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The genetic garden

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The Genetic Garden

Over the years, the mangrove forests have undergone tremendous pressures due to the demands of growing human population. A great number of people lives in the coastal mangrove areas and derived their livelihood from mangrove products aside from fishing and farming. Immediate action is needed to prevent further damage of the remaining mangroves and its sustainable management is the establishment of the mangrove genetic garden where species could be maintained. The prime functions of the mangrove germplasm garden is for protection and conservation for sustainable use.

Selection of Site. The principal concern of designing a mangrove genetic garden is the conservation of biodiversity in mangrove ecosystem. The sites should be selected not intended to serve as national park but as a pool to enhance genetic diversity. The identification of sites will be based on the following criteria:

- accessibility
- close proximity to research ecosystems and/or habitats with rich diversity (large number of endemic, threatened and/or rare species);
- legal status (possibly reserved or protected areas); and
- institutional/social (social, political, economic, and human aspects).

Site Characterization. Boundaries should be delineated and characterized showing land use patterns, anthropogenic features using Geographical Information Systems (GIS). Baseline inventories through ecogeographical survey should be conducted to assess the needs for research and monitoring, and management intervention. Ecological zoning and/or stratification of mangrove zones into homogenous strata will be undertaken to identify intraspecific genetic variation.

Socio demographic information, economic condition, awareness perception and attitudes of coastal mangrove dwellers toward mangrove conservation will be initiated.

Sampling Technique and Selection. The method of sampling will depend on the status of the area. A priority knowledge of patterns and structural complexity of genetic variation within and between species as well as at ecosystem level is necessary. Breeding systems, reproductive biology and mode of occurrence are fundamental to conserving and managing genetic resources.

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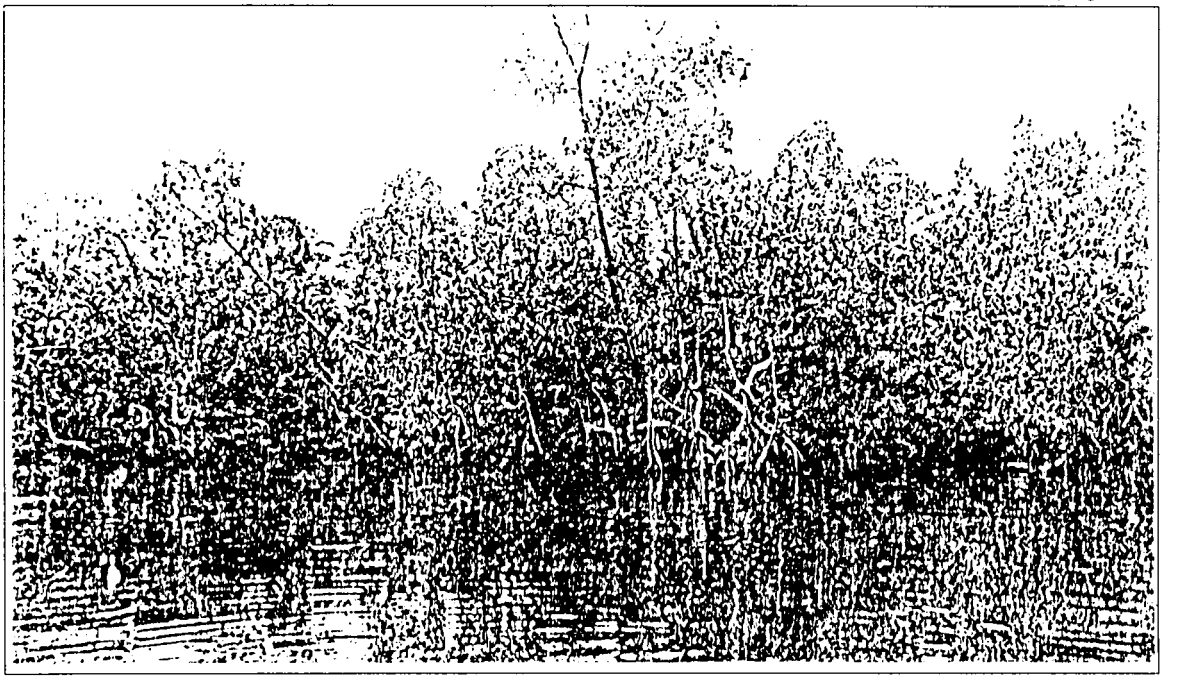

