Ornamental fish industry- New avenue for livelihood in Brahmaputra basin and need for a public aquarium

The Brahmaputra river system and its associated floodplain wetlands (beels) in Assam are endowed with a good number of indigenous ornamental fishes. Fishes of the genera *Channa, Anabus, Botia, Danio, Trichogaster, Esomus, Rasbora, Mystus, Nandus, Badis, Sisor, Chaca*, etc. native to this part of the country have adorning the aquariums worldwide now a day. As such, rearing and marketing of indigenous ornamental fishes can be taken up as a means of amiable livelihood involving particularly the women folk of this region. However, presently most of the locally available potential ornamental fishes have been unauthorizedly collected by traders operating from outside the state. The entire demand of export of these fishes met through wild collection. Besides this, wild fish-stock of these ornamental fishes of this region dwindling very rapidly in recent times due to habitat degradation and growing human interventions on aquatic ecosystems.

In recent years a good deal of work has been carried out on ecology and fisheries of ornamental fishes in upper Assam (Bania, 2011; Biswas and Boruah, 2000; Biswas *et al*, 2004; Choudhury *et al*, 2005; Das and Biswas, 2005; Das *et al*, 2006; Das *et al*, 2007). A total of 148 species of potentially culturable ornamental fish species have already identified from the upper Brahmaputra basin. Again, there is vast scope for culture of indigenous ornamental fishes. Therefore, technology generation for captive breeding of some of the selected endemic ornamental varieties is the need of the hour. But to go for this, brood stock development of the same species is of utmost importance which is often neglected by all groups of people. It would definitely be the first step for the most viable alternative available to fulfill the export demand of these fishes and reducing the pressure on their natural fish stock of the region along with ensuring employment opportunities.

However, aquatic habitats of Bahmaputra basin are increasingly being affected by the human activities (Bania & Biswas, 2008) along with the natural factors. In most of the areas, people are directly or indirectly dependent on the resources. Majority of the people in many places earn their livelihood from fishing in the water resources throughout the year.

However, there is an impending danger of drastic reduction in natural population of certain fish species if the present mode of exploitation continues unabated. The present practice of exporting native ornamental fishes based on natural collection alone is not a sustainable practice and may have serious implications in view of the fact that eight of the potential
ornamental fish species of Assam have already been assessed to be threatened (Bhattacharyya et al, 2003). No attempt has been made so far for propagation of majority of fish species for sustainable trade. Rearing of ornamental fish species as well as captive breeding can be a suitable option of livelihood for the people of this region. For breeding purpose brooders of equal size, age and sex are of prime importance as dependence on wild collection for breeding is highly challenging and also risky for profitable production purpose unless the young ones selected from the nature and reared in captivity to make them brood stock. In view of these, focus on developing brood stock of threatened ornamental fishes like murrel (*Channa aurantimaculata*), restricted to certain pockets of Assam only which may generate additional employment opportunities for the people of this region.

The entire supply of Indian ornamental fish is primarily dependent on wild catch (85 per cent) and a few artificially bred varieties (15 per cent) of exotic fish. Increasing agribusiness opportunities of these live fishes in the world market could be a matter of concern for the sustainability of this natural wealth in the long run, since the supply is entirely dependent on wild catch.

As stated Brahmaputra basin has vast resource of fish germplasm. Among the fishes identified till date, 148 species were found to have ornamental value. Air breathing fishes like *Channa aurantimaculata* is the prized species of murrel group which are endemic to this region. The market price of these species ranges from Rs. 250-300/kg. Both of these species are the wetland dwellers and their distribution is restricted in some pockets of the region only. The wetlands of Dibru-Saikhowa and its surrounding especially Maguri and Khamti Gohali beel are the most suitable habitats for these species (Bania, 2011). Due to over exploitation and ecological degradation these species are not available frequently although earlier found as dominant species. According to CAMP (1998), the status of these species falls under threatened category. However, their propagation and culture has never been attempted. So, there is an urgent need to develop the brood stock as the first step to generate the technology for captive breeding of these indigenous threatened ornamental varieties for future sustainability which would be one of the most viable alternatives for the people solely dependent on the natural water bodies of Dibru Saikhowa for their earning. On the other hand contribute to sustainability of ornamental fish trade.

