GLOBALLY SHRIMP FARMING APPEARED AS A SIGNIFICANT COMMERCIAL ACTIVITY DURING EARLY 80’S. HUGE AND IMMEDIATE RETURN ON SHRIMP FARMING MADE IT A MULTIMILLION BUSINESS IN A SHORT SPAN OF TIME. NEW PRODUCTION TECHNIQUES, ASSOCIATED WITH ATTRACTIVE PRICE AND HIGH LEVELS OF PROFIT PROVIDED THE INCENTIVE FOR PRIVATE INVESTMENT IN SHRIMP FARMING. THE INDUSTRY WAS SUPPORTED BY INTERNATIONAL AGENCIES AND NATIONAL GOVERNMENTS AS A PART OF THEIR STRATEGY OF EXPORT LED GROWTH. UNDER THE FAVOURABLE CLIMATE CREATED BY VARIOUS FACTORS OPERATING AT MICRO AND MACRO LEVELS, THERE WAS A RUSH FOR THE ‘PINK GOLD’, UNDER THE COVER OF BLUE REVOLUTION, THROUGHOUT THE WORLD, PARTICULARLY IN RESOURCE-RICH LESS DEVELOPED COUNTRIES IN THE TROPIC. IN SPITE OF THE HIGHLY IMPRESSIVE FINANCIAL PERFORMANCE, THE RAPID GROWTH OF COMMERCIAL SHRIMP PRODUCTION HAS GIVEN RISE TO SEVERE OPPOSITION FROM VARIOUS QUARTERS FOR ITS ADVERSE SOCIAL AND ECOLOGICAL IMPACTS.

SHRIMP CULTURE IS PRACTICED IN COASTAL BRACKISH WATERS. THESE COASTAL RESOURCES TEND TO SUPPORT HIGH-VALUE ECONOMIC ACTIVITIES (LIKE SHRIMP FARMING) AS WELL AS LIVELIHOODS OF MANY POOR PEOPLE (LIKE SMALL-SCALE FISHING). THE PATTERN OF RESOURCE USE IS COMPETITIVE; AN INCREASE OR CHANGE IN THE USE OF RESOURCE BY ANY ONE TENDS TO LIMIT THE OPTIONS AVAILABLE TO
other stake holders. Growth of shrimp farming on a commercial basis involved a competition for natural resources of coastal wetland system and this constituted the basis for many social conflicts of very serious nature in many countries (Deb, Apurba. Krishna., 1998). Shrimp culture, just like agriculture and fisheries, depends on the natural environment for land, water, seed and feed. Expansion of shrimp culture accentuates competition with other users of these resources, which include local farmers, fisher folk, livestock holders, small artisans and many others. Acquisition of command over coastal resources by powerful rural elite and private entrepreneurs from outside resulted in loss of livelihood and employment to the rural poor, growing marginalization of peasants, fishermen and workers, widening inequality in income distribution, decline in food security etc.

Conflicts over control of natural resources inevitably arise when market forces and public policies make new uses of these resources more commercially profitable than were traditional ones (Barraclough, Solon., Andrea, Finger-Stich., 1996). These conflicts will be more acute if the new users of the natural resources replace production for own-consumption and local markets by traditional users, with production for elite consumption elsewhere. Even those groups who retain their traditional access to these resources may find their traditional uses less productive than the new uses. Customary holders of these resources may shift them to new uses or dispose of them at prices escalated by the competition for resources. The worst affected are the customary users of the natural resources, who have no legal entitlement on them. The levels and qualities of their livelihood are likely to deteriorate in the long run; because their livelihood support system is destroyed without compensation or alternative means of livelihood.
Environmental and social degradation is pointed out to be the root cause of many conflicts that stem from the expansion of shrimp farming. The ecological fragility of the coastal areas exacerbates conflicts and loss incurred. Shrimp farming is pointed out to be ecologically unfriendly and non-sustainable (Flaherty M., Karnjannakesorn, C., 1996). Devastating effects of shrimp farming on the environment are destruction of mangrove forests, pollution of water bodies and depletion of aquatic resource base, loss of biodiversity, salinization of agricultural land and aquifers, loss of agricultural and live-stock production etc. Environmental degradation is likely to affect the poor more directly and severely, because the poor are more dependent on natural resources for their livelihood.

