Chapter Five

Findings, Summary, Recommendations and conclusion

5.1 Introduction

Aquaculture is broadly classified into two viz., and they are Fresh water aquaculture and Coastal aquaculture which deal with all Farming practices of freshwater and saltwater respectively. As Freshwater aquaculture is monsoonal rain dependent, it cannot be year-round venture and the fishery developmental programmer and other aquaculture activities cannot be fully relied on it. We are therefore forced to undertake coastal aquaculture by utilizing the brackish water and near stove regions of our country. Prawn culture comes under the coastal aquaculture. Prawn are aquatic organizations in habiting the seas, estuaries and back waters there are more than 50 verities of prawn and six of them identified has coastal aquaculture majority of them breed and spawn in the sea and the young over migrate towards coastal waters/actuaries/back waters for growth and return to the sea for reproduction the best species for culture in India are the liger shirmp (Penacus monodom) white shirmp (P.Indicus) bananes shirurps (P.merguiensis) and flower prawn (P.wemisulcatus)

India is in the threshold of a "Blue revolution" thanks to the rapid expansion of aquaculture in the country particularly the prawn forming during the recent-years India is considered as one of the world leaders in prawn production and export. Considering the requirement of precious foreign exchange for the country for national prosperity ministry of commerce has identified marine products export as a thrust area for development Marine products account for a major shave of the exports of the country. In 1994-95

about 90.305 tones have been exported, registering a 10 per cent increase over the last year (1993-94) production of 81,064 tones. Prawn exports have contributed to this significant growth in value. prawn accounts for 35.4 per cent in terms of volume and about 70.74 per cent of the value of marine products exports. Shrimp exports to Japan and United states the two leading importers of prawn increased be 17 per cent and 12 per cent respectively in the first 8 months of 1994.

Though there has been appreciable increase in value realization the total shrimp exports in terms of quantity has not recorded corresponding increase shrimp production through increased fishing efforts, introduction of new fishing methods vessels, fish finding devices etc., production, fishing methods vessels, fish finding devices etc., production remained more or less stagnant. The legal conclusion is that aquaculture of shrimp is the best alternative to increase shrimp production. The marine products Export development Authority has been implementing many schemes with a view to promote scientific shrimp farming in the country.

While the aquaculture Industry was taking rapid strides towards putting India on the aquaculture map, as envisaged in any industry there were quite a few problems. To this effect the state and central governments have begun to take active steps to stream line the Industry's growth, the need to regulate the Industry to ensure sustainable development was recognized by one and all. In spite of all these, shrimp production continuous to increase with more and move entire and small farmers taking to aquaculture. About 82,500 hectares have been brought under shrimp farming and about 64,000 tones of shrimp

exported in the current year this is about 17,000 tons higher than 1992-93 volume and almost double the shrimp production of 1990-91.

Considering that the advantages for weigh out in favor of shrimp culture, ministry of commerce has brought shrimp farming under extreme focus for large scale and faster development. In order to co-ordinate the development of the Industry, the centre has set up the organization to develop brackish water aquaculture also centre took steps to treat aquaculture Industry on per with the agriculture sector

5.2 Benefits of the Prawn Culture

The Prawn culture is more beneficial to the Society as well as to the Economy of our country. There have been substantial Socio Economic benefits arising from Prawn culture development there benefits include increased in one, employment, Foreign Exchange earnings and improved nutrition and health (pull in, 1989 : UNDP / Norway / FAO, 1987 : Schmidt : 1982).

5.2.1 Economic Benefits

(a) It can be a dependable year round source of animal protein unlike agriculture or animal human dry.

(b) It is certainly a profitable venture than maintaining live - stocks as the food conversion nation in prawn is 1:2 against 1:3 and 1:4 is pig/chick and cattle respectively.

(c) Prawn culture yield is quite high compared to that of agriculture or live stock.

(d) As prawns are of delivery worldwide constituting more that 90 per cent by value of marine products export and have demand of high-exchange export market, the prawn farming especially in brackish water bonds would go a long way in enhancing the national income besides creating employment opportunities especially for rural men and woman folk.

