

INDIGENOUS KNOWLEDGE AND FISHING IN ASSAM

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Abstract: Indigenous knowledge is an integral component of any holistic approach and can provide management of fisheries with potentially critical information. The role of fishermen who are the local inhabitants associated with the marine environment cannot be ignored. These people are actually the ones who depend on the sustainability of management measures for their long-term survival. These fishermen are in constant contact with the water bodies and have access to a wide variety of knowledge. A visiting researcher may not get such easy accessibility to such varied knowledge. Their knowledge regarding the location of fish, behaviour of various species in relation to time, tide, lunar phase and use of appropriate fishing methods to capture particular species at particular times and places cannot be compared to an outside researcher. The Kaibartas, a Scheduled Caste of Assam, are mainly involved in fishing. This paper attempts to review the role of traditional knowledge in fishing of Assam and how it has helped the fishermen to face the present day challenges raised by the local ecosystem and their long-term environmental sustainability. Data were collected during the years 2011-13. A structured household schedule was used to collect primary data on population pattern including educational status, occupational pattern and others. Interview method was applied to collect relevant data on fishing methods and sources of fishing.

Keywords: Fishing, indigenous knowledge, water bodies, sustainability.

INTRODUCTION

Indigenous knowledge with reference to fishing generally refers to the customary knowledge of marine life within traditional ethnic or indigenous communities. In fields like agriculture, fishing, horticulture, health and so on, this knowledge seems to be transmitted from generation to generation orally. In fishing practice, traditional knowledge varies in dimension including fishing practices, development of customary rules and enforcement mechanisms (based on punishment and shaming) (Kay and Adler 2005 as cited in Utomo 2010:2). Indigenous knowledge is however either not given due attention or ignored by development officials of the fisheries sector. Traditional knowledge exists as part of complex cultural systems. They cannot be isolated from the whole. It is the role of anthropologists to intervene and explain their existence in the society. Sometimes scientists try to incorporate these traditional knowledge in their research but find them to be misleading.

Indigenous people with their traditional knowledge systems are trying to adapt to adverse climatic conditions and create sustainable livelihood patterns. Their diverse forms of knowledge, deeply rooted in their relationships with the environment as well as in cultural cohesion, have allowed many of these communities to maintain a sustainable use and management of natural resources, to protect their environment

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and to enhance their resilience, their ability to observe, adapt and mitigate has helped many indigenous communities face new and complex circumstances that have often severely impacted their way of living and their territories (Magni 2016 :3). All over the world fishermen try to subsist on the basis of traditional knowledge. Their knowledge of the ecology and fish behaviour, weather and oceanographic conditions, navigation, fishing methods, vessel design and propulsion and processing and trade has been effectively used to overcome specific localized problems and to enable the use of local resources in sustainable way (Nirmale,Sontakki et al 2003 :1).

Assam is rich in aquatic resources and fishing in Assam is carried out mainly by the Kaibartas, a Scheduled Caste of Assam. Most of the rural populations of Assam catch fish for their daily consumption. The mighty river Brahmaputra with 42 important tributaries flows for 640 km in the state (Bhattacharjya 2005 as cited in Dutta and Bhattacharjya 2007:1). The Kaibartas depend on the beels and rivers for their subsistence. Assam is gifted with many extensive water bodies commonly known as beels (Jhingram and Pathak 1987) that are the only source of fish for the poor people in the surrounding villages .All natural wetlands are called beels in Assam (Baruah et al 2000:37). A total area of 101232 ha is covered by 3513 wetlands (Bhagabati 2000:2). This paper attempts to review the role of traditional knowledge in fishing of Assam and how it has helped the fishermen to face the present day challenges raised by the local ecosystem and their long-term environmental sustainability.

METHODOLOGY

The present study uses both primary and secondary sources. As for primary sources, five Kaibarta villages of Kamrup, Nalbari and Lakhimpur districts of Assam were visited to collect information. The data were collected during the years 2004-2007 and 2011-2013 using interviews and non-participant observation.

Barpith and Boripara are situated in Kamrup districts of Assam and are about 8 kms from Guwahati city. Bornibari of Nalbari District is under North Borkhetri Mouza and is about 18 km from Nalbari town and 85 km from Guwahati city. Koliyoni and Gharmora villages of Lakhimpur District are at a distance of 7 kms from Lakhimpur town and 400 kms from Guwahati city.