Social cost of shrimp farming refers to the negative impact of shrimp culture on the society. The society, particularly the poor has to bear the adverse effects of expansion of the shrimp industry. There are several specific mechanisms through which shrimp culture generates adverse social effects. Important among them are changes in land use pattern, decline in the quantity and quality of natural resources, decline in livelihood and food security etc. Major issues of social and environmental cost of shrimp production are increasing marginalization of poor farmers and workers, breakdown of traditional livelihood support systems, and decline in food security.

magnitude of the problem in the state appears to be very low. This can be attributed primarily to the low level of intensification of scientific shrimp farming in the state. The proportion of area under scientific shrimp culture in the state and the degree of adoption of intensive culture practices are very small. In Kerala commercialization of shrimp culture appeared as a modification of the age old practice of traditional shrimp filtration, social and environmental sustainability of which is well proven over time. The system of production was not altogether alien to the society and there was an institutional set up, though with a lot of inadequacies, to sustain the social fabric.

7.1 Marginalization of farmers and workers

Marginalization of rural poor, as a result of the expansion of shrimp farming, is due mainly to deprivation of people from the ownership of land, denial of access to or destruction of common property resources like fishing grounds and mangrove forests. Development of shrimp farming has led to significant changes in the pattern of coastal land use in countries where shrimp culture is promoted on a large scale. Like agriculture, shrimp culture is a land based activity. Expansion of shrimp farming naturally lead to a change in use pattern of coastal land, in the form of a shift in land from other economic and environmental uses to shrimp culture.

7.1.1 Conversion of Mangrove Forests

The most significant change in land use caused by expanding shrimp industry is pointed out to be the conversion of mangroves into shrimp ponds (Primavera, J.H., 1997. Deb, Apurba. Krishna., 1998.). Mangrove forests are highly productive eco systems providing many environmental, economic and social services to the local inhabitants. Coastal people depend on mangrove forests for livelihood, employment, food, fodder,
fishing, wood, housing materials etc. Destruction of mangrove forests means cessation of the flow of these valuable services and deprivation of people from their means of livelihood and income. However, destruction of mangrove forests cannot be attributed to shrimp pond construction alone. Mangrove forests are being depleted for a large number of other uses, like agriculture, wood collection, human settlement, urban development etc. Total loss of mangrove forests due conversion into shrimp ponds is estimated to be less than 3 per cent (Chamberlain, G.W., 2001).

In India also mangrove forest destruction is reported for the construction of shrimp ponds, mainly from West Bengal, but the extent of destruction is argued to be negligible (Aquaculture Authority of India., 2001). As per the statistics of Government of Kerala, quoted in the Environment Impact Assessment Report submitted to the Honorable Supreme Court of India by the Aquaculture Authority (2001), the area of mangrove forests converted for shrimp farming in Kerala was only 25.8 hectare, which accounted for 1.03 per cent mangrove resources of the state in 1992. In the absence of other reliable data to contradict, it is reasonable to believe that development of shrimp farming in the state has not caused social deprivation of the coastal population of a serious magnitude by way of destruction of mangrove forests.

7.1.2 Conversion of Agricultural Land

Another mechanism by which expansion of shrimp farming leads to impoverishment of coastal inhabitants is the conversion of agricultural land into shrimp ponds. Many shrimp farms are developed on land formerly used for paddy cultivation (Network for Aquaculture Centre in Asia-Pacific, 1994). Shift in land from agriculture to shrimp farming
occurred either through legal sale by luring local small scale farmers with high prices offered or forced sale by various means of harassment. The magnitude of the problem aggravates when such conversions become irreversible. Under intensive systems of shrimp culture life-span of shrimp ponds is limited to 5-10 years because of the attendant problems of self-pollution and infestation (Primavera, J.H., 1997). In such cases shrimp farmers abandon the farms and move to new pastures in a pattern often referred to as ‘rape and run’ (Csavas, Imre., 1994). The transition to shrimp farms is irreversible in the sense that once shrimp farming is finished the land becomes sterile and is unable to support any natural or agricultural productivity. Large scale abandonment of shrimp ponds is reported from top shrimp producing countries in the world (Lassen, T.J., 1997). According to one estimate the area of abandoned shrimp farms worldwide was 1,147,300 hectare in 1994, of which 847,000 hectare was in Asia (Rosenberry, Bob., 1994).

