Floating Mangroves for Tropical Oceans

(biofuel, cash crop halophytes, carbon sequestration, and uptake of land-based marine pollutants)

Photo: *Avicennia marina* mangroves

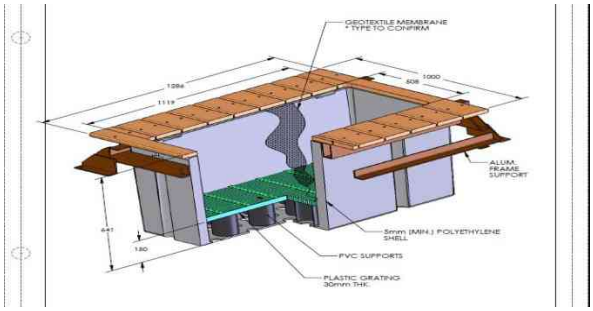
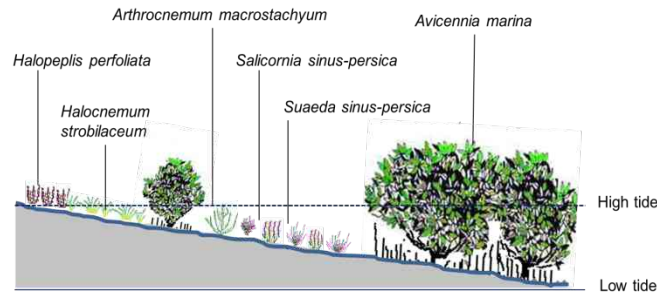


Photo: Semi-permeable floating mangrove device



Graphic: Cross-section of inter-tidal vegetation zones

Photo: Model floating mangroves

Background

Mangroves, depending on species and location, have high primary productivity rates, producing large quantities of woody biomass, based on seawater only. This makes them highly valuable for the production of fresh-water independent biofuel. By producing biofuel based on floating mangroves in the coastal oceans, the competition for food-security is eliminated. 1 ton of wood-chips are currently being sold for ca. 170 US$, and make available 3500 kW/h. Moreover, mangroves store up-to 50 x more carbon when compared with tropical rainforests. They once covered 32 million hectares globally. Less than half of it remains, due to habitat loss. Mangroves can sequester 1,5 tons of carbon / hectare / year, and store up-to 700 tons in the sediment. UNESCO's new science-based technology offers a number of potential benefits, including environmentally friendly biofuel, a contribution to climate change mitigation via carbon sequestration, reduction of land-based marine pollution, and the production of other cash crop halophytes. A model of floating mangroves has been developed in Qatar, and it shows a remarkable increase in biomass. There is the need to develop a larger proto-type with replica, in order to provide exact scientific data, with good statistics. It has been proven that it works. It might be a real blessing for the production of renewable energy, as well as to reduce atmospheric carbon levels in the best interest of climate change mitigation. The concept is promising for all coastal tropical and some sub-tropical countries.

UNESCO Addis Ababa, in partnership with UNESCO's Division on Ecological and Earth Sciences, is currently discussing the possibility to further develop this element jointly with the International Tropical Timber Organization (ITTO), and the African Union Commission (AUC). Funding is needed to develop a prototype. Almost every (African) tropical Member State offers suitable bio-geographical conditions for the prototype.

Milestones

A. A model of floating mangroves has been developed in Qatar,

B. The new concept has been presented during the COP 18 Climate Change Conference,

C. The scientific findings have been published: *Floating mangroves: the solution to reduce atmospheric carbon levels and land-based marine pollution?* Springer, TVS 47; 2014.

D. The African Union Commission and ITTO support this proposal,

E. Encourage stakeholders to develop proto-types of floating mangroves,

F. Develop proto-types and collect statistically sound scientific data with African scientists;

1. Carbon sequestration capacity of floating mangroves,
2. Capacity of floating mangroves to uptake marine pollutants (N, P, K, others),
3. Profitability prospects of floating mangroves in view of biofuel and cash crop halophytes,
4. Economic feasibility to develop and apply floating mangroves on a large scale,
5. Optimization of the materials and design of floating mangroves,
6. Environmental and socio-economic impact assessment of floating mangroves.

G. Stakeholder and specialist work-shop to develop recommendations for future activities.

Indicators

a. Prototype with replicas of floating mangroves and accurate scientific data produced by young professional men and women in Africa.

b. Number of peer-reviewed scientific papers produced.

c. Number of African M.Sc. and/or Ph.D. thesis produced.

d. Prospects on floating mangroves produced and made available to tropical Member States and their mangrove R & D community.

Photos: Seawater-irrigated fresh-water independent floating mangroves in Qatar show very good productivity, development of flowers and seeds.

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