Ecological Mangrove Restoration: Re-establishing an ecosystem with community participation

Mangrove forests are vital for healthy coastal ecosystems in many regions of the world. They support an immense variety of sea life in intricate food webs associated directly with the mangrove trees themselves.

They are refuge for juvenile fish, crabs, shrimp and mollusks. Mangroves are also prime nesting and feeding sites for hundreds of migratory bird species. Additionally manatees and dugongs, crab eating monkeys, fishing cats, sea turtles and Mud Skippers utilize and depend upon mangrove wetlands, as do the spotted deer and the endangered Royal Bengal tigers of the Sundarbans of South Asia.

Healthy mangrove forests play an important role in carbon sequestration -their ecosystems and corresponding wetlands account for nearly a third of the world's terrestrial carbon stores (Ramsar Secretariat 2002).

Intact mangroves also form a natural coastline protection shield against floods, storms or other natural events such as hurricanes and tsunamis that usually cause disaster.

Beyond these irreplaceable ecosystem services, mangroves also provide important socio-economic benefits to coastal communities. In regions where the forest has been destroyed, local coastal communities are left with marginal or unproductive fisheries and without their traditional livelihoods.

In spite of those important functions, more than 50% of the global mangrove forests have been destroyed over the last 100 years, mainly caused by human harmful projects. In addition, mangrove ecosystems and salt marshes are vulnerable to negative effects caused by climate change such as rising sea levels, higher temperatures, storms, floodings and so on.

Reforestation programs in these areas would therefore rebuild mangrove forest protection and increase the potential for sustainable development. The improvement of mangrove ecosystems will enhance their function as a natural water treatment system and spawning grounds for fish, improving health and fishing possibilities while benefiting marginalized local communities.

However, very few organisations so far have dealt effectively with mangrove restoration and relatively few experiences exist on successful, long-term mangrove rehabilitation. partly because these have not corrected the problem(s) which caused the mangrove loss in the first place. Too often, due to economic reasons and traditional forestry practices favouring charcoal production, single species mangrove plantations are established. However, these plantations are often established in mud flats, salt flats and even sea grass beds, thus converting one viable and important ecosystem into another, which is not a wise solution when attempting to "restore" ecosystem functions, even if these projects do successfully establish some mangroves.

This practice of hand planting propagules and seedlings is aptly described as the "gardening method," whereby monoculture plantations of usually one or two varieties of mangrove are

established. These plantations are also less resilitant to natural disaster, disease or insects. In tropical areas where there may be two or more dozen mangrove species, it makes little sense to label this “gardening” approach as “restoration” because the natural biodiversity and productivity of the original healthy mangrove forest is not an outcome under this simplified technique. Most often, these “gardening” efforts fail to establish any significant mangrove cover.

In search of a compromise between economic value and biodiversity, Mangrove Action Project (MAP) promotes the concept and practice of Ecological Mangrove Restoration (EMR). EMR is based upon a set of basic ecological principles and capable of restoring a much more naturally functional and biodiverse mangrove ecosystem when compared to other more capital and labour intensive methods such as hand-planting alone.

Ecological Mangrove Restoration is defined as “the process of repairing damage caused by humans to the diversity and dynamics of indigenous ecosystems” (Jackson et al. 1995). It is a holistic approach to mangrove restoration that also includes a view of the proposed plant and animal community to be restored as part of a larger ecosystem with other ecological communities that also have functions to be protected or restored. It has been reported that mangrove forests around the world can self-repair or successfully undergo secondary succession over periods of 15-30 years if: 1) the normal tidal hydrology is not disrupted and 2) the availability of waterborne seeds or seedlings (propagules) of mangroves from adjacent stands is not disrupted or blocked.

Unfortunately, many mangrove restoration projects move immediately into planting of mangroves without determining why natural recovery has not occurred. There may even be a large capital investment in growing mangrove seedlings in a nursery before stress factors are assessed. This often results in major failures of planting efforts.

EMR approach can be a first step to re-establish an ecosystem that benefits nature and livelihoods at the same time. With mangrove restoration, the natural functions of the mangrove ecosystem will be revived. Water quality, health and fish fauna will be improved and new income opportunities will be created, positively affecting the livelihood of the rural communities.

Moreover, adaptation to climate change and increased disaster risk through cost-effective natural vegetative protection shields such as mangroves is a relatively new concept and relies on ecosystem services instead of engineering technologies and hard infrastructures to reduce the severity of disasters.

MAP’s EMR projects include direct involvement of local communities in the restoration of mangrove ecosystems, as well as in building up sustainable solutions that will benefit them directly, as a way to ensure the success and the longevity of the project. Critical to the process is development of a community mangrove management plan by the local group which will be the primary force preventing the repeated degradation of the restoration site.

Reaching far beyond just planting of seedlings, EMR, which restores natural water flows, greatly increases the overall success rate for restoring large areas of degraded mangrove forests producing a more biodiverse restoration with long-term results.

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