Conversion of agricultural land into shrimp farms may give rise to problems with serious social impacts. The detachment of local farmers from the ownership of land leads to their marginalization as wage labour and break down of the traditional livelihood support. Another important effect of the conversion of agricultural land into shrimp farms is the reduction in food production for own consumption and sale in local markets. The transformation of multiple-use agricultural land into monocrop shrimp farms poses a serious threat to local food security. Shrimp entrepreneurs used to evict local farmers and fishermen from their land using money and muscle power, frequently ending up in blood-shedding conflicts (Deb, Apurba. Krishna., 1998).
Conversion of coastal agricultural land into shrimp farms is reported in India from states and union territories like Tamil Nadu, Andhra Pradesh, Orissa and Goa (Aquaculture Authority of India., 2001). In Orissa, the intruding shrimp farmers gained a significant portion of Chilka’s fisheries by squeezing out land from local fisher folk using money and muscle power (Pattanaik, Sarmistha., 2006). Increase in demand for coastal land by shrimp farmers has resulted in considerable rise in the price of land, making land non-affordable to local farmers and inducing them to sell their property (Mukul., 1994).

In Kerala traditionally shrimp farming was practiced in paddy fields, in rotation with paddy crops. Shrimp is raised in fields when paddy cultivation is impossible due to high salinity of water. Shrimp farming is carried by contractors who lease out land from owners for a period of five to six months. The system of rotational cropping of rice and shrimp is highly environment friendly and mutually supporting. It doesn’t involve any transfer of ownership of land and impoverishment of farmers. After the expiry of the contract period in April, these fields remain open to all for fishing, till the commencement of agricultural operations in the next season. In fact shrimp filtration is a source of supplementary income and livelihood for agriculturists and workers.

However, with the advent of scientific shrimp culture some ‘pokkali’ paddy fields in Ernakulam and Alapuzha districts and ‘Kaipad’ lands in Canannore district, previously used for rotational cropping of rice and shrimp, are converted into shrimp farms. This conversion is induced by many factors. Low price of paddy and rising cost of production made paddy cultivation non-viable. Inadequate supply of labour, rising unionization of labour and conflicts, loss inflicted by natural calamities etc are other factors that induced farmers to
abandon paddy cultivation and to keep land fallow. Development of shrimp culture opened up a new option of profitable use of land. But the huge amount of investment and the high risk involved in shrimp farming tempted small and marginal farmers in the area to sell their land to outside entrepreneurs who were willing to pay very high price for paddy fields. Conversion of paddy fields into shrimp farms has affected paddy production and retrenched farmers and workers from paddy cultivation. Farmers and agricultural workers are deprived of their traditional means of livelihood, forcing them to seek employment in wage labour market in rural and urban areas. In this context a positive effect of shrimp farming is noteworthy. In Ernakulam district it is observed that female workers displaced from pokkali cultivation get absorbed in peeling sheds for processing works related to shrimp harvested from farms (Shyna, P.O., Joseph, Sheela., 2000). To that extent shrimp farming mitigate the loss of livelihood inflicted by it. However, people with less social mobility like old women, who are deprived from agriculture, suffer severely. Their prospects of alternative means of livelihood are slim.

In the absence of detailed information on conversion of agricultural land, mainly because such conversions are illegal in the state, a correct estimate of the magnitude of the problem is difficult. But the magnitude of this transformation is likely to be very low and is evident from the fact that total area under scientific shrimp culture, practicing mono-crop of tiger shrimp is very low and less than 0.5 percent of total area under rice cultivation in the state.