(e) Prawn are esteemed world over as a choice scuffed item both in traditional and international value.

(f) Their delicious taste, ordinary veracity and high nutritional values have they number one in gourmet's choice round the world.

(g) In 1994-95 about 90,305 tones marine products have been exported, registering a 10 per cent increase over the last year (1993-94) production of 81,064 tones. Prawn exports have contributed to this significant growth in volume. Prawn accounts for 35.47 per cent in terms of volume and about 70.74 per cent of the value of marine products exports.

(h) Prawn exports to Japan and U.S., the two leading importance of prawn increased by 17 per cent and 12 per cent respectively in the first eight months of 1994.

(i) About 82.500 hectares have been brought under prawn forming and about 64,000 tones of prawns exported in the current year. This is about 17,000 tons higher than 1992-93 volume and almost double the prawn production of 1990-91.

5.2.2 Social Benefits

Prawn culturists are becoming concerned that prawn culture itself in imparity targeted as a cases of environmental damage in a period when there is significant damage to the environment from many other resource users - and that restrictions are unfairly placed on prawn culture development, either in gaining fair access to resource or through in necessary restriction on prawn culture developments including trade prawn culture products. Coastal Aquaculture for shrimp is environment Friendly: other Fist VICTIM is shrimp Forming itself since the medium of culture is water:

The quantity of shrimp pond efficient is less noxious than other sources of coastal efficient water pollution problems arise because of large volumes discharged in areas with limited water supply or poor flushing capacity/ In such situation self pollution occurs, with shrimp farmers themselves being the

most severely affected (Philips M.J., 1994). There is also strong evidence of impacts of water pollution on shrimp term for Economic losses. On the cost coast of Srilanka major shrimp motility has been reported on pollution of the main supply canal "Dutch Canal" by bond efficient water, which serves as a water supply and discharge canal for several hundred shrimp Farms such mortalities have happened in creak - faced farms in India. eg: Kandalarge creck near Nellore (Andhra Pradesh)

Prawn culture warm management leading to a good quality culture environment - will provide on optimal environment for the culture of aquatic species, and reduce Economic losses due to various factors including disease, that is the main objective of protecting aquatic development. As some existing environmental impacts or interactions represent serious economic problems for farmers, there should be incentive for introduction of improved practices to help farmers, as farmers are keen to be receptive to economically feasible and socially acceptable solutions, which enhance Economic returns.

There has been considerable interest from framers in the development of suitable method to treat shrimp pond efficient. The possibilities for treatment can be made into physical method. Such as filtration or settlement many and fast (1992) have evaluated many treatment processes to remove suspended solids and soluble organic carbon and found that filtration was the best treatment process to remove suspended with less than mg/litre. There is no doubt that filtration treatment can be successful but with a considerable cost/ for a 10 he. Pond in Hawali, with efficient treated by screening and filtration after which the water was vassed, Rubel and Hager (1980 in warg and fast, 1992) reported capital cost of U.S. $ 135, 500 hectares and annual operating

cost of U.S. $ 75,000 hectare. Such costs limit the application of this technology in most Asian countries and therefore indigenous and cheaper operation need to be explored.

5.3 Community participation in inevitable in prawn culture

Community participation and farmer co-operation are very important in prawn culture for socio - economic benefits when compared to agricultures, and there is more opportunity to revolutionize the coastal rural Economy through prawn culture including fishing. The unique feature of prawn culture is its self-renewability and its being a sources of tapping bio energy for an indefinite period of lime, status of shrimp prawn culture is India indicates that it has an estimates brackish water of about 12 lakhs handily 1,20,000 sen. is under shrimp farming out of which 50 per cent is under traditional / extensive farming. The remaining 60 per cent is under modified extensive and semi-intensive farming and thereby contribute employment income for the local rural people.

