

The seminar I gave on small-scale aquaculture options was based on my experience in small-scale aquaculture in general as well as on observations made during the one day trip. The main issue is that there has been no development assistance in aquaculture for the small-scale farming sector in Myanmar because of government concerns about national food security.

As discussed in my previous article on aquaculture in the country, a narrow focus on rice at the expense of fish constrains the attainment of food security. The government supports only relatively large-scale fish farms. Supporting government policy is required to allow the conversion of a portion of farmers' rice fields into fish ponds. Perhaps the integrated rice/fish system developed by two farmers in Thee Gone Lay Village could be promoted on a widespread scale as it may not require a change in government policy. What is clear is however, is that there are several promising technical aquaculture options available for brackish water as well as freshwater and terrestrial agricultural environments that are socially and economically appropriate for the utilisation for the benefit of poor farmers and fishers in Myanmar.

Assistance to areas affected by Cyclone Nargis

My visit to the delta was arranged by Myanmar Egress, a civil society organization with three wings: a capacity development centre; a think tank for policy research and advocacy; and a media unit publishing a newspaper and a business magazine. Myanmar Egress has also formed an NGO; the Nargis Action Group with four Burmese AIT alumni (Tin Maung Thann, Htin Aung Kyaw, Aye Aye Mon and Aye Mya Mya) to provide relief work for Nargis affected areas. The group is currently working with a number of international organizations and NGOs and links up with MFF for aquaculture and fisheries activities. Should you wish to provide assistance to the cyclone victims, I suggest you contact U Tin Maung Thann who, besides being the Vice President of MFF, is also President and Director (Policy) of Myanmar Egress. He may be contacted at tmthann@gmail.com. The need for assistance, especially to Nargis affected areas is acute. Officially the death toll is about 160,000 with about 70,000 missing to give a total of about 230,000. Unofficially the death toll is at least 300,000 persons. If the latter figure even approaches the truth, this would make the death toll greater than the Asian tsunami, further illustrating the need for assistance.

Harvesting, traditional preservation and marketing of fishes of Chalan Beel, Bangladesh

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Overview

The legendary Chalan Beel is the largest beel (wetland) situated in the north western region of Bangladesh, with an area of more than 350 km² during the rainy season and about 90 km² during the dry season. It is one of the most important inland wetlands, creating employment opportunities and providing a huge amount of fish to rural people every year. Chalan Beel is located in area overlapping Atrai of Nawgaon district; Singra, Gurudaspur, Baraigram of Natore district; Chatmohor and Bhangura of Pabna district; and Tarash, Ullapara, and Rayganj of Sinajganj district. Most areas of Chalan Beel are flooded land and consist of numerous small beels and canals. Several rivers and their tributaries form a dense water network over the entire beel area.



Gone fishing...a child baits his hook for fishing in Chalan Beel.

During the rainy season, the entire Chalan Beel fills with water and creates a breeding ground for many native fish species. The people living around this beel include both professional fishermen and general members of the public who also harvest a huge amount of fishes at this time. The traditional method of preserving fishes through sun drying is an old practice in areas adjacent to the beel. We conducted a study of the harvesting, preservation and marketing of fishes in the Chalan Beel area.

Methodology

Various parts of Chalan Beel including Atrai, Singra, Baraigram, Gurudaspur, Chatmohor, and Bhangura were surveyed for a period of 12 months from September 2006 to August 2007. During the field survey, different areas of the beel, fish landing centres, fish markets and fish drying sites were visited. Information was collected by direct interviews from fishermen, fish traders, and dried fish producers. Fish samples of each species were collected and preserved in labelled plastic jars using 10% formalin solution.

Fishes of Chalan Beel

A total of 81 fish species were recorded from Chalan Beel including 72 indigenous fish species and nine exotic species. Native fishes were recorded under following 12 fish orders - Cypriniformes (33.33%), Siluriformes (29.17%), Perciformes (13.89%), Channiformes (5.56%), Mastacembeliformes and Clupeiformes (4.17% each), Osteoglossiformes (2.78%), Cyprinodontiformes, Anguilliformes, Synbranchiformes, Beloniformes and Tetraodontiformes (1.39% each). Among the available indigenous fishes, 38.89% fishes were in the list of threatened fishes of Bangladesh declared by IUCN¹. In addition to fishes, small freshwater prawns, crabs and some other fisheries items were very common in Chalan Beel.

Harvesting of fishes

Harvesting of fishes in Chalan Beel was done by using a variety of fishing gears. A total of 27 different types of fishing gears were recorded during investigation period from different areas of the beel. Recorded fishing gears were categorized into five major types which were nets (44.44%), traps (18.51%),



View over part of Chalan Beel.



Fishing by drag net.

hooks and lines (22.22%), and wounding gears (14.81%). Moreover, fishermen used bana (bamboo split made into rectangular shaped structures) prior to fishing to enclose specific water area for making their fishing more effective. Also, a technique locally called katha fishing is often used during the dry season. This involves providing tree branches or other aquatic vegetation in a specific area of the beel during rainy season (in the deeper portion of the beel) aimed at creating shelters to encourage aggregation of fish, for easy capture.