7.2 Loss of Livelihood

Coastal wetland systems in tropical countries are endowed with very rich biodiversity and high productivity. These eco systems provide a wide
variety of natural resources in the form of land, water and biological resources. Traditional livelihood activities of coastal population are closely tied to the resource base of the wetland eco system. In Kerala livelihood activities of people in coastal areas are highly diversified to cover agriculture, fisheries, coir-fiber processing, lime shell collection, animal husbandry, poultry, and many more small scale activities supported by the natural resources derived from the eco system.

The level of traditional livelihood activities of coastal population depends on the quantity of natural resources available, access to the resources and productivity of the eco system. Shrimp farming poses a threat to livelihood systems of the customary users of the eco system services in coastal areas by diverting natural resources to the production of shrimp, and thus denying their access to natural resources and reducing the productivity of the fragile eco system.

7.2.1 Diversion of resources and denial of access

Shrimp farming is a high-value economic activity based on the natural resources and environmental services provided by the coastal eco system. With the commencement of shrimp farming, the competition for natural resources between the customary users and the new users (shrimp farmers) increased. In this competition the shrimp farmers used to dominate because of their money power and contacts with political and bureaucratic top brass. Various mechanisms of resource diversion from historic uses to shrimp farming and denial of access to natural resources are explained below.

The main form of diversion of resources to shrimp farming assumes the form of conversion of agricultural land, which is discussed in detail in
previous section. Customary users of coastal land couldn’t withstand competition from the rich and powerful shrimp entrepreneurs and as such alienated from land, their primary means of livelihood. The conversion of coastal wetland into mono crop shrimp farms reduced the access of agriculture workers and fisher folk to inundated paddy fields for fishing. Under traditional paddy-shrimp rotational cropping system paddy fields, left vacant by contractors after seasonal shrimp filtration, remain common access property for fishing, for almost two months, till the commencement of agricultural operations for paddy cultivation. This practice provided agriculture workers, particularly female workers, belonging to the weaker sections of the society and members of the local fisher folk with means of self provisioning and income. But the conversion of paddy fields for construction of shrimp farms involved the denial of common access right to paddy fields and deprivation of the rural poor of a means of sustenance and income. But the overall impact of the problem in Kerala is limited and localized because, as indicated earlier, the extent of paddy field conversion is relatively small in the state.

Diversion of resources of has taken place not only in the case of land, but in the use of biological resources also. Shrimp industry is dependent on coastal natural resources for biological inputs like seed and feed. The traditional system of shrimp filtration involved trapping and stocking of shrimp juveniles in paddy fields till the attainment of marketable size. In the initial stages of scientific culture, shrimp farmers have to source shrimp seeds from shrimp-fry (post-larvae) collectors who used to collect it from wild waters. It is argued that the treatment of shrimp post larvae in estuaries and backwaters as ‘seed resources’ is erroneous and constitute an encroachment of the resource complex of historic users (Stephen, David., et al., 1993)
7.2.2 Decline in Productivity

Decline in the productivity of coastal eco system can be attributed to degradation of environmental conditions and loss of biodiversity. As the traditional inhabitants of the coastal area depend primarily on natural resources for their livelihood, any decline in the productivity of the eco system will deteriorate the level and quality of livelihood activities also. Study conducted on biodiversity modification in coastal wetland ecosystems in the state has proved that the coastal backwaters of the state are being degraded due to various forms of pollution, reclamation and several other stress factors (Nandan, S. Bijoy., 2008).