However, many problems are not these of individual farms, arising from conflicts with others over access to resource or through crowding or over stocking of culture areas. On these occasion, co-operation among farmers in essential in solving problems. Such farmers groups are likely to be particular important in coastal-agriculture, where multiple resource-conflict and environmental degradation are significant, ESO/NACA (1994) has recommended governments to seek to encourage the formation of farmer "self help" groups, and to facilitate problem solving among farmers.

5.4 Improvement of Socio-Economic and Agricultural Farm Labour

When coastal aquaculture was introduced, the price of lands went up. Owners of small and marked lands which were lying follow and un productive over several years thought it productive over several years thought it profitable to sell them. Later when they found that returns from prawn culture were very high, they realized that they had lest an opportunity of using the land themselves to derive such benefits. This has led to a sense of frustration leading to social problems among the coastal population. These issues are the result of a lack of clear-cut public policy on land/water use for prawn culture.

To solve these problems, the concept of satellite farming is advocated. This is not a new concept since it has been encountered even before the social unrest cropped up. The MPEDA has already brought out a look on the principles and practice of satellite farming. So it is incorrect to say that this concept is a strategy to stifle the choice of opposition to prawn farming. Satellite farming is a community project which would make small and margined farmers feed that they are also partners in the progress of this living conditions of this coastal village could also be built up by the move privileged of the Industry, who could be committed to such provisions. Co-operative prawn farming is practiced at Vedaranyam small prawn farms of 5-10 hac. Jointly owned by 3 or more persons from the local communities can be a Forerunner of the satellite farming.

Prawn culture generated more employment and more income than agriculture. One hac. of prawn farm can provide employment directly to a persons and another 4 persons directly in the ancillary Industries. Hence it is

not true that prawn farming would Vander agricultural labour jobless. Even, in some districts of Tamilnadu where prawn culture is practiced, shortage of agricultural labour is so acute that the landowners are looking to machines to take area. This is because the agricultural laboures and margined farmers found it more paying in the non-farm sectors rather than engage themselves in the strenuous, seasonal and less interactive work of the agricultural sector. Further in locations close to Urban area, agricultural lands are being converted for building homes for the over flowing urban population. So it is inevitable that we have to reconcile to the fact that such changes do occur in the modern era to meet the multi factors needs of the society. Prawn culture being an activity in the saline follows lands of the coastline such changes deserves to be welcome.

It may be concluded that prawn culture is essentially a reveal-based industry. An eco-friendly prawn culture in areas clearly demarcated as suitable for the purpose will ensure a sustainable production without involving any confrontation with other interests. The national government has declared prawn culture as an "*extreme focus centre*". Both the centre and the states are seized of the problems that arose or are likely to arise out of this activity. So that suitable forms, regulations and guidelines are pronounced for the development of coastal prawn culture. Many of the conflicting issues in prawn culture can be overcome setting up model prawn farms in each district to educate the public. Specific problems of local nature have to be sorted out through natural understanding, keeping in view the overall interest of the large segment of our population living below the poverty line.

It is hoped that the sites of least prawn culture will view this emerging industry in to the proper perspective and resort to a positive out look to contributes to its growth in a well-organized and scientific manner and build our national Economy.

5.5 Cost of the Prawn culture Economic Cost

Shrimps are recognized the world over as a choice sea feed item and are also as "living Dollars" and they play a dominant role in an sea feed exports trade. For instance, during the years 1993-94, out of India's total sea food exports of 2,36,678 tones valued at 2,433 crores, shrimps constituted 81,064 tones its volume and 930,19 crores in value. Prawn culture is an Industry, which could satisfy a range of national priorities for Socio-Economic development. It has attached extreme focus alternation of the union government of India for exports. There have been significant developments in the inland and coastal prawn culture sectors. Shrimp culture in particular in the coastal areas has gained alternation on account of its contribution to the exports earnings. The cultured shrimp production reached 62,000 tons in 1993-94 and projected to reach 1, 00,000 tones by the year 1996-97. Development and commercial prawn culture cannot be viewed in isolation form environmental concerns.

