Research Paper Geography

Impact of Shrimp Culture In Chilika Area, East-Coast of India: A Study of Krushnaprasad Block of Puri District, Odisha

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ABSTRACT

Commercial shrimp farming in India expanded rapidly after trade liberalisation initially were introduced in early 1990s. This paper examines the social, economic and environment impact that has been generated in the community along Odisha-coast in East India. The result suggests that macro-level policies such as trade liberalization are useful at the national level, but at the local level they can generate imbalanced growth. Although the shrimp farming has generated substantial foreign exchange at the local level, it has widened the gap between rich and poor. To protect the livelihoods of the rural communities and the environment India needs to formulate effective coastal resource management policies and established adequate institutions at the local level this will help ensure a stable source of income from shrimp farming for small scale farmers and minimise adverse impact on the local environment.

KEYWORDS trade liberalisation, fishing community

INTODUCTION

The fish economy of the Chilika Lake underwent a series of dramatic changes from the early 1990s. Liberalization trade policy that boosted export and modernised techniques has also seen shift in Chilika lease policy and the entry for first time of non fisherman into the shrimp culture industry (Samal & Meher, 1999). Modernisation of fishing technique with introduction of nylon net motorised boats and semi intensive shrimp culture all those have changed fish economy of Chilika. Simultaneously there is dramatic change in the Chilika lease policy in 1991and subsequent modification in 1994 allowing modern shrimp culture in the lake. Over the years of traditional fishing methods and fishermen organisation have undergone dramatic change on Chilika Lake. Fishing and shrimp culture operation shrinking the lake gradually because of siltation and cause environmental damages. Basically the shrimp culture in Chilika lake region has done in two methods.

MATERIALS AND METHODS

Study area

Chilika Lagoon, the largest brackish water lagoon of India lies in the eastern coastal region, situated between latitudes 19°28′ and 19°54′ North and longitude 85°05′ and 85°38′ East. It is designated as an important Ramsar site of India on 1st October 1981. The pear shaped lagoon has a water spread area which varies between 906 km^2 to 1165 km^2 during summer and monsoon respectively. The total lagoon is divided into four ecological sectors i.e., Northern sector in fresh water zone, Central is brackish, Southern is marine type and the Outer Channel sector in marine in nature but during monsoon it becomes fresh as the flood waters from more than 50 rivers and rivulets discharged through outer channel sector to the Bay of Bengal. So the estuarine lagoon is a unique assemblage of marine, brackish and fresh water eco-systems.

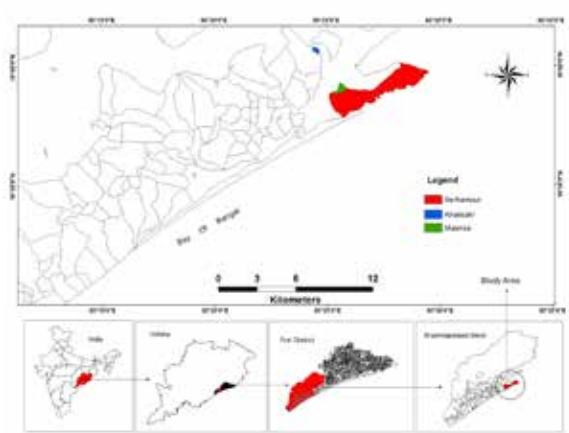

Figure-1: Location map of Chilika showing study area.

In viewing the marine water dominated areas like outer channel sector along with the revenue villages of Krushnaprasad block of Puri district those are situated inside the lagoon or its coasts mainly involved in Shrimp culture. In these areas, the shrimp farming is carried out in a broader way. Some of them have their own lands which are used for the culture purpose. But in a larger portion, have been doing unauthorised shrimp farming inside Chilika by both the fishers and non-fishers. The former is in some portion of the leased area meant for capture fishing and the later is in the encroached area inside Chilika. The study conducted in three villages i.e., Mahansa, Berhampur and Khatisahi of Krushnaprasad Block of Puri district (Shown in figure-1). The primary data were collected through structured questionnaire from the shrimp farmers and secondary data were collected from different government office.

RESULTS AND DISCUSSION

The shrimp cultures in the study area are meant only for revenue earning. The details of the preparation of enclosures and their overall management were studied mainly by interviewing to the fishers and also done through field observations those are described below.

Table-1: Categories of enclosures and their communities

involved in shrimp farming.

Enclosure type	Community	No. of enclosures studied
Embankment enclosure	Fisher	13
	Non-fisher	4
Net enclosure	Fisher	-
	Non-fisher	11

Community of enclosures
In the shrimp farming in the studied area of Chilika, 28 persons those were involved in the activities were studied out of which 46.4% owners were fishers and 53.6% were from non-fisher communities. But interestingly, the shrimp farming through embankment enclosures had 76.5 % owners from fishers and 23.5 % non-fishers whereas all the net enclosures were owned by non-fisher communities (table-1).

Preparation of enclosures for shrimp culture
In Satapada area of Krushnaprasad block, shrimp culture was carried out through co-operative society (legally up to 1999). These co-operative societies are called Primary Fisherman Co-operative Society (PFCS). But after that all are said to be un-authorized shrimp farming. The shrimp enclosures are divided into two types:

i) Embankment enclosure
ii) Net enclosure

***Embankment enclosure*:** Shrimp culture in Chilika area consists of both shrimp pond and shrimp enclosure. The individuals operated shrimp ponds and shrimp enclosures. The individuals operated shrimp ponds are encircled by earthen embankment, that are in common property resources (CPR). These areas were previously used as paddy fields. The enclosures are situated on the bank of the Chilika where earthen embankment / nylon nets / both separated it from the lake area termed by our study as "Embankment Enclosures".

***Net enclosure*:** The net enclosures (prawn gheries) inside the lagoon where nylon nets with the help of bamboo act as borderline in all sides are used. The net enclosure can be up to 1000 acres and require significantly less preparations (Flaherty *et al.*, 2009).

Enclosure management
Both 'net enclosures' and 'embankment enclosures' are first cleaned of all the marine species and other unwanted predators and competitors trapped inside. After these preparations, the enclosures are over desired shrimp species are stocked inside. In these systems of management, there is no need of providing any feed supplementary to the shrimp as there having already enough plankton in the lagoon water to support the shrimp. Sometime the snails are smashed to be given as feed to the shrimp in the 'embankment enclosure'. There is occurring of high tide and low tide in every full moon day and new moon day in a month at an interval of fifteen days during which the water level of Chilika changed. In the process, the water level of net enclosure gets increased and after full moon days, the water of Chilika starts receding for the next fifteen days. Due to these natural phenomena, it does not necessitate to exchange of water in both the embankment enclosure as well as net enclosures (prawn gheries).

In the individually operated shrimp ponds, the land is ploughed and treated with lime and compost. The water used to fill the shrimp ponds generally comes from Chilika lagoon and is often to dry out later than being discharge at the end of the crops. Snails are used as shrimp feed in the individual operated pond. The use of medicine and the artificial feed is rare in the shrimp ponds operated in Chilika area (Flaherty *et al.*, 2009).

Shrimp species selection
Since, Chilika lagoon is a brackish water lagoon, the salt/brackish water is the primary medium of growth of the dominant species of shrimp culture is the tiger shrimp i.e., *Penaeus monodon* (Pattanaik, 2007). In most of the cases the species *P. monodon* (locally called Bagada) is being used for the shrimp culture, but in some cases *Fenneropenaeus indicus* (locally called Kantala) also used together with *P. Monodon* but not alone the 'Kantala'. The shrimp seedlings are obtained both from breeding hatchery as well as collected locally from the sea mouth of Chilika. The cultured period varied from 90-120 days and usually one crop per year is done. The stocking density of shrimp is on average 10,000 pieces per acre. The size of the *P. monodon* shrimp is larger.

The area in and around Chilika where shrimp culture is presently practiced was mostly used for capture fishing through Jano / Bahani / Chingudi khanda or was a land mass. In embankment enclosure, where discharge of water takes place after harvesting the shrimp, no steps are taken to treat the discharged water. This is due to (i) ignorance of the consequence or (ii) wrong notion of the shrimp farmers that the effluents of their ponds will be diluted with the sea water. Sometime water dries off there itself leaving no scope for discharge.

Earlier, i.e., five to six years back, all shrimp farmer used to consult the technicians of the feed companies regarding the various environmental parameters viz. pH and salinity of the water, condition of the soil and shrimp but now it has been ended gradually.

Environmental impact on shrimp culture
I) Aquaculture is encouraged for increasing production, both for domestic and export market. Planned development of aquaculture also results in.
II) Shrimps are very highly sensitive organism and as such are particularly vulnerable to upstream pollution.
III) Shrimp ponds themselves produce effluents and when intake and outflow systems are not well designed, there is a strong tendency for farms to pollute each other water supply.
IV) The Industry's use of fresh water intake quantities has often depleted local supplies,

But there was various issues relating to these shrimp culture activities those were raised during the questionnaire survey. The major issues are discussed below.

Specific Environmental problems of the surveyed sites
Expansion of shrimp farming is not free from environmental problems shrimp farming assumes no responsibilities for dangers to other groups from their activities. The direct human and economic cost of environment damage is extremely hard to quantify. Shrimp culture has also been the causes of degradation of environment in numerous ways. The adverse impact of shrimp farming on environment on these localities i.e. Satapada/Chilika of Odisha (India) occurs in following forms.

- The use of high protein feed in shrimp ponds is a highly polluting activity in the sense that feed waste is highly toxic.
- The use of large amount of fertilizers, pesticides in the shrimp pond pollutes the surfacewater. The discharge of these effluents into water bodies such as ponds, creeks, rivers etc. cause strong polluting affects leading to mortality of fish and other marine species.
- Saline water from the shrimp ponds seeps into the neighbo0uring agricultural field and Salinities.
- Drinking water has become saline due to continuous seepage of saline water from shrimp ponds into drinking water table.
- The overcrowding of shrimp culture has led to indiscriminate conversion of agricultural land into shrimp pond. The conversion has an adverse impact on agricultural activities mostly in term of paddy production. This ultimately is causing a fall in employment in agricultural sector in this region since requirement of labourers in shrimp pond is comparatively lower than that in paddy fields for the same area.

This practice aggravates landlessness among the farmers.

- ❖ The use of water possessing rich organic matter and over stocking of seedling increases the risk of shrimp diseases and causes high mortality which in turn leads to collapse of the as in Satapada/Chilika area
- ❖ The encroachment over common property recourses for shrimp ponds also reduces the pasturelands for cattle and availability of fuel wood.
- ❖ While collecting the shrimp seedling fry of many other aquatic species are thrown away leading to depletion in the stock of fish, shrimp and crab. The indiscriminate killing of fish due to water pollution and extensive collection of shrimp seedling.

Social Impact of shrimp culture

Conflict between Shrimp farmers and rice farmers, fishermen and non-fishermen and various groups of fishermen have emerged. There has been a reduction in grazing land for domestic animals due to shrimp farming. Income disparity between poor fishermen and rich non fishermen has risen because the later have more financial resources to invest and are able to sustain loss due to crop failure.

Women participation in Shrimp Culture

The Participation of women in shrimp farming is caste specific, while women of the higher caste don't go to shrimp farm. The women of lower caste do take part in various activities of shrimp culture viz. collection of shrimp seedling, smashing of snails, and preparing feed for the shrimp.

Finally, these encroachments basically led to shrinking the movement areas of fishes in Chilika and also the small fishermen may not get sufficient areas for their natural way of fishing. Therefore, the loss of fishery-based livelihoods has led to the weakening of the customary arrangements. Institutions like PFCSs at every level have been affected (Samal and Meher, 2003).

CONCLUSION

In Satapada area shrimp culture has been carried out in both net enclosure and embankment enclosure though it had been banned by government since 1999. For the shrimp culture there has been serious degradation of the environmental, social and economic environment of the lake. There should be proper public awareness and also implementation of planning and policy for shrimp culture. The shrimp farming cannot be stop completely in this area as most of the people in this area both fishers and non- fishers earning their livelihood from this occupation. So there need to develop proper judicious method for shrimp farming so that there will be sustainable shrimp culture without the degradation of the environment.

REFERENCES

1. Samal K. C. (2002). Shrimp culture in Chilika Lake: Case of occupational is placement of fisherman. Economic and Political Weekly. 37(8): 1714-1718. 2. Samal K. C. and Meher S. (1999). Socioc-economic survey of villages in and around Chilika. Nabakrushna Choudhury Centre for Development Studies, Bhubaneswar. 3. Samal K. C. and Meher S. (2003). Co-operative Societies of Fisherman of Chilika lake: Problems and prospects. Journal of Rural Development, 22(4): 517-525. 4. Flaherty M., Samal K. C., Pradhan D. and Ray D. (2009). Coastal Aquaculture in India. 290pp. 5. Pattanaik S. (2007). Conservation of Environment and Protection of Marginalized Fishing Communities of Lake Chilika in Orissa, India. J. Hum. Ecol., 22(4): 291-302.