Conservation Strategies. Genetic conservation efforts can be carried out in two ways: *in situ* and *ex situ. In situ* depends on ecogeographical surveys and monitoring of important habitats to determine the number, size, and extent of resources needed to provide range of species. *Ex situ* management include the managed or living stand where the seeds will be collected and maintained for observation. This involves collection, storage and regeneration, documentation and information systems development, evaluation, enhancement and exchange.

A combined *in situ* and *ex situ* conservation techniques is ideal to conserve and manage the genetic variation of mangrove trees.

Research and Monitoring. A long-term research program should be initiated to gain scientific understanding of the ecological process that maintains mangrove biodiversity. Researches are best addressed in an inter-disciplinary approach in assessing the different natural and socio-economic process in mangrove ecosystems. Monitoring on the other hand, should be an integral part of any conservation activity. Biological indicators at all levels of ecosystems, species populations, and genetic diversity must be identified and selected. Appropriate assessment should provide a baseline information on the conservation status of biodiversity.

Development of Management Plan. A comprehensive management plan will be drawn from the physical, socioeconomic, and ecogeographical surveys. The plan should provide an overview of the steps to be undertaken essential in the establishment of a mangrove genetic garden. This should be based on the distribution of genetic variability as determined by surveys and include as many genetically local population as possible. The plan should also specify directives for coordination and involvement of coastal communities to integrate them in the conservation and management of the mangrove resources.

Policy and Management Recommendations

The government laid down management action-oriented policies, rules, and regulations related to mangroves through Presidential Decrees, Letters of Instruction, Special Orders, and Administrative Orders. However, these rules and laws need effective and efficient implementation.

The conservation of natural resources like mangrove forests is the joint responsibility of both the government and the citizens. The following are recommendations for some key forms of action towards the protection of our mangroves. They are addressed to individuals or community groups, environmental groups and the government sector.

Individuals or Community Groups

- Monitor aquatic resources in the area, particularly mangrove forests, and raise community awareness by organizing the community for the protection of these resources.
- Dispose garbage and other waste properly to avoid polluting mangrove swamps.
- Initiate or join activities to replace or replant more mangrove trees, specially in areas where reforestation of mangroves are badly needed.
- Adopt aquaculture methods which entail minimal modification of mangrove areas, e.g., oyster culture in aerial roots, mussel culture, clam culture, seaweed farming, etc.

Environmental Groups

- Strengthen information dissemination campaign on all aspects of mangrove forests as an ecosystem, through both mass media and school curricula incorporation.
- Establish closer linkages with other environmental groups and government institutions that work for the protection of mangrove resources, and participate in their activities.

Government

- Delineate the areal extent and zone of mangrove areas. This will involve a review of the present zonification and classification guidelines.
- Formulate steps to halt uncontrolled and unnecessary alteration of mangrove areas.
- Installation of data/information bank on mangrove forests as a natural resource and as an ecosystem.
- Reevaluation and assessment of the relevance of the following in mangrove area management planning: a.) *ownership/common property value;* b.) *conditions of open access;* c.) *establishment of social welfare value;* d.) *international value judgment;* e.) *existing alternative resource policy;* f.) *irreversibility and* g.) *policy and allocation of mangrove forests*

Sources: (1) Roman EB. Designing a Genetic Garden for mangrove Germplasm Conservation. Canopy International. Sept-Oct 1993.