Unplanned and uncontrolled developments can be deter mental to the environment, even though prawn culture is a much less polluting activity than some of the other Industries and even domestic sewage crowing of forms in certain locations, Salinity influence on drinking water supplies and agriculture land and associated encroachment of ecologically valuable environments like mangroves and pollution threats from intensive farms are some of the issues

involved. Already a few instances of multi-user conflicts have become the cause of sectal tension in some place in India. For the Industry to be Eco-Friendly and sustainable over a long period it has to be curved out within the environmental limits. But virtually there are no standards for us to determine the environmental limits. To plan for the sustainable and Eco-friendly prawn culture basic information about the farms located in an area is a must.

5.6 Impacts of Prawn Culture on Various Fields

Even though the main concern of the aqua culturist is the health of the species being cultured, the implications of prawn culture activities for water, agriculture, and environment are of equal importance, as continuation of his enterprise and public support for it will depend on its safety levels. The field is attracting the attention of the large number of investors as well as the criticism of environmentalist and public at large. No doubt, criticism is healthy trend us it would serve to promote balance development of prawn culture.

5.7 Impacts on environment

Prawn culture interacts with the environment, by using the resources and causing environmental changes. In some cases environmental problems have resulted from conversion of wet land habitats, nutrient and organic waste discharges, introduction of erotic fishes, chemical uses as well as from deterioration of water Quality and decreasing availability of suitable sites for prawn culture. Unfortunately there is a substantial lake of adequate information and date related to adverse environmental effects of prawn culture in developing countries. There are several factors, which influence the environmental compatibility of prawn culture. There are site selection, layout of the term and water availability, species selected for prawn culture, culture

method, operational procedures, production levels, skill, technology standards, legal states, Economic viability and general Co-ordination in overall management.

Based on the current information the key areas of ecological concerns could be visualized. Many prawn culture operations result in the release of metabolic waste products and unconsumed food in the aquatic environment degrading both water and the bottom sediments. The release of soluble inorganic nutrients such as nitrogen and phosphorus could cause hyper nitrification possibly followed by entroprication of a water body. The resulting algal blooms may by partially harmful to the farmed stock. Organic environment of the benthic bio-systems may result in increased oxygen consumption by the sediments. These could cause in extreme cases release of carbon dioxide, methane and hydrogen sulphide etc., and enhanced demineralization of organic nitrogen and reduction of biomass.

5.8 The following are the other impact of prawn culture on environment

5.8.1 Salt water seepage

Seepage is water drained from pond. This is a main pollutant of water and it causes major problems in crop cultivation. As most of the prawn farms are not built with proper drainage facilities they drained the waste or contained water into the nearby fresh water cavals which results in water pollution. In instances where prawn forms are being set up in the vicinity of agricultural lands, any problem as seepage of saline water in to the agricultural lands or ground water resources for drinking could be overcome by providing a gap filled with fresh water by the Prawn Farmers.

5.8.2 Soil degradation and pollution of the environment

Depending upon the vital range, the influence of the sea extends from a few to several kilometers up the rivers/creeks, which constitute the saline belt. In Tamil Nadu, there are no perennial rivers and major agricultural operation depends on seasonal but erratic rains and on excess water discharged from the dams. So, prawn Farms could be set up only in the Saline belt. In some places in Nagai-Quadi-E-milleth district particularly in Sirkazhi Taluk most of the prawn farms met up on Fertile lands. As it set up for among from the river they have to draw the water to the bend, this causes degradation of soil. The precaution that a prawn forms has to be aware of it that sufficient time lay should be given for pond preparation for the next crop. The popular belief the saline soil will become un useful for even due to prawn farming in true. Prawn culture is a pollution Industry. The reservoirs nearer to the prawn farm get polluted by pollutant drained from the pond which poses a greater threat to fish and other farms of marline life as well as health of the human beings. The efficient treatment system is being made compulsory to all the prawn farms as per the forms on the pollution control board to ensure the safety of the environment and a sustainable prawn culture.