Keeping fishes indoor is a rewarding hobby enticing people of all ages, of all social and economic strata of the society. Household that owned an aquarium with fishes often develops an emotional attachment to them and recent findings also suggest its meditative role in certain
disorders. Further keeping fishes as pets in an aquarium perhaps provide the best opportunity to avail the lifestyle a particular fish adopts in nature that often attracts people since time immemorial. For all these reasons and considering the wide range of benefits to the household and the society, ornamental fishes are rightly been called as ‘live jewel’. Information on natural fish stock, particularly their distribution pattern, habitat preferences, population structure, biodiversity status etc. are very essential for undertaking programmes on sustainable utilization and effective conservation of available fish germplasm resources.

North East India particularly Brahmaputra basin of Assam is virtually a granary of freshwater ornamental fish species. In fact the region is abode of many endemic and rare varieties of fish having potential ornamental value. But it is very sad to mention that there is a lack of a public aquarium in the Brahmaputra basin. Keeping in view the prospective market and the livelihood it can be therefore, proposed to set up a public aquarium, first of its kind in Assam for live gene banking of indigenous ornamental fish at the bank of Brahmaputra at any convenient site where locally available ornamental fish species of the Brahmaputra basin will be displayed for visitors particularly for school and college students. This idea will definitely help in establishment of a live gene bank for indigenous ornamental fish species of the Brahmaputra basin as well as raising awareness among different stakeholder for conservation of indigenous ornamental fish.

As mentioned earlier keeping colourful and fancy fishes, popularly known as aquarium fishes or live jewel is one of the oldest and most popular hobbies of the world. However, freshwater ornamental fish for international trade are mostly procured from wild stock. More and more fishes have been domesticated and popularized for business purpose. Over 2500 species are traded globally and some 30-35 species of fresh water fish dominate in the international market. Not only the attractiveness and colour, but also the rarity is important in an export market. The wholesale value of the global ornamental fish trade is estimated to be US dollar 1bn while the retail value is US dollar 6bn. The entire industry including accessories and fish feed is estimated to be worth more than US dollar 14bn. The Indian ornamental fish sector is a small but vibrant segment, with potential for tremendous growth and large scale gainful employment generation. At present the ornamental fish export from India is dominated by the wild caught species, which cater to a small portion of the global market. 90% of the freshwater ornamental fish species exported from India is caught from North Eastern region particularly from the Brahmaputra drainage system. This has caused a gradual depletion of many rare and endemic species of the region. In fact, the pressure of exploitation is so intense that certain endemic species is on the
verge of extinction. Under this backdrop, the concept of setting up of public aquarium is the need of the hour which will act as live gene bank for indigenous ornamental fish species of the region, which will not only help in conservation of fish diversity but also generate awareness about aquarium fish among the younger generation to take it as entrepreneurship. The aquarium is expected to attract tourists of all age group and help in revenue generation besides conservation of the native ornamental species

The collection of indigenous ornamental fish species should be done from throughout the Brahmaputra basin.

While thinking of public aquarium some technical pointed that should be taken care of are-

- Ornamental fishes should be collected from the Brahmaputra basin and acclimatized them in separate enclosures
- The quarantine measure should be taken for a varying period depending on the species and life stages of the species to be stocked for rearing.
- Adequate care should be taken for combination of species for stocking in aquarium
- Standard method should be followed for maintenance of water quality and fish health
- During installation of aquarium, provision should be made for adequate lighting arrangement, filtration, water recirculation etc.

Keeping of aquarium has emerged as the second most popular hobby in recent years, next to photography. Perhaps, China is the pioneer in adopting aquarium fish as hobby. The world’s first public aquarium was established in England in 1853, and now about 500 public aquarium exists throughout the world. The ever existing demand for aquarium fishes gradually paved the avenue towards global trade of ornamental fishes. The world trade of ornamental fish is valued at about US 427.29 million (FAO, 2001). India’s overall trade presently is over Rs. 150 million. About 80% of ornamental fishes from India to International market are exported via Kolkata Airport of which the lion’s share (more than 80%) is contributed from North East region.

The Brahmaputra is blessed with diverse types of water bodies in the form of hill streams, torrential streams, brooks, wetlands etc which harbours a great array of ornamental fish species. 167 species of fish has been reported from upper Brahmaputra basin while Das et al (2006) highlighted the indigenous ornamental fishes from rivers of upper Assam. Bania (2011) reported 108 species from the Dibru Saikhowa National Park out of which 84 species are ornamental in nature.