Fishing in Assam using Traditional Knowledge

Fishing in Assam is mainly carried out in the wetlands, streams and rivers. In 1992, the Assam Remote Sensing Application Centre, Assam Science and Technology Education Council, and the Space Application Centre of the Indian Space Research Organization developed a classification system for the wetlands in Assam that divided them into six categories: (i) lake/pond; (ii) oxbow lake/cut-off meander; (iii) water-logged areas; (iv) swamp/marsh (v) reservoir and (vi) tank (Baruah et al

2000:37). The Kaibartas of Barpith village (Kamrup district) depends on the beels (wetlands) and the Khanajan river passing nearby the village for their subsistence. The Kaibartas of Boripara village catches fish in the fishery (Borhala beel), Deepor Beel (Kamrup District) and also the Brahmaputra river. In Bornibari, they carry out their fishing operations in the Baria beel and Kapla Beel about 3 and 4 kms respectively, away from the village. There are also 20 individually owned fisheries in Bornibari. The villagers of Koliyoni and Gharmora villages (Lakhimpur District) depend upon the beels and the Dhol and Gelajan rivers passing nearby the village. They do not have any possessory right over these water sources. In addition to individual family fishing units, joint trips (thoras) are organized under the leadership of any one villager.

The peak fishing period in Assam starts from mid September and continues up to mid May. There are about 90 to 106 varieties of fish caught by the fishermen (Kaibarta) of the three study villages. Some of the varieties are available only during the peak fishing season but the rest are found all the year though in fewer quantities. Some varieties like *kanduli*, *mirka*, *bhakua*, *sol*, *borali* and *chital* are available only from mid September to mid May. The rest of the varieties are found all the year though in fewer quantities.

The Kaibartas of Assam generally employ a variety of fishing techniques. These techniques, however, vary from village to village. In the study villages, three fishing techniques are found to be employed. One of them is the **Bana** fishing technique. Fishes are protected in the beels and fisheries by this technique. It primarily comprises erection of split bamboo screens (*bana*) across a water way (small river or connecting channel of open beel) with the help of bamboo poles. The interspace of the screen is small (4-6mm). This is carried out in the months of September to November when the water level in the beels and rivers recedes. Generally in *bana* fishes are trapped, forcing them to move along a narrow and long bamboo woven barricade. When the flow of water ceases, the *bana* is dismantled (Sarma 2015:235). Bana fishing is usually done during May-June and September-October (Bhattacharjya, et al 2004:26). **Katal** method is another method applied in *beels* and fisheries. It comprises of a small and circular (15-30 m diameter) sheltered area, erected immediately after the monsoon season (August-October) and harvested during January-February. At least 40 bamboo poles (about 12 to 14 feet long) are placed along with tree branches at selected points where fishes concentrate. Water weeds (water hyacinth) and bushes are placed inside the bamboo barricade which is tied by ropes. Fishes take shelter there in and they find it more convenient to stay in the bushes and eat the barks of the branches. These areas are subsequently encircled by drag nets and fishing is carried out. After the net is spread around, the bushes are removed and the fishes are caught. Filtering technique makes use of fishing gears like dip nets, bag nets, sieve nets and encircling nets in inland fisheries. The dip nets (dhekijal) are operated by keeping them submerged in water

and picking up wandering or feeding fishes by rapid action. Cast nets are thrown on the surface water in shallower area in which the fish of the concerned area are trapped and get collected in pockets.

