

# Balancing Upstream Agriculture Security with Downstream Aquaculture 'Prosperity' – Some Reflections from India

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Hydro solidarity has become an essential requirement for not only water management but also peaceful coexistence of humans in India as there is increasing upstream and down stream conflicts over user of water in many river basins. These conflicts have assumed serious proportions in many cases causing social unrest and communal disharmony among riparian states.

In the last decade, there have been reports of violence and deaths on account of conflicts over water rights between upstream and down stream areas in many river basins in India. *Narmadha, Cauvery, Krishna, Godavari* basins are some examples for such incidents. In the case of dispute over water use between Karnataka and Tamilnadu states over *Cauvery* River, there were communal disturbances between two nationalities viz. *Tamils* and *Kannadigas*.

In fact several water tribunals were formed and judgments pronounced in many river basin's disputes but solutions are evading for a long time. In the case of *Cauvery*, the problem remains for more than a century. There are also many court cases pending at local levels as regards uses of water, which affect livelihoods of many. All these are clear indications of the hydro animosity among communities, states and nations.

These conflicts are related to many aspects of water uses. In this paper we would concentrate on the issue of aquaculture and how is it affected and affects other water uses in a river basin or a catchment.

## **Aquaculture in India**

Aquaculture may be defined simply as farming fish and other aquatic organisms. Fish is used here generally to include all farmed aquatic organisms. Land based systems are commonly integrated with agriculture by stocking fish in rice fields. Water based systems are for raising fish in water bodies such as rivers, lakes, reservoirs or bays. Asia accounts for about 90 % of global production with China dominating the scene. Aquaculture contributes to the livelihoods of the poor through food supply, employment and income. Though there are many aquatic organisms shrimp culture has received more publicity. However, it contributes to 10 % of global production and carried out by better off farmers.

India occupies second position in the world in aquaculture production and contributes to about 7 % of world production. Fishery sector in India provides employment to about 6 million fishers and another six million are employed in fishery related activities. That is about 1 % of the total population depends upon fishery sector in India.

Inland aquaculture has been the major fish producing system in India. Inland production includes catches from rivers, tanks, reservoirs and lakes. Major states, which are involved in inland aquaculture, are West Bengal, Andhra Pradesh, Orissa, Tamilnadu, Madhya Pradesh, Karnataka and Maharashtra. Aquaculture is generally dominated by traditional species but there is a tendency for production of high value species like shrimp, which is also environmentally degrading and has come under increasing scrutiny and criticism.

Pollution of water and land systems, destruction of coastal habitats and significant socio-economic costs are to be balanced against benefits of exports earnings and 'employment' from this sector. In this paper we deal more of these aquaculture problems and how to balance the human food security and ecological security and sustainability. This is especially important in the context of contradiction between agriculture and aquaculture in many states in India and also some other South East Asian countries.

## **Shrimp Culture**

Shrimp culture in India has begun on a commercial scale only during last four or five years. About 1.2 million hectares of land has been identified as suitable for brackish water aquaculture, of which already about 0.10 million hectares under cultivation. Development of shrimp culture has taken place on a significant extent mainly in Andhra Pradesh, Tamilnadu, Karnataka, Kerala, Orissa, Maharashtra, Goa, Pondicherry and West Bengal.

Liberalisation of economy, high profitability and good international market are the factors, which have given impetus to shrimp culture boom in India. Shrimp culture has been listed as one of the priority sectors by the government for increasing

export and thereby foreign exchange reserves. The government also has chalked out a policy of leasing out its vast land area along the coast on favourable terms to the industrialists. In addition, liberal credit from financial institutions and subsidies from government have encouraged the operations on a large scale.

Also the Marine Products Export Development Authority (MPEDA), a government sponsored organization is involved in promotion of shrimp culture. It has set up its research and development units to cater to the needs of shrimp industries. Motivated by high profitability, not only individual companies but also corporate bodies are participating in a large number in shrimp production.

Cultured shrimp production contributes to about 25 % of total shrimp supply of 200,000 tons in India. It is seen that while cultured shrimp production is increasing, the production through capture is stagnating. The shift from capture to culture is sign of depletion of national habitats as noted on global level by Csavas. In India, shrimp culture is 100 % export oriented.

Of the total sea food export of Rs.25,040 million, shrimp exports constituted about 71 %. Japan is the largest importer of shrimp from India, the share of which is about 44 %. West Europe ranks as second largest market. United Kingdom, Spain, Italy are other countries importing shrimp from India.

### **Impact of Aquaculture on Local Economy:**

Fast developing aquaculture has already made its consequences on local economy and environment. Apart from wastelands, fertile agricultural lands are also bought. Not only private lands but also village commons have been encroached by them. These include pasture lands, canal and stream banks, burial grounds, common land used by fishers for drying of nets, foot path etc.

