mangrove forest ecosystem, the more it is exposed to various forms of exploitation and utilization. The mangrove forest ecosystem is very critical to survival of some rural communities inhabiting the area because they depend on this ecosystem for their daily survival in the form of income, food, building and healthcare. To them, life without the mangrove forest is unimaginable. Generally, the importance of mangrove cannot be overemphasized. Mangrove trees remained the most efficient photosynthetic flora compared to any other plant, forming a bridge between land and sea for much of the world's tropical coastal marine life (Russell, 1986). Quarto (2001) reported mangrove as fish nurseries and breeding grounds for fishes, crabs, shrimps, Mollusks and other sea life. The mangrove forest areas have the potential to be developed as tourism centres (ecotourism).

Contributions of Mangrove Forest Ecosystem to Sustainable Livelihood Forest Products

Mangrove ecosystem, as a whole, is treated as one of the most bountiful sources of edible products, both of floral and faunal origins, among all the major forest ecosystems. Apart from honey, tender leaves and buds, the fleshy fruits of *Avicennia marina*, *Pluchea indica*, *Bruguiera gymnorrhiza*, *Avicennia officinalis*, *Oncosperma tigillaria* and *Sonneratia apetala*, which are frequently used as vegetables in the daily diets of many marginal families of mangrove-fringe villages worldwide are all direct product of the ecosystem. Wild mushrooms and other fungal flora growing across the forests are also reported by Das *et al.* (2002a) as potential sources of income generation for the rural population.

Improving Coastal Water Quality

Mangroves maintain coastal water quality by abiotic and biotic retention, removal and cycling of nutrients, pollutants and particulate matter from land-based sources, thus filtering these materials from water before they reach seaward coral reef and sea grass habitats (Ewel, 1997). Mangrove root systems slow water flow, and by so doing, facilitate the deposition of sediment. Toxins and nutrients can be bound to sediment particles or within the molecular lattice of clay particles and are removed during sediment deposition. Compared with the expense of constructing a wastewater treatment plant, mangroves are commonly selected as receiving areas of effluent. Increasingly the notion of specifically constructed mangrove wetlands is being adopted and used for treatment of aquaculture and sewage effluents (Seanger, 2002).

Mangroves are functionally linked to neighbouring coastal ecosystems (Ellison, 2004). For instance, terrigenous sediments and nutrients carried by freshwater runoffs are first filtered by coastal forests, then by mangrove wetlands, and finally by sea grass beds before reaching coral reefs. The existence and health of coral reefs are dependent on the buffering capacity of these shoreward ecosystems, which support the oligotrophic conditions needed by coral reefs to limit overgrowth by algae (Ellison, 2004). Mangroves supply nutrients to adjacent coral reef and sea grass communities, sustaining these habitats' primary production and general health. The physical properties of mangrove forests tend to slow the water flow and sedimentation. Along with this deposition process occurs nutrients derived from various sources, including leaching from agricultural areas

Endangered Mangrove Coastlines and Human Development

As result of their entangled above – ground root system, mangrove communities protect shoreline during storm events by absorbing wav energy and reducing the velocity of water passing through the root barrier. In addition, mangroves protect intertidal sediment along coastlines from being eroded away during harsh weather all year round. As new cities are developed, mangrove forests around the world have felt a great impact not only

on their ecosystems health, but also their wave-attenuating capacity (Bruma, 2014). Wave energy may be reduced by 75 per cent in the wave's passage through 200 meters of mangrove forests, a very substantial amount once the mangrove has been removed. Mangrove covered shorelines are less likely to erode, or will erode significantly more slowly, than shorelines not covered by vegetation during periods of high wave energy (Seager, 2002). Mangroves also have influence on coastal profile, water depth and bottom configuration. Mangroves provide a number of essentials for many different ecosystems, including food and shelter for a diverse animal community, living both below and above sea level (Schongalla, 2014). Maintaining a healthy mangrove forest sustains natural protection and is less expensive than seawalls and similar erosion control structures, which can increase erosion in front of the structure and at adjacent properties due to coastal currents. Mangroves are a better alternative to protecting coastlines from eroding than other man-made structures, such as seawalls.

