Lake 2016: Conference on Conservation and Sustainable Management of Ecologically Sensitive Regions in Western Ghats [THE 10TH BIENNIAL LAKE CONFERENCE]
Date: 28-30th December 2016, http://ces.iisc.ernet.in/energy
Venue: V.S. Acharya Auditorium, **Alva's Education Foundation**, Sundari Ananda Alva Campus, Vidyagiri, Moodbidri, D.K. Dist., Karnataka, India – 574227

ECONOMIC VALUATION- AN AID TO MANAGE WETLANDS

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***Synopsis*– Economic Valuation is considered as a best tool in the effort to improve the management of environmental resources such as wetlands. The present paper is an attempt to find out the total economic value of overall economic efficiency of the various competing uses of mangroves should be assessed. Sample sites in Vellikkeel, Kunchimangalam, Valapattanam and Payangady of North Malabar are selected for the study. Owing to this, the methods of investigation adopted in the present study range from house hold surveys, review of literature, foot surveys of bio-diversity studies, and Ecosystem value analysis from people of different walks of life like aged people, fisherman, and other stakeholders. An economic evaluation of selected mangrove area to assess both the market and non market values which supports – (a) economic activities (b) environmental & ecological services, is very essential to protect the fragile ecosystem. Method of Costanza *et al*., (1997) is followed to determine the ESV. The ecosystem service value per hectare per year is calculated as US $ 10960. So the value for total 3750 ha of North Malabar is 10960 x 3750 = 41100000 (US $). The cost benefit analysis of shrimp farming indicates that commercial farming became a threat to wetland.**

1. INTRODUCTION

Valuation is considered as a best tool in the effort to improve the management of environmental resources such as wetlands. The Mangrove forests are one of the most productive and biodiverse wetlands on earth. Generally speaking, mangroves are distributed in the tropical and sub tropical zones between the Tropic of Cancer and the Tropic of Capricorn with the Malaysian and Indonesian region supporting the most diverse mangrove communities in the world. The mangrove ecosystem derive many of the physical, chemical and biological characteristics from the sea and the inflowing freshwater from the upland forests. Kerala, a relatively small state comprising an area of 38,864 Km² criss crossed by 44 rivers, contains several large natural lakes, manmade lakes etc. Mangrove forests of Kerala are highly localized , but the species diversity of these mangroves and its associates are comparatively rich. In North Malabar mainly the mangroves are situated in Edakkad, Pappinisseri (on the banks of Valapattanam river), Kunhimangalam (Perumba river), Kavvayi estuary and areas like Tellichery, Mahe etc. The mangrove ecosystem are widely recognized as providers of wide variety of goods and services to people, including storm abatement, sediment trapping, nutrient trapping, nutrient uptake and transformation and provision of wide variety of plant and animal products (Khaleel, 2005). Due to their unique ecology and physiology, mangroves provides optimal breeding, feeding and nursery ground for many ecologically and economically important fish and shell fish species as well as feeding habitat for resident and migrant birds. A figure of 1% decline per year has been given as the conservative estimate for the Asia-Pacific region, while accurate estimate of global deforestation rates of mangroves are as yet unavailable. Anthropogenic pressures on mangroves include clear cutting and reclamation for agriculture and aquaculture, urban expansion, developmental activities, various types of pollution etc. Much of the conversion of mangroves has occurred because this habitat was traditionally regarded as wasteland (Jagathap *et.al*., 2002)

The present paper is an attempt to find out the total economic value of overall economic efficiency of the various competing uses of mangroves should be assessed. An economic evaluation of selected mangrove area to assess both the market and non market values which supports – (a) economic activities (b) environmental & ecological services, is very essential to protect the fragile ecosystem. These values are forgone benefits of mangroves which should be compared with net returns from full conversion of mangrove area into commercially intensive areas. The study focused on the importance of economic valuation in conservation and sustainable utilization of mangrove rich wetlands.

2. MATERIALS AND METHODS

Sample sites in Vellikkeel, Kunchimangalam, Valapattanam and Payangady of North Malabar are selected for the study. Valapatanam is rich in species diversity of mangroves (Khaleel, 2005). The study envisages to generate baseline data on the mangroves and wetlands of North Malabar and to review the pattern of resource use in the wetlands in terms of sustainable utilization of resources. This demands an inter-disciplinary approach with components of socio-economic, biodiversity, and cartographic appraisal of the landscape units in different localities.

Owing to this, the methods of investigation adopted in the present study range from house hold surveys, review of literature, foot surveys of bio-diversity studies, and Ecosystem value analysis. Data collected through questionnaire and interview with the people from different walks of life – aged people, fisherman, and other stakeholders. Detailed survey has been conducted to obtain data regarding products, cost of labor etc. Samples were collected for taxonomical studies. Method of Costanza *et al*., (1997) is followed to determine the Ecosystem value. The essence of Ecosystem value approach is to estimate values as subtractions from or additions to income that leave people equally economically satisfied with or without a change in the services provided by Mangrove ecosystem.

