



# Traditional Fishing Gears and Fishing Methods of West Siang District, Arunachal Pradesh

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## ABSTRACT

Arunachal Pradesh is gifted with vast fisheries resources harbouring great ichthyofauna diversity. The Galo tribe of West Siang district of the state have been practiced different types of fishing methods using various fishing gears since generations. The present study was undertaken to collect and document the relevant information on the traditional knowledge related to fishing gears and methods adopted by the fisher folk of Galo tribe in the district. For this purpose, systematic survey was conducted and the information was collected by personal interview and interaction with the fishers covering four villages including Karga, Kamki, Kato and Nomuk of the district. The study indicated that various types of local indigenous fishing gears have been used by the fishers for catching fish which are prepared from the locally available materials by applying indigenous ideas and skills for the purpose of fishing. The indigenous traditional fishing gears and methods of fishing of West Siang district of Arunachal Pradesh are being developed by the Galo tribe of the district.

**Key Words:** Fishing methods, traditional fishing gears, West Siang district.

## INTRODUCTION

The West Siang district of Arunachal Pradesh has varied geographical features from very low land of 120 m to an altitude of 4000 m covering an area of 8325 sq km. It is situated between longitude 94° 00' E to 95° 00' E and 28° 150' N and 29° 150' N bordering Upper and East Siang at East, China towards North, Upper Subansiri to Western and Assam at South. The district with its headquarter at Aalo, the homeland of various tribes such as Galo, Adi, Bori, Bokar, Pailibo, Ramos and Membra (West Siang district) is gifted with vast aquatic resources in the form of rivers, ponds, streams, etc. that holds large numbers of freshwater fish species, most of which are cold water hill stream fishes. The district has numbers of river and rivulets including Siyom, Sipu, Hoo, Hirik, Hiru, Kidi, Ego, Siji, Yagyapchu, Sike, Shigen and Rimi, having rich biological diversity of fish fauna (Bagra and Das, 2010). Among the diversified fish fauna many species

possess characteristics features to become high food and ornamental value. Fishing is the second important occupation after agriculture including horticulture of village people living around the vicinity of the rivers.

The local Galo and other tribal people use and employ a number of unique indigenous fishing gears and fishing methods to catch the fish for food purpose. A wide variety of indigenous fishing gears used by the villagers of Galo tribe are gill nets, cast nets, hook and line, traps, etc. These fishing crafts and gears are locally prepared by the fishers. Traps are prepared from the locally available materials such as bamboo, cane, etc. These indigenous traditional knowledge are generously passed on to newer generations by older ones (Kