

Chapter -8

DISCUSSION

It is usually noticed that various advanced ventures while in the process of being developed may create negative impacts on nature, our surrounding environment, natural resources, the socio-economic setup because these developmental works hardly consider the environmental aspects around us. In the economic development, the shrimp culture has definitely contributed positively however, its impact on environments like soil and water pollution, damage to natural resources and depletion of natural habitats cannot be denied. It is unfortunate but the truth is that the development of shrimp farming in West Bengal, in general, is the result of the destruction of natural ecosystem as well as resources such as trees and aquatic living organism in the coastal area.

8.1 Development and Affects

As we can easily get an idea about the human activity involving shrimp culture in the study area by using comparison and change detection matrix from multi temporal satellite data the change that are observed in the Land use and Land cover classes, it has been noticed in the study area for a long time that this aquaculture is done by following traditional procedures. Traditional culture was limited to coastal saline lowland and saltpan areas. It has been found through the result of the change detection that as a result of shrimp farming, the number of the brackish water tanks/ponds and the area of the brackish water tanks/ponds both have increased in just eight years. This growth is not equal everywhere. In Ramnagar-I and Ramnagar-II the number of the brackish water tanks/ponds is less than the area of brackish water tanks/ponds. It can be easily guessed from that in those two blocks the shrimp farming is done in traditional or semi scientific way. In other three blocks, it is found that in comparison to 2008 to 2012 the rate of brackish water tanks/ponds has increased in 2012 to 2016 and in maximum instances of this growth happened with the expenses of agricultural land. As a result, the amount of agricultural land is quickly decreasing. Paddy is the main crop of this area and due to the decreasing paddy field, the production of paddy is decreasing. Naturally, its price is quickly increasing. Its effect is falling on the people from every section of the society.

This development has introduced many positive and negative impacts on coastal areas but the extreme consequences of negative impact are faced by agricultural land. The reasons behind this are loss/limited profit from rice cultivation. The focus of the Government has also moved to aquaculture and people are encouraged to do more and more aquaculture to maximize the profit. The profit margin is 12 times more in shrimp farming in comparison to paddy cultivation. But there are many drawbacks come with the financial development which are gradually polluting the environment. As a result of shrimp farming, not only the agricultural lands are decreasing but also the salinity of paddy field beside the shrimp ponds are growing due to seepage and leakage. The shrimp farmers are made canals from the brackish water rivers/streams/canals for their shrimp ponds. As these are made in unscientific way, during the high tide those manmade canals are overflowed and salinized the nearest paddy fields. Naturally the production of paddy decreases and cost of production increases. During the digging the canals, shrimp farmer ruins the embankment of the rivers/streams/canals. In this process embankment losses their natural strength.

After the end of the shrimp farming period, the sewage water with the antibiotic and medicine is directly released without any treatment in the rivers/streams/canals. It is negatively affecting the riverine ecosystem. As a result, many species of fish are now extinct. Due to the cutting of trees and the use of large machinery, the village environment is now turning into an industrial environment. Not only it is effecting the environment and economy, also it has a social impact too. As it is hurting the paddy farmers in many cases, they are protesting by whichever means they have before them. Direct united protest often leads to bloodshed. On the other hand, as per the farmers, implementation of legal actions is not adequate to tackle the situation. There is no concern for ecological sustainability and people are becoming more greedy and ready to do anything just for the money. Shrimp farmers are desperate for their personal benefit and do not care for public interest or the environment or adoption of sustainable methods. The administration is so long indifferent and seems to have no awareness of the problem.

The success of coastal aquaculture is going to face a major threat if it does not take care of its environmental conditions and just focus on monetary profit. It can be clearly stated that shrimp farming has caused major negative social impacts in some areas, and at the

same time has also brought substantial social and economic benefits to others. In case of the coastal community, both positive and negative impacts are there from shrimp culture, the people are earning more and hence their lifestyle has changed, transportation and education options are also improved a lot but on the other hand due to environmental degradation, they are unable to live a healthy life in spite of having money. Hence to keep all these parameters (economy, environment and society) at a balanced condition, sustainable development of coastal aquaculture is crucial.

8.2 Sustainable Aquaculture

There are various measures for reducing environmental impacts and attaining sustainable aquaculture namely site selection, design of shrimp ponds, scale and extent of farming area, management etc. Among these factors, site selection has been attempted and discussed in this study in details.

8.2.1 Site selection: Site selection is one of the most important factor in this context. It ensures suitable soil as well as water regimes for the farm and at the same time maximizes the productivity of shrimp farming also, minimizing the destruction of natural habitat while saving it from critical conditions. It can also minimize the damage on productive lands by reducing adverse effects. It also checks the saline contamination of groundwater, agricultural land, and freshwater irrigation systems.

Here, the focus of the study was to identify and prioritize sustainable development of shrimp culture based on the different criteria affecting the shrimp culture development. The study necessitates the sustainable development of study area by reducing the land use conflict with agriculture. Based on this, the results of the research identified and prioritized the potential sites for sustainable development of shrimp culture in this study area.

The potential area for shrimp culture is estimated to be 4% (3289.8 ha) of total area by considering the aspect of the land-use conflict. It is found that existing aquaculture farm is located in the unsuitable area. The study demonstrated the potential use of Remote Sensing and GIS integrated with analytical hierarchy approach to identify and prioritize the potential site for shrimp culture.

Now, other than site selection, there are other factors that are also significant for a stable, balanced as well as sustainable development of aquaculture and can be discussed as follows:

8.2.2 Design: the design of the shrimp pond can be considered to be a vital aspect. In order to maintain sustainability, design of the pond - specifically good design, the design of water supply and discharge systems can play a major role. A proper design means high-quality of water supply along with optimal pond water conditions. The generation and spreading of various diseases, as well as the usage of undesirable chemicals can be decreased by this. Other than diminishing effluent quantity and/or maximizing effluent quality, a good design also checks salinization of the adjacent agricultural lands. It also prevents salinization of groundwater or freshwater irrigation systems.