In the studied areas, nets were recorded as the most effective fishing gear to catch fish both for small scale and large scale harvesting. A wide range of fishes both small and large were caught by these nets. Around 20% of fish traps were used for catching large fishes with the remainder used for small to moderate size fishes. Hooks and lines were found to catch predominantly moderate to large size fishes only with different baits including earthworms, small frogs and small live fishes. Among the recorded wounding gears, 75% were used during heavy flooding period

and 25% were used at the end of rainy season and when water level of the beel was low. All the wounding gears were used for harvesting large size fishes.

Impacts of illegal and over fishing

The use of illegal fishing gear and overfishing were found to be very common problems in Chalan Beel. Fishermen were harvesting indiscriminately without considering the impact on natural broodstock or fry. More than 80% of the nets used in fishing were found to be small meshed, capable of catching almost all types of fishes. As both broodstock and fry were caught indiscriminately, fish abundance and the availability of particular species in the beel are decreasing every year.

Moreover, during dry season, fishermen harvest fish from low depressions of the beel by complete dewatering. This badly damages fish stocks, contributing to conservation and fisheries management concerns.

Traditional preservation of fishes

Several preservation methods were observed during investigation period. Many fishermen used square or rectangular shaped guizza (bamboo splits made with floats) and deck of their boats for preservation of their catches. They also preserved their harvested fish (38.89% of native fishes) with ice. Crushed block ice was used in 100% ice preservation.

The most common and an old preservation method practiced in areas adjacent to Chalan Beel was sun drying. Both commercial scale and household sun drying were conducted in the beel areas. The fish used for drying varies according to the time of year and availability of particular species. Commercial operations generally dry 10-140 kg of fish per day while households dry less than 10 kg per day.

There are at least several hundred of producers involved in drying fishes in the studied areas. All the dried fish producers followed traditional drying methods (i.e. directly under the sun). A total of about 30 fish species were recorded to be prepared in this manner while two other species of prawn and crab were also observed being dried. The dried fishes and prawns are used for human consumption but dried crab was used for poultry or fish feed after crushing. Among the 30 species of fishes recorded, 20% were used in small scale household drying.

Most of the dried fish producers (70%) did not mix any salt with raw fishes prior to drying. The remaining 30% of producers used commercial salts but they did not maintain any proper ratio of fish and salt. In general, they used 50-250 g of salt for one kilogram of raw fishes.

Fishes were generally dried on racks made from bamboo (locally called chatal) but are also dried directly on nets laid on the ground. In some cases heavy infestation by flies was conspicuous. Drying duration usually varied between two to six days depending on the size of fish and weather conditions. After drying, the fish were sorted according to species and size. The product was then packed into plastic or hessian bags and temporarily stored in tents.



Lift nets are also used for fishing in the beel.



Harvested olive barbs (*Puntius sarana*).



Sorting of dried fishes.

Marketing of fishes

The marketing channels for fresh fish harvested from Chalan Beel was composed of fishermen, several middlemen (up to six in number) and finally consumers. Fishes were brought to local fish landing centres initially then transported to other places of the country. People involved in the marketing channels often used several vehicles for transportation depending on the distance they needed to travel. In case of short distances (less than 5 km) they normally used bicycles, vans, rickshaws or nocimon but for longer distances they used buses, trucks and trains. Over longer distances, aluminium pots or bamboo baskets were used, together with crushed block ice.

Marketing channels for dried fish were somewhat different. Dried fish producers usually carried their product to a dried fish landing centre 2-4 times a month. Very small amounts of dried fish were sold to the local travelling vendors and people at the drying site.

Conclusion

By and large, Chalan Beel is still playing an important role in the development of the Bangladesh economy through creation of employment opportunities for many fishermen and fish traders; and through supplying animal protein to the people. The beel represents an important resource base for the country. However, at present fish populations in the beel are at stake due to the use of illegal fishing gear, overfishing, reduction of water area, and through construction of roads and bridges through the middle of the beel. Proper scientific management of the beel and its fishery is an urgent requirement if maximum sustainable yield is to be achieved. More attention should be given for the conservation of fishes and other species in Chalan Beel. There is clearly a need for implementing fisheries regulations, particularly to protect mature fish during the breeding season. A sufficient number of temporary or permanent fish sanctuaries must be established for this purpose.

As Chalan Beel provides a huge amount of dried fish every year, the sun drying methods employed must be modernized. Considering the socio-economic capabilities of dried fish



Tent for temporary storage of dried fishes.



Small-scale household fish drying.

producers, low cost technologies such as solar tent drying should be adopted for obtaining quality dried products. Technical and financial support need to be provided to producers from government and other related authorities.

Reference

1. International Union for Conservation of Nature and Natural Resources - Bangladesh. (2000). Red Book of Threatened Fishes of Bangladesh. IUCN - The World Conservation Union. 116 pp.