Productivity of both capture and culture fisheries in coastal area depend on the quality of water. Good quality water is an essential input for the optimum growth and survival of shrimp in farms. For the industry, natural waters is the source ‘clean water’ as well as the ‘waste sink’ in to which farm effluents are discharged (Neiland, A. E., et al., 2001). If discharge of farm waste in to natural waters exceeds its carrying capacity, the free environmental services of waste sink and clean water will get exhausted and the industry will have to encounter the negative feed back cost. But this is an externality imposing a cost on the historic users of coastal waters for livelihood. Discharge of waste water overloaded with nutrients, sediments and chemicals will destroy the aquatic environment of estuaries, backwaters and canals in coastal areas and deplete the biodiversity and fisheries resources in these water bodies. Shrimp farming is a victim as well as cause of water pollution, particularly in areas where there is a high concentration of shrimp farms. Shrimp farmers attribute the decline in productivity of farms (Table 3.14) mainly to the pollution of water. The problem assumes threatening proportions in times of disease outbreaks. In the case of a serious
disease threat, in order to minimize loss, farmers resort to distress harvest and the water with bacteriological and viral contamination is drained into open waters. This practice is highly detrimental to the health of fisheries in wild waters and shrimp stocked in neighbouring farms. However, the protagonists of the shrimp industry have pointed out that the place of shrimp industry in the pollution of water bodies is far behind modern industries, agriculture and civil bodies (Epa, U.P.K., Wijeyaratne, J.S., 2008).

A serious threat to biodiversity posed by shrimp farming is the practice of elimination of unwanted species of fishes and aquatic animals from ponds. Unwanted species are competitors/predators which compete with cultured shrimp for food, thus affect their growth, and prey upon the shrimp seeds stocked. But these are also fishes and aquatic organisms abound in natural waters and constitute an important component of natural fisheries. In the course of farm preparation, these unwanted species, their eggs and larvae are destroyed using organic and chemical compounds. After applying predator eliminators, shrimp farms are flushed with water, which in turn is discharged into open water bodies, causing the depletion of biodiversity in natural waters also.

Indiscriminate collection of shrimp-fry of desired species (tiger shrimp and white shrimp) from natural waters inflict large scale mortality of juveniles of other fishes and crustaceans. It is reported that for catching each tiger shrimp fry, about 26 other shrimps, 29 fin fishes and 70 other zooplankton were simultaneously destroyed (Deb, Apurba. Krishna., 1998). The practice of natural fry collection for the supply of seeds in shrimp culture farms causes huge loss of the fishery resources in wild waters. But with the advent of the hatchery technology dependence on wild fisheries for shrimp seed declined significantly. In the year 2001, there were 26
hatcheries in the state with a capacity to produce 327 million shrimp seeds (Department of Fisheries., 2005).

Another negative externality of shrimp farming on biodiversity is the destruction of mangroves and conversion of paddy fields and the consequent loss of habitat and breeding grounds for many species of shrimp and fishes. As a result the stock of fisheries in natural water depletes, causing deterioration in the livelihood support provided by the ecosystem to the local fisher folk.

7.3 Food Security

World wide, international agencies and national governments promoted aquaculture citing its potential to revolutionize food production. An important declared objective of policies to popularize aquaculture was the enhancement of food security. This target can be achieved if the system produces affordable fish for domestic markets and home consumption. It is observed that development of aquaculture has positive income and consumption effects on households, but the consumption effect (increased consumption by producers and domestic consumers) is more powerful when aquaculture produced low value fin fish (Ahmed, Mahfuzuddin., Lorica, M.H., 2002. However, shrimp culture which occupies a major sector of aquaculture in terms of area and market value, cannot be treated as an activity that has anything to do with global food security.

Shrimp is a high-value commodity with huge demand in rich markets in cities and abroad. It is a part of the menu of luxurious consumption by the elite. Price of shrimp in domestic and international markets is so high that it is not affordable to the poor. Even though the major producers of shrimp are the backward economies in the Asia, most of the produce is
exported to rich countries like USA, Japan, countries in European Union etc. As such production of shrimp in farms makes little contribution to food requirements in domestic market and local food security. In the sample studied all mono crop (tiger shrimp) farms sold all their produce to export firms or their agents. In the case of traditional farms also high-value tiger and white shrimps are sold to agents of export firms, while low-value other shrimps and fin fish are sold in local markets.