Fishing Implements

The fishermen of Assam mainly use implements made of bamboo. The implements used in fishing mainly consist of traps, nets and line and rod. Among traps mention may be made of valve traps, cage traps and basket traps. *Chepa* is a spindle-shaped valve trap made by binding thin strips of bamboo. These strips are held together by cane strings and are given the shape of a curved drum. The middle part is broader than the ends. The valve has been so designed that once the fishes enter the trap they cannot come out again. One end of the trap remains closed and the other end is kept open. An artificial dam is prepared in shallow running water leaving a small passage. The fishermen then blocks the open mouth of the trap and then places the trap at the passage where the fishes exist, placing the valve down against the current of water. The fishes are lured into the trap with the water and are trapped. A valve less trap (*Charaha*) is also used alongside of a *chepa*. A *chepa* is used along the current of water whereas a *charaha* is placed against the current of water. *Balda* is again a box-like fishing trap made of bamboo strips with a valve along the entire length. It is operated either for or against water currents to catch various fishes in shallow areas. A miniature funnel-shaped *charaha* is fitted inside wherein a long earthworm is inserted as bait for the fishes. Another drum-shaped bamboo trap is used known as *ghuni*. The anterior space of this trap is packed with dry grass and shrub and is kept dipped in a beel or a stream. The fishes use the anterior space as a sort of nest. *Jakhe* is a triangular shaped basket trap. It is made by weaving together very thin bamboo strips which extend from the handle. A cane is fastened at the base of the mouth to serve as a measure for carrying the basket on the shoulder by clinging the rope over the shoulder. The simplest type of trap is the cage trap (*Polo*) made of bamboo strips. Thin bamboo strings are attached to a circular bamboo ring to form the opening or mouth. Gradually the bamboo strips are widened towards the base and secured in place by a strong bamboo rim. Some strings keep the bamboo rim and the bamboo strips attached. Generally polo is used in knee deep still water usually in the beels. Fishes hidden in the mud are usually caught by this trap. The cage trap is held by the manipulator at the upper rim and plunged into the water. Fishes then enter the trap through the broader rim and get entangled in the cage trap. When the manipulator pulls the cage trap up from the water, fishes which are inside are taken out by hand through upper rim. All these traps are made from locally available bamboo.

Fishing basket, *Khale*, is a pot shaped basket where fishes are kept after trapping with basket trap. It is made of cane and the mouth of the basket is open. The fisherman holds the handle of the trap with the left hand and the rope by the

right hand and plunge it into water. Then it is drawn towards the body after which it is lifted from water and trapped fishes are taken out and kept in fishing basket. *Jiyoni* is another drum-shaped bamboo container used for preserving the fishes alive. It is provided with a passage for putting in and taking out the fishes from inside the container. The container is kept dipped in water in the *beels*.

In case of line fishing, fishes are tempted with real or artificial bait attached to a line. It is attached in such a manner that the fishes cannot escape from the line after it swallows the bait. In *nol borhi*, a hook attached to a short line is hung from the middle of a floating twig, usually made of *nol* bamboo (Colocassia stem), *kankulla* (pith plant) piece, etc. The hook is baited (with earthworm, insects, etc) and set in shallow stagnant water of beels or flooded shallow areas. The length of the floating twig varies from 0.2-0.3m. Other implements include a *borhi*, consisting of a long bamboo from which a fine string is suspended. An iron hook is attached to the fine string and a bait is attached to the hook. A fish swallowing the bait gets pierced through its gullet. *Dorruk* is a thin elastic piece of freshly cut green bamboo. The extremities of the *dorruk* are sharply pointed. It forms a sharp curve when the extremities are brought closed together with the help of a piece of earthworm, which acts as the bait of the trap. Attached to a long strong string the *dorruk* gets pierced through the gullets of the fish when it swallows the bait. *Kathi borhi* (bamboo hook) is made of fine flexible bamboo strips. These strips are folded in the middle and the two ends are joined together with earthworm or prawn bait. At the time when a fish devours the bait, the two ends of the hook releases suddenly with the mouth of the fish remaining wide open. This prevents it from escaping. Normally, the length of the *kathi* is 10mm and 1-2mm wide. It is operated during monsoon period (June –September) to catch fishes like *Anabas* sp., *Nandus* sp, etc. In addition, various types of short and long hand lines are used sometimes with multiple hooks.

The different types of nets used by the fishermen of Assam were originally hand-oven with cotton threads but they have now replaced them with nylon threads. Some of the nets used in the study villages include cast nets, hand nets, dip nets, gill nets and so on. Hand nets (*haatjaal*) are used to catch fish in shallow water. It consists of a bamboo handle and a conical or funnel shaped net woven with thread which is connected with the handle (Sarma 2010:47). The net is dipped into water and lifted up quickly in a jerky movement for catching fishes in shallow muddy waters (Bhattacharjya 2004:41). *Dheki jaal* (Dip net) is a variety of hand operated net. The only difference between them is that the frame is triangular and it is fixed with the help of a number of bamboos driven in to the bottom. The dimension of the net is much larger. It is used in deep water and is leveled up and down with the feet. Gill nets used in the study villages are of three types—*puthilangi*, *garelangi* and *kawoilangi*. It is rectangular shaped and elongated with two nylon strings joining them parallelly. Small and medium sized bamboo sinkers are tied at two sides of the net. This is a passive gear and the fishes get either gilled or entangled

while trying to pass through the net. It is a common gear of the region and is used in all depths ranging from shallow wetlands to deep rivers. *Asara jaal* or cast net is large and conical in shape. The mouth of the net is broad and consists of some pockets to which some iron sinkers are fixed. A rope passes from the center and the fishermen folding it carefully throw the net into the air, such that it covers a huge area. Cast nets are operated in deeper parts of *beels* and rivers.