3. RESULTS AND DISCUSSION

The extent of Mangrove forest in North Malabar from Calicut to Kasaragod Districts is 3750 ha., Kannur District is having the major share of it. These wetlands harbor a number of plants and animals. Large number of plants and animals depend on mangrove wetlands as their habitat. The mangrove wetlands of North Malabar contain 14 true mangrove species in various families and mangrove associates. The population of birds in the mangrove wetlands is 109 species in which 34 are migratory. There are diverse fishes, shell fishes, clams etc in the wetlands. The mangrove wetlands have strong linkages with coastal environment and agriculture and are considered important areas for sustenance of the coastal communities. Stability of the function of these ecosystems depends on climate stability and coastal processes. Even a minor change in global temperature and climate of the area would have major impact on the coastal wetlands and also on land and water based activities in the region. Most of the true mangroves are medicinal and economically important. Coastal communities are involved in *Kaipad* cultivation, fishing, shrimp farming, clam collection, crab collection etc. The *kaipad* is a mode of rice cultivation practicing in fields of riverside. It is totally an eco friendly mode of cultivation.

Ecosystem Service Value: By analyzing all the factors related to the ecosystem, service value is calculated (Table 1) as per the method of Costanza *et al* (1997). The total N, P, K, value of the mangrove wetland estimated was 2343617.3 Kg/hectare. It was found to be Rs.1774963.8 / kg /hectare (sreeja .et.al.2009).

3.1. Cost Benefit Analysis of Shrimp Farming

The cost benefit analysis of shrimp farming is given in Table- 2. This clearly indicates that conversion of mangrove forest into commercial shrimp farms is financially viable for those who can afford the amount. Even though converting mangrove forest into commercial shrimp farms is viable from private perspective, it was against from the society's point of view. In general it is a revealed fact that after a five years farming, the land is not suitable for cultivation. The external cost for treating waste water is also very high. The cost of rehabilitation of mangroves from the abandoned land was very high as it requires land preparing and tree planting in the first year and the cost of maintaining a mangrove forest for another fifteen years. So the result strongly implies that, conversion of mangrove area into commercial shrimp farms are not economically feasible. The excessive shrimp farming by clearing mangrove forest poses a great threat in these areas. Most of the shrimp farms are in large scale by deforestation of mangroves. An analysis of the input and output of the investment is shown in the table 2. The total value in terms of money can create a fear in people about its need to be conserved.

Table -1 Ecosystem service values of mangrove wetlands (in US $ /ha/year)

1	Ecosystem function in terms of dry matter/ha/year	150
2	Fish and shellfish habitat	2000
3	Waterfowl and other bird habitat	1200
4	Wildlife habitat	1000
5	Pollution filtration	260
6	Protection against Tsunami and wave damage	1500
7	Heavy metal removal	100
8	Oxygen production (20 kg./ha)	40
9	Nutrient production and recycling	450
10	Chemical pollution absorption	300
11	Aquatic production	350
12	Microclimate regulation	800

13	World climate regulation	100
14	Flood control	600
15	Erosion control	800
16	Ground water and recharge supply	60
17	Energy source	80
18	Livestock grazing	30
19	Fishing	90
20	Fertilizer industry	50
21	Recreation & Aesthetics	500
22	Preservation of gene pool	200
23	Scientific Research	100
	Total	**10960**

Table-2- cost benefit analysis of shrimp farming

Item	**Total**
Yield per hectare (Kg)	7,500
Farm Price (Rs/Kg)	370
Value of Production per hectare (Rs)	27,75,000
Young Shrimp (Rs)	40,000
Feed	2,00,000
Oil, Electricity	24,000
Pond clearing, repair, machine	1,00,000
Family labor	45,000
Hired labor	10,000
Others	10,000
Total variable cost(TVC)	4,00,000
Interest expenses	40,000
Land tax and land rent	20,000
Opportunity cost of land	5,00,000
Depreciation	5,000
Total fixed cost(TFC)	65,000
Total cost(TVC+TFC) Net income per hectare	4,65,000

4. CONCLUSION

The results show that mangrove wetlands form a highly valuable ecosystem. There is clearly a need to utilize wetland and mangrove resources on a sustainable basis, to reduce the levels of conversion to other land uses, and declare certain mangrove areas, especially those with pristine resources, as conservation and preservation zones. These general objectives of resource conservation and mangrove land allocation should be properly spelt out in mangrove development plans to sustain the benefits of the resource over a long period of time and for a greater number of people.

5. REFERENCES

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