Shrimp is produced at a very high opportunity cost in terms of production lost in agriculture, small fishery, animal husbandry, poultry etc, all of which catered to the food security of local population. In other words high profit and foreign exchange earned from the production of shrimp farming is at the cost of food security of most vulnerable sections of the society. Expansion of the shrimp industry displacing paddy fields is described as “prawn revolution at the cost of [the] rice bowl” (Parthasarathy, R., 1994) In fact the expansion of shrimp production in backward economies is intended to serve the tastes of the luxurious consumption abroad, leaving the domestic poor destined to starve.

It is argued that shrimp exports are under priced because shrimp entrepreneurs rarely include the social cost of shrimp production in the price of shrimp. Market value of shrimp doesn’t reflect its ‘true price’, because it is based on private cost of shrimp farmers and ignores costs in terms of destruction of coastal natural resources. It is argued that shrimp producing countries are losing more than they gain from shrimp aquaculture. The industry is not doing much to alleviate food shortages. Conversely, it is doing much damage by further marginalizing poor rural communities (Mulekom, Leo. van., et al., 2006).
It is pointed out that shrimp aquaculture is a rather inefficient way to produce food, because it is based on pellet feeds derived from wild fish captured from common waters. Under the intensive farming shrimps are fed about three times their harvested weigh. Out of the total amount fed only 17 percent is converted into consumable flesh, 15 percent is leached or not consumed, 20 per cent is released in faeces and the remaining 48 per cent is used by the organism for maintenance, molting shells and metabolism (Primavera, J.H., 1994). Shrimp production by intensive farming may lead to an environmental cost, referred to as ‘fish meal trap’. Fish meal trap refers to the hypothesis that aquaculture is environmentally damaging because it causes increased fishing effort in capture fisheries to meet the increased demand for fish feed in aquaculture. In Kerala shrimp is cultured under traditional and modified extensive systems. Under traditional shrimp filtration farmers do not resort to supplementary feeding, but under modified system supplementary feeding is adopted to accelerate the growth of shrimp. Pellet feeds are used to supplement the natural food available in grow-out ponds, but very often farmers used to economize the feed cost by substituting costly pellet feeds with home-made fish feed. But in home-made feed also, an important ingredient is the clam meat, widely used as a source of protein in poor mans’ diet. Again the shrimp farmers are jeopardizing the local food security to serve the rich customers abroad.

7.4 Conclusion

Development of shrimp aquaculture implies commercialization of an agribusiness as a part of a larger process of capitalist development in food production. Commercialization of shrimp culture integrates the whole production chain with the global economic system. The incorporation of shrimp farming into the domain of global economic system was effected
through mechanisms like export orientation of production, flow of foreign and domestic capital into the production system, free operation of market forces, development of technology and state policies. Shrimp farming has benefited the national economy in the form of increased foreign exchange earnings, while making positive contributions to the growth of regional economy in the form of employment and income.

But the process of capitalist development undermined the very sustainability of fisheries and other livelihood supporting systems in coastal areas. With the development of shrimp farming local people were retrenched from traditional livelihood activities. They were forced into more marginalized positions and compelled to make more intensive use of remaining natural resources to eke out a living or to depend on the market and urban-industrial network for wage employment. It made them more vulnerable to poverty and unemployment. Thus the market-led process of commercialization of shrimp farming has created a paradigm of development with deprivation.

Accelerated development of shrimp culture is the result of rational response by capitalist entrepreneurs to opportunities of profitable investment opened up by globalization of markets. Lofty profits appropriated by investors were the reward for enterprise and risk-taking. But the process flawed in that considerations of private profit outweighed the social and environmental sustainability of the production system. The negative externalities of the development, manifested in the form of adverse environmental and social impacts, exceeded the benefits conferred. This was mainly the result of unplanned and unregulated development of shrimp farming, facilitated by inadequacies and shortcomings of the existing legal and institutional framework for management of coastal
resources, already explained elsewhere. It follows that there is ample scope for improvement in the production system to the benefit of all stakeholders. A properly planned and regulated development of shrimp aquaculture with balanced considerations of economic, environmental and social sustainability can enhance the returns from the system at national and regional level.

References


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