8.2.3 Scale and extent: The area of shrimp farming is another factor in this issue. By limiting the area that shrimp farming can occupy, the negative impacts of shrimp farming on natural environment may be reduced. To obtain sustainable aquaculture, the areal extent can be limited by escalating already existing farms than expanding new ones. Keeping this in mind, if the goal here is maximizing production through minimum destruction of habitat or land use conversion, then the intensification of existing farms over development of new farms can be considered to be an appropriate strategy (Hambrey, 1996; Menasveta, 1997). For that to happen as recommended, the other possible problematic issues related to intensive systems need proper attention and management as needed. Ways of production rise in fixed lands may be resolved for intensifying production of existing farming areas.

8.2.4 Management: One of the major contributing issues to the environmental effects of shrimp farming is poor management practice. In the context of developing sustainable coastal aquaculture, it is necessary to mention that a substantial decrease in environmental impact can be achieved by relatively simpler modifications in the management practices.

The reductions in water exchange along with increased aeration as well as proper and careful pond water management may help reduce the quantity of routine effluents. It may also decrease the rate of spread of disease.

In case of soil management practice in this regard, careful management of soil particularly soil acidity may cause betterment in pond water quality along with reduction of shrimp stress as well as disease. These improved conditions may be attained through timely and appropriate treatments including regular flushing, liming, or lining with laterite soils.

Other than these, a proper management practice also includes providing the correct amount of good quality food at the right time throughout the production cycle. This practice can help to reduce the feed along with the metabolic wastes.

8.2.5 Technology and research: This may be noted as another important measure in this regard, as better and improved technology and research should reduce the environmental impact of shrimp farming in various ways. New and advanced technologies for water treatment and management may work towards the improvement of pond water and effluent quality. At the same time, advancement of technology in this matter can lead to the development of higher-quality as well as low-pollution diets which will reduce the feed-associated wastes in pond water improving the effluent quality.

8.2.6 Proper Planning: Now, for proper planning and policymaking as well as micro/macro level development planning, certain important data and information are essential and needed in desired time. This includes information regarding the existing Land use and Land cover pattern, spatial distribution along with other change-related information. Proper planning which would include the formulation of suitable plans and execution of the same, motivation and regulation are required to avoid the disturbances in the ecological conditions and also to create an environment-friendly character of the coastal aquaculture program in the densely populated areas.

On the other hand on the social side, measures have been incorporated in certain projects for giving support to the poor coastal communities. This poor community would want to gain access to the aids and benefits of shrimp farming so that their being supplanted by external interests can be prevented and their poverty may also be reduced.

8.3 Recommendation:

Economically shrimp farming has a lot of importance, but again shrimp farming has a lot of negative impacts on environment. So it is essential to keep watch and be attentive so that shrimp farming does not injure the environment or the losses caused by it can be lessened, which means emphasis on sustainable shrimp farming. There are guidelines in India from Indian Council of Agricultural Research (ICAR), guidelines from Food and Agriculture Organization (FAO) in international basis for sustainable shrimp farming (ICAR, 2018; FAO Aqua-Book, 2002). Other than these, guidelines of honourable Supreme Court or state guidelines are there (AIR, 1997). But, whether or not these guidelines are being followed by the shrimp farmers for shrimp farming is not monitored in most of the cases. In some places, it is done in black and white that to one-sided, which means environment is being neglected to priorities the economic aspect, again in some other places, the economic side is not emphasized to give priority to the environment.

Keeping all these sides/aspects in mind my suggestions would be forming Joint Aquaculture Management Committee (JAMC) in the coastal districts wherever shrimp farming is going on. The committee will consist of representatives of farmer (both aquaculture and agriculture), aquaculture experts, farm technicians, environmental scientists, legal adviser, GIS experts and government officers. They will monitor where the farmers are following the farming guidelines for the site selection of shrimp farming, tank construction, water treatments, farm management etc. farmer will given sustainable farm management training. In this respect, the committee will take the help of local community, local administration, government agency, private agency, modern technology wherever necessary. In this purpose, the use of modern technology like Remote Sensing and GIS will be especially helpful for data collection, data management and decision making. Village Resource Centre (VRC) by Indian Space Research Organisation (ISRO), Central Inland Fisheries Research Institute (CIFRI), Mapping Unit of State fisheries, Marine Product Export Development Authority (MPEDA), Government or Government undertaking units will especially help in this purpose.

Favourable environment for shrimp farming or environmental impacts of shrimp farming over the farming areas are not the same in everywhere in the shrimp farming areas. Out of five study blocks in the present study, shrimp farming is going on in semi-

scientific or traditional method in large coastal areas of Ramnagar-I and Ramnagar-II, in places where there were wetlands or saltpans earlier. As a result, the negative impacts of shrimp farming is comparatively less in these two blocks, the fallow lands are utilized economically. In the other three blocks (Contai-I, Desopran, Contai-III), in maximum cases shrimp farming is being done in double or triple cropped lands using saline water, hence salinity is increasing in paddy fields, rice production is decreasing. As a result, these blocks have comparatively more negative impacts. So, micro level (sector level) planning or impact analysis is necessary for proper planning or impact analysis of shrimp farming. That means, wherever and whatever problems are existing, the planning should be done accordingly. In this manner, if shrimp farming can be done with proper planning then in many cases, the negative impacts of shrimp farming can be reduced and then the true success of shrimp farming can be achieved.