5.8.3 Spread of diseases

These are many adverse reports to show that prawns carry special diseases, which affect the human population. It causes some protozoon, Fungus and bacterial diseases.

5.8.4 Floods due to construction of Prawn Farm

Floods may cause due to poor construction of prawn farms which threaters the nearby village. As most of the drainages converted in to prawn

ponds, the floods caused during the rainy seasons enters in the village and results in heavy damage to the properties of the peoples.

5.8.5 Cutting of trees in the coastal zone

It is alleged that tree telling increases the vulnerability to erosion, cyclone etc., To constitute a pond most of them removed all the trees which results in soil erosion and is experienced in many part of Nagai Quid-E-Milleth district in Tamil nadu.

5.8.6 Closing of river mouth / Estuaries

In Tamil Nadu there is no perennial rivers farming large unlike others states on the east coast. Hence the Cauvery water only the main source for agriculture closing of this canal mouth to construct a pond prevents and this facilities to the farmers those who depend on crop cultivating lands.

5.8.7 Hindrance to Fishing

In the vast coastline of India water intake for prawn culture is set up at many areas in Nagai-Quaid-E-Milleth district in Tamil nadu. In some places, It may affect the fishing operations particularly such areas most be displayed by bugs or such floating objects but most of them forget to display these areas. It causes some damages to the fisherman's net while they are fishing.

5.8.8 Impact on employments

It is tree that prawn farming would vender’s agricultural labour jobless. In some districts of Tamil Nadu where coastal aquaculture is practiced, storage of agricultural labour is so acute that the most of them employed by the prawn farms. These are the impacts of prawn culture on the environment, agriculture, and employment and on other ecological factors. The following are the steps to be taken to eradicate the above said problems:

a. Proper gap of sufficient midth should be given between butter zones, which can be filled with fresh water.
b. Salt Resistant with high yielding varieties of agriculture crops should be invented.
c. The concept of blending fishing with coastal aquaculture could be developed.
d. The concepts of satellite farming can be advocated.

5.9 Conclusions

Shrimp farming offers significant employment opportunities, which may help alleviate the poverty of the local coastal populations in many areas, if it is properly managed. The published literature on that topic shows large discrepancies, and much of the available data is of anecdotal nature. Estimates of the labor-intensiveness of shrimp farms range from about three times less to three times more than when the same area was used for rice paddies, with much regional variation and depending on the type of farms surveyed. In general, intensive shrimp farming requires more labour per unit area than extensive farming. Extensive farms cover much more land area and are often but not always located in areas where no agricultural land uses are possible. Supporting industries such as feed production or storage, handling, and trade companies should also not be neglected, even if not all of them are exclusive to shrimp farming. Typically, workers on a shrimp farm can get better wages than with other employments. A global estimate from one study is that a shrimp farm worker can earn 1.5 – 3 times as much as in other jobs; a study from India arrived at a salary increase of about 1.6, and a report from Mexico

states that the lowest paid job at shrimp farms was paid in 1996 at 1.22 times the average worker salary in the country.

Shrimp aquaculture is expanding in many areas that in the past had been managed under some kind of common property régime. This is particularly the case in coastal zones where fisher folk require easy access to beaches and where multiple uses by different users of land, water and forest resources have made exclusive control by individuals untenable. Several case studies mention that due to the expansion of modern shrimp ponds in coastal areas, local fishermen can only reach the beach by trespassing at great risk on shrimp farms or by taking a long detour. Local people have not only lost access to their fishing grounds and to their sources of riverine seafood and seaweed, but they have also relinquished social and recreational activities that they traditionally enjoyed on their beaches. Moreover, coastal lowlands and mudflats are used during the rainy season by many coastal communities for the extensive farming of fish and crustaceans — practices which have traditionally been regulated through customary common property régimes. Since the latter have frequently had no formal legal status, the customary holders of areas appropriated for shrimp farms have been easily dispossessed, usually without compensation.