During the months of July and August, when the paddy fields are also flooded, the fishermen of Boripara village (Kamrup District) are found to practice a method of catching fish by attaching earthworms to hooks and tied in ropes. These ropes are laid out in the paddy fields or inland pools and small fishes that come to eat those earthworms are caught by the hooks. Then they gather those ropes and collect the fishes.

Some type of poison is also used by the fishermen of Assam to kill or frighten the fish. Burnt lime or pesticides (Bhattacharjya et al 2004:13) are sometimes directly applied to the water body for the purpose. Paste is made from the whole shrub, *Polygonum hydropiper*, found abundantly in wetlands for poisoning fish. After the paste is spread over the water surface of pools of streams, fishes come over to the surface after some time. They are then easily caught. Powder made from the outer bark of Karoi tree (*Albizia odoratissima*) and paste from the fruit of Moin (*Duranta plumieri*) is also used (Bhattacharjya 2004) by these fishermen to poison fishes. However, the use of poison is not found in any of the study villages.

Another traditional method of catching fish, especially catfish, though not found in the study villages was reported from river Kalong-Kapili, an important South bank tributary of Brahmaputra river. In this practice, small catfishes (*Mystus* sp) are caught in marginal areas of the river using raw meat of domestic duck (*Anas platyrhynchos*, Linnaeus, 1758) as an attractant. Shoals of small catfishes attracted by the smell of the meat enter into small pits, where they are hand picked (Dutta & Bhattacharjya 2009:1). The duck meat's strong flavour acts as the magnet which attracts the fish in this innovative procedure to catch the fish.

As regards fishing crafts to negotiate through water, the fishermen of Assam mainly depend upon rafts (bamboo and banana) and dug-out canoe as well as plank-built boats. The rafts made of bamboo (*Bahor bhur*) and bananas (*Kolor bhel*) are cheaper and easily made. The marginal fishermen use banana trees and bamboo, both of which are locally available in the region. These are generally required when they go fishing with cast nets, gill nets and line fishing in shallow waters. Small wooden dug-out canoes (*tulunga nao*) made from a single log of wood (mainly mango) are rare to see these days. They are expensive due to availability of tree logs and cost of labour. These were generally used in shallow floodplains lakes and wetlands while using traps, gill nets and lines. The plank-built boat is spindle-shaped and is most commonly used in Assam. It is made by joining wooden planks (of good timber like sal, urium, etc.) together with iron nails. The boat is painted with coal

tar to make the joints leak-proof and to also to increase their life (Bhattacharjya et al 2004:4). Mechanized boats are used in large rivers for transportation of fish and people these days. However, in all the study villages plank-built boats (*nao*) are widely used by the fishermen.

Beliefs Related to Fishing

The Kaibartas of the study villages associate fishing with belief in some supernatural powers. Everywhere in the world, it is seen that, fishing communities are to face various uncertainties; they are to meet with hazardous climatic and associated natural irregularities which may jointly result in the complete failure of the catches (Sarkar 2009:192). The fishermen of the study villages perform Satyanarayan Puja and Ganga Puja before undertaking any major fishing operation. Ganga Puja is a ritual performed at the fishing sources by every fishing household of the study villages. A man, if he feels insecure, particularly about any fishing operation, may make small offerings and perform this ritual to ensure success of his venture. This ritual is performed to appease the *jalkouri* (presiding deity or custodian of the water bodies, etc). Sarkar (2009) also mentions about *Gangapuja* performed invariably by the fishermen of the Sundarbans area. The Kaibartas start the fishing season with the Satyanarayan Puja. This creates a sense of solidarity among them as this puja is performed in the village at the community level. After the performance of this puja only can the fishermen afford to venture out in the rivers and wetlands. Ganga Puja though performed individually on certain occasions is also a community ritual. When the group as a whole prepares to go out on a fishing trip, they perform this ritual on the banks of the river/wetland. This gives them a sense of confidence, security and feeling of togetherness.