Purchase of agricultural lands on a large scale has boosted artificially the value of lands several times in these regions. It is reported that one acre of land which was about Rs.2500 in 1991 has increased to about Rs.1,00,000 in 1994. Tempted by these spiraling prices, even small and marginal farmers have sold their lands thus losing their only source of livelihood. In some areas farmers were compelled to sell their lands as they found it difficult to carry on cultivation operations since aquaculture ponds surrounded it.

In such cases, they were offered only less prices than the prevailing market price. Conversion of agriculture lands into prawn has affected the employment opportunities of thousands of agricultural labourers most of them belonged to depressed castes. Moreover paddy is the main crop cultivated in these areas which is more labour intensive compared to other crops. Hence conversion of paddy lands into prawn farms has affected the employment opportunities for agricultural labourers on a massive scale. The problem is particularly important for women agricultural labourers as they use to get employment in many operations of paddy cultivation such as transplantation, weeding and harvesting. Conversion of paddy lands into prawn farms has not only displaced agricultural labourers and poor peasants but also affected rice production in the area.

## **Ecological Impact of Shrimp Culture:**

Like that of many Southeast Asian countries, unregulated shrimp culture has resulted in ecological degradations in India. These problems are common both for agriculture and fishing communities. A major problem noted is pollution and salinisation of drinking water in many villages. Excessive pumping of ground water along the coast for the purpose of salinity control in the ponds has resulted in intrusion of sea water. Also storing of sea water in ponds continuously for many months has turned the ground water saline through seepage. Seepage of saline water from prawn farms has led to acidification of soil of nearby agricultural lands. Thus there is a danger that most of the fertile lands would become barren after few years.

It is found that effluents which contain chemical fertilizers, antibiotics and toxic elements are discharged from prawn ponds polluting nearby estuaries, canals and tanks. Discharge of effluents also causes death of fish in estuaries reducing the availability of stock, especially shrimp seeds, for those who are depending upon them traditionally. Yet another ecological implication of shrimp culture is destruction of forests along the coast leading to deforestation. It is found that trees like coconut, palmyrah, tamarind and casuarina are cut to make fish farms. Destruction of mangrove forests has also been reported to a significant extent.

As a result the coastal area is now more prone to ravages of cyclone, which already affects the east coast often. Destruction of trees has also created fuel problem for local people who have depended upon them traditionally for their fuel requirements.

Thus the downstream aquaculture has created adversity in agriculture in the upstream in the guise of 'prosperity' in downstream. There were protest movements in many states and filing of court cases for remedies. The Supreme Court has ordered for regulation of these farms and Government of India has passed an Act for better management of these catchments.

However the problem continues, as not adequate efforts taken by government for proper regulation of these farms. Most of these farms are run by big companies and they evade all the rules and regulations prescribed under this Act. Hardly there were any efforts for involving the stake holders-agriculturists, shrimp farmers, companies, fisher folk, trade unions, NGOs, and government – in the process of negotiations.

In the foregoing description we have seen the impact of shrimp aquaculture on local economy and environment especially how they affect water systems in lakes, tanks and under ground. It is also seen that the shrimp culture affects agriculture through conversion of paddy lands in to aqua-farms and degradation of agricultural lands after some time. In another situation it is seen that the water use for agriculture affecting aquaculture mainly fresh water aquaculture. In this case, the

competition between irrigation and aquaculture affecting the later. This occurs through damming of rivers, which affects downstream flow affecting fishers who are depending upon it for their livelihood.

The best way for ensuring of hydro solidarity in a catchment is through the process of dialogue and negotiation of issues including water rights among different stakeholders. Multi Stakeholders Dialogue (MSD) is a well recognised concept in the river basin management and advocated by United Nations Organisations. In fact, FAO has already prescribed effective procedures under Article 8 of code of conduct for responsible aquaculture.

There are already some basin level organization established in India, for addressing the upstream/downstream issues, however most of them were defunct mainly because of the inactive dialogue process involved. It is to be noted here that the National Water Policy framed by the Government of India in April 2002 also did not recognize explicitly the importance of dialogue process in balancing of different interests in a catchment. The problem is not peculiar to India but prevalent in many South East Asian countries.

#### **References:**

1. Rajagopal, A (1995): " Intensive Shrimp Culture and its impact on local economy and environment in India", **Development Education and Exchange Papers (DEEP)**, FAO, Rome.
2. Government of India, (2002), **National Water Policy 2002**, (mimeo), Ministry of Water Resources, New Delhi.
3. Csavas, (1993): "Aquaculture development and environmental issues in the developing countries of Asia, **Environment and Aquaculture in developing countries**, ICLARM.
4. Ruddle, (1993): "The impact of Aquaculture development on socio-economic Environments in Developing countries: Towards a paradigm for Assessment" in **Pullin et al.**