A "How-to-do toolkit" on in mangrove restoration

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Introduction

Mangroves are shrubs or small trees that grow in coastal saline or brackish waters but if undisturbed, they can grow into trees of considerable sizes. They are found mostly in the tropics and subtropics, mainly between latitudes 25° N and 25° S. Mangroves are salt tolerant plants known as ***halophytes*** that are adapted to life in harsh coastal conditions. They contain a complex salt filtration system and root system to cope with salt water immersion and wave action. They are well adapted to the low oxygen (anoxic) conditions of waterlogged environments. In most environments, they are found in tidal estuaries where salt water mixes with fresh water.

Importance of mangroves

Mangroves have been identified as one of the most productive and biologically complex ecosystems on earth. They represent a unique ecosystem which play crucial environmental functions. Some of these include the following:

- Provides ideal breeding/spawning grounds for fish and other aquatic life. It is generally recognized that without mangroves, the fisheries sector will most likely be doomed.
- Provides effective, low-cost environmentally friendly protection natural barriers against extreme whether events such as storms and floods particularly for low-lying coastal communities.
- They are considered one of the most productive ecosystems rich in biodiversity and provides habitats for a wide variety of animal and plant species.
- Provides sustainable livelihoods for the local population through fishing, oyster collection and lime and salt production.
- Play a crucial role in groundwater purification, storage and recharge.
- Store considerable amounts of carbon and thus serve as major carbon sinks to mitigate climate change effects.

Threats to mangroves

Globally, mangroves are under severe pressure thus threatening their survival. The threats to their survival stem from the following factors:

- Climate change resulting from declining rainfall and the continuous buildup of salts in the soil.
- Unsustainable land use practices such as oyster harvesting, illegal logging for timber, salt mining etc.
- Conversion into human settlements.
- Pollution due to waste disposal and dumping.

Outline of steps

Given the importance of mangroves to our seascapes, it is imperative that efforts at the community level be geared towards not only their protection but restoration as well. This simplified guide outlines the steps involved in restoring mangroves in our local environments. Since there are different species of mangroves depending on location, this guide is only restricted to mangroves of the *Rhizophora species* commonly found in West Africa.

(1.). Collecting the seeds

Mangrove seeds are called 'Propagules'. Depending on your location, the seeds will ripen and fall to the ground in the middle towards the end of the rainy season. In The Gambia for example, the propagules are ripe around mid-August to early September. A propagule is ripe when the buds start to emerge at the tip.

(2). **Transporting and storing the propagules**

The ripe propagules should be collected before planting in the selected area. Once collected, they should be transported to the planting site in bags and placed under water overnight to prevent them from losing their water content.

(3.) **Site identification**.

The ideal site for planting mangroves is one that is subjected to daily tidal influence, has clay top or upper subsoils. If the site is outside the influence of the daily tides, the planted seedlings will not survive. They should be submerged in the water for only one day otherwise the propagules will start to decompose thereby lowering their chances of survival.

(4). **Planting techniques**.

Although young mangrove seedlings can be planted randomly, it is generally recommended to plant them in rows. The plants should be spaced 1 meter apart and 2 meters between the rows. This spacing would give 5, 000 plants per hectare. Before planting, 2 persons can hold a marked rope tied to 2 poles with people stationed along the row ready to plant on the 1 meter marks. Once the propagules are planted, the rope is then transferred to the next row and the process is repeated until the whole area is planted.

(5). **Follow ups and sustainability plan**.

To be successful, mangrove restoration initiatives should be community-based and involve the participation of the local communities. Once planted, it is important to monitor and replace those that did not survive. If there are nearby schools, environmental clubs should be established, supported and engaged in the entire process. Regular field visits as part of the environmental curriculum in the schools should be organized to the sites. In that way, monitoring aspects can be taken up by the schools' environmental clubs on behalf of the communities.