

AQUACULTURE IN MANGROVE ENVIRONMENT

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Coastal ecosystems, of which mangroves form an integral part, are intricately diverse and equally high productive biotopes, accounting for more than 60% of the World's sea-food production, through capture and culture fisheries. Essentially an Intertidal or littoral space, the mangrove ecosystem is a stressful habitat and is subjected to the lack of vigorous water motion, active sedimentation of fine particles, relatively sheltered location with high decomposing detrital matter, all of which makes the biota adapt to a wide range of environmental variations or evolve strategies to minimise the severity of stress.

No correlation is reported to exist between the phytoplankton biomass, benthic biomass and exploitable fish yield from the mangrove ecosystem. A major part of the primary production enters the mangrove food web as dead organic matter, i.e., detritus, which is either utilised within the mangrove ecosystem or transported into the adjoining water body in a degraded form. Several costly experiences have proven that mangrove environment is not necessarily the optimum location for aquaculture. In spite of being a none-too-ideal aquaculture site, the estuaries and backwaters fringed by mangrove vegetation have long been used for rearing and/or fattening of prawns, bivalves and finfishes.

In India such areas, to name a few, are "bheris" in West Bengal, "Chemmeen Kettu" in Kerala, "Gazani" in Karnataka, "Khazan" in Goa and "Khar lands" in Maharashtra, and they reportedly cover an area of over 45,000 hectares with an annual yield of 15,000 tons of shrimps and 20,000 tons of bivalves, crabs and finfishes. The general consensus based on the analysis of cost factor, pond management efficiency and annual production levels has indicated that the disadvantages of setting up of largescale commercial aquaculture ventures in mangrove areas outweigh the advantages and should be resorted to only in the absence of other options. The scientifically managed aquaculture operations in mangrove ecosystems are relevant to less-developed and developing countries where considerations of minimum use of capital, simplicity of operation, low cost-low price products and a substantial and effective market demand favour it.

In India especially in the last two decades, a number of experimental aquaculture farms have been developed in estuaries and backwaters fringed with mangrove vegetation. A fish farm in the reclaimed mangrove swamp sustained prawn and fish production varying from 1400 to 2200 kg/ha, with prawns alone contributing 550 kg/ha. The culture of "mulletts" and "pearl spot" in a fish farm surrounded by mangrove vegetation showed a net increase in fish biomass of 800 kg/ha and a high rate of return of 75% on the investment. Similarly, in the culture of green mussels on a floating raft in a mangrove-lined open estuarine site, a high yield of 4.8t/ha/yr with a rate of return of 180% on the investment has been reported.

The aquaculture in mangroves signifies a case of necessity rather than suitability. In specific cases of aquaculture in the mangrove ecosystem of India as elsewhere, economic and social benefits may outweigh management problems. Experience in Thailand, Indonesia, Ecuador and Panama

has shown that salt flats and other spaces on the landward side of mangrove vegetation are suitable for aquaculture. While any substantial increase in marine capture fisheries is thought to be rather uneconomical, other logical course of action for fulfilling the realistic demand for seafood proteins will be from marine and estuarine culture fisheries or aquaculture and towards this, mangrove vegetation as an integral part of most productive and presently underutilised coastal ecosystem, offers immense opportunities for generating food resources through aquaculture.

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