The Kaibartas believe that death or birth as defiling and offensive to the deities and so the fishermen do not undertake any fishing operation for a stipulated period after the birth or death of a relative. They also believe that menstruating women must not touch any kind of fishing gear. Besides these, fishermen avoid from their fishing activities on a new moon day or a full moon day and on such other festive occasions like Viswakarma Puja, Lakshmi Puja and on Bihu (Magh, Bohag and Kati).

Threats to the Fishing Sources

The people dependent on fishing in Assam however are under constant threats posed by poverty, encroachment of fishing sources and development initiatives. Though equipped with a rich store of indigenous knowledge, they are trapped between environmental threats and projects related to development. Their knowledge and know-how, deeply rooted in the relationship of indigenous peoples with nature and community, has proven to be efficient to respond to some of these challenges;

however, it is not enough (Magni 2016:31). The wetlands of Assam (many of them) are facing encroachment issues related to development projects. The Deepor Beel, one of the prime fishing sources for the fishermen was found to be infested with water hyacinths, the solid and liquid wastes as a result of city's garbage dumping may lead to leaching into the beel (during rainy season) affecting the water quality and the lives of fishes. Large-scale encroachment, heavy siltation from the denuded hills surrounding the beel, accumulation of all sorts of filth and wastes from the Bharalu and Bahini rivers, unregulated fishing practices, invasion of aquatic weeds, industrial development within its periphery, construction of railway line along the southern boundary, quarrying within the beel ecosystem, etc., have pushed this once-pristine ecosystem to the brink of disappearance (Planning Commission 2008:5). The beel was once a major source of livelihood to a number of families but is now facing threats both from man as well as environment. Similar is the case with Kapla Beel. Facing illegal encroachments the total area of the wetland is shrinking. The Dhol and Gelajan rivers of Lakhimpur are also facing problems due to siltation as a result of floods. The reduction of forest area in recent times has led to unavailability of cane. Hence, fishermen these days are found to use nylon and polyethylene for their fishing implements. This also adds to the durability of their implements. The different wetlands are not equally productive. The large wetlands where certain varieties of fish have ideal natural breeding ground are naturally more productive than the smaller and shallower ones. The fishing population of the state with their own traditional methods manages to earn a good return during the peak season. Fishing happens to be the next most important means of livelihood after agriculture in Assam. In recent times, however, due to the various above mentioned causes they get very low returns from fishing. Thus, the younger generations do not find it preferable to follow their parents' vocation. At present (according to data collected between 2011-1013), only 37.04 % of the total population of study villages of Kamrup District pursue fishing as their primary occupation. It is 72% in the study villages of Nalbari District and 43.92% of the total population of study villages of Lakhimpur District. In case of father's father's generation this percentage was 100% in Nalbari and Lakhimpur Districts and 72.92% in Kamrup District (from data collected between 2011-14). They find it practicable to follow other vocations wherever other opportunities become available.. This occupational mobility may lead to the loss of valuable traditional knowledge which needs to be tapped for the sustainable management of fish rearing.

CONCLUSION

Access to education, awareness of the present environmental scenario and dissemination of traditional knowledge through technical schools are some of the probable measures required for the sustainable development of the region and to face the present day challenges. Caught between environmental hazards on one side

and development initiatives on the other, if some solutions are not taken rapidly there will be negative consequences for the survival of these populations as well as for their knowledge systems. Knowledge loss has been already responsible for increasing the vulnerability and risk for indigenous populations (Magni 2016:31). Though a vast amount of this traditional knowledge have already been documented there is need of more future documentation and that ought to be region specific. Some of the rational indigenous technologies undoubtedly need preservation to prevent them from fading away gradually (Aier and Changkija 2012:384). Experts need to validate whether such knowledge and use of local resources are based on scientific rationality and efficacy. Hence, such indigenous knowledge can be gainfully blended with the modern scientific and technical wisdom to evolve a package of fisheries management that employs ready acceptance by the fishermen and local resources without adversely affecting the environment (Nirmale, Sontakki et al 2004:36). Without causing damage to the present ecosystem, these traditional methods and knowledge should be used and implemented side by side with modern ecofriendly ways.

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