Benefits of Mangrove Forest

Habitat for endangered species

Mangroves are often the habitat of wildlife species. More than 100 species of birds live here, and extensive land borders with mud that the mangrove forest is a place of landing of thousands of migratory birds. Mangrove forest is a place of landing of thousands of migratory birds, including rare species like the Asian Bleekers (*Limnodruus semipalmatus*).

Protection against natural disasters

Mangrove forest vegetation protects the buildings, agricultural crops or natural vegetation from damage by storms or salt-laden air through her filtration process (Davis *et al.*, 1995).

Siltation

The physical properties of plants in mangrove forests assist her siltation process. Siltation is closely related to the removal of toxins and water nutrients, which are often bound to the sludge particles. With the mangrove forest, sea water quality is improved from silt erosion (Davis *et al.*, 1995).

Recreation and tourism

The mangrove forest provide different attraction for tourist site. Characteristics of forests that are in transition between land and sea is unique in several respects. The tourists also get lessons on the environment directly from nature. Pantai Padang, West Sumatra's total area of 43.80 ha of mangrove forest areas, have the opportunity to be a tourist area of mangrove. This tourist activities in addition to providing direct income to the manager through the sale of entrance tickets and parking, are also able to grow the economy in the surrounding community by providing employment and business opportunities, such as open food stalls, rent a boat, and a tour guide. (Davis *et al.*, 1995).

Educational and research

Efforts development of science and technology requires a good field laboratory for research and educational activities.

Maintain the processes and natural systems

Mangroves play essential role in supporting the ongoing processes of ecological, geomorphological, or geology in it.

Carbon sequestration

The process of change fotosentesis inorganic carbon (CO₂) into organic carbon in the form of vegetation. In most ecosystems, these materials decompose and release carbon back into the atmosphere as (CO₂). However, mangrove forests in fact contain a large amount of organic material that does not rot. Therefore, more mangrove forests serve as carbon sink than a source of carbon (Davis *et al.* , 1995).

Maintain microclimate

Mangrove forest evapotranspiration and able to maintain ketembaban rainfall region, so that the micro-climate equilibrium maintained.

Prevent the development of acidic sulfate soil

The existence of mangrove forests to prevent teroksidasinya coating pyrite and obstruct the development of natural conditions.

Mangrove Forests and Fisheries

In the review cycle of biomass, mangrove forests provide input of nutrients to aquatic ecosystems, providing shelter and care places for children of fish, where the mating/spawning, and others. The main food source for aquatic organisms in mangrove area is in the form of particles of organic material (detritus) resulting from the decomposition of mangrove litter (such as leaves, twigs and flowers). During the process of decomposition, mangrove litter gradually increasing levels of protein and serves as a source of food for a variety of deposit-eating organisms such as molluscs, crabs dang Polychaeta worms. These primary consumers become food for the consumer level two, usually dominated by predatory fishes smaller then eaten by juvenile fish forming large predatory consumer level three short, mangroves play an important role in providing habitat for various kinds of commodity-ragamjenis important fisheries in both whole or part of their life cycle (Davis *el at.*, 1995).

Conclusion

Mangrove forest is seen to be an important natural resource extremely beneficial to people living within this vicinity. The indigenous populations occupying the mangrove forest ecosystem have depended on it for food, shelter, clothing and income. There are

equally many direct economic benefits from mangrove resources as they are seen to be sources of energy, sites for fishing activities, a habitat for diversity of flora and fauna and an attraction site for tourism. Above all, Mangroves are now looked after by scientists as saviors in the today's scenario of global warming. Most of the coastal areas throughout the world are going to be affected by sea level rise due to global warming. The effects of which are already visible. Therefore, when most of the coastal areas will be flooded, mangroves can possibly provide a gene bank for cultivating salt tolerant species of crops which could be our future resource.

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