With these caveats in mind, let us look at a few cases where modern shrimp farming has had some rather serious negative consequences for many people as well as for their environment. We attempt here to cite cases that bring out several of the contradictions associated with divergent social and economic contexts.

From the present study it is evident that the surface water quality is worst affected due to intense practice of aquaculture or shrimp that has mushroomed in this region. The first fact is that the contaminated water is being let out of the pond and it is spread over the low lying areas. These areas, after some time with the contaminated nature make the soil pollution as well as pollute the subsurface water. The results of various parameters clearly indicate that the surface water let out from the ponds contains abnormal limits of bio-chemical parameters prescribed by the WHO and ISI standards and this will pose a major health problem in this region. Soil pollution and waste land is seen in majority of this region and many agricultural lands were transformed into shrimp ponds. Though it is a good income gaining business, the people who are depending on the agricultural activities for a very long time in this region is now jobless and starving. The bio-chemical parameter results show that there is every indication that this region would be a focal point for a major outbreak of infectious disease if the waste water let out of the ponds, if they are not maintained properly.

An Extensive water sample analysis carried out in over half-a dozen villages of Sirkazhi taluk, in the aquaculture belt of Nagapattinam district by the quality of the only source of potable water ground water. An independent study made to established that hardness, chloride and alkalinity levels of water collected coastal villages in Srikali taluk of Nagapattinam District spread over the seven villages of Niethalvasal, Mehendrapalli, Keelaiyur, Pudukuppam, Eranjimedu, Thirunagari and Radhanallur are in excess of the prescribed tolerance limits for drinking water.

Prawn culture and shrimp farming are done in coastal districts of Chengalpattu, Cuddalore, Thanjavur, Nagapattinam, Tiruvarur, Pudukottai, Ramanathapuram, Tuthukudi and Kanyakumari. There are about 1200 such aquaculture farms in Tamilnadu. The effluents let out of these farms containing bio-degradable wastes are not properly treated in many cases and hence pollute groundwater in adjoining areas, even up to a distance of 6 km. affecting agriculture. Added to this, a majority of the prawn farms have been flouting environmental guidelines by discharging untreated effluents into the neighbouring Poromboke lands. There are about 648 Aquaculture units, which are occupying the areas of about 1484 hectares. The estimate on wastewater generation from these units is also not available. There have been no aquaculture activities along the coastal line of the districts as per the report of fisheries department.

The inspection team noticed destruction of mangrove vegetation at most of the prawn farming sites for the development of shrimp farms. Significant destruction of mangrove forests was observed near the Aqua Gold Shrimp Farm at Village Vellar in Killai Taluk of South Arcot District similarly on Pichavarum estuary in Village Pichavarum in Killai Taluk of South Arcot District of T.N., the shrimp farms are constructed by clearing mangrove vegetation. Mangrove vegetation in Kuchipalam Village is also facing threat due to the expansion of prawn farming activity.

Mangrove forests constitute an important component of coastal ecosystems in tropical regions of both hemispheres. They thrive in tidal estuaries, salt marshes and muddy coastlines. Mangroves are dominated by trees and shrubs of the Rhizophor genus. Some species have the peculiar

faculty of rooting from the seed still attached to the tree. Mangroves were regarded as being practically worthless by colonial settlers and urban dwellers, but coastal indigenous populations had been using them sustainably for many centuries as sources of firewood, construction materials, and nursery beds for fish and crustaceans and as protection against storms and floods. During recent decades mangroves have been disappearing rapidly, victims of urbanization, commercial logging, unrestricted fuel wood collection, charcoal making, river impoundment and, more recently, shrimp pond construction.

Studies should be undertaken to estimate in a more systematic way the direct and indirect causes and impacts of the destruction of mangroves associated with the expansion of the shrimp industry. Measures designed to mitigate damages should take more account of social implications. Even though there is no authoritative study of mangrove deforestation in general, and much less of mangrove deforestation due to shrimp farming, we cite some estimates found in the literature in order to illustrate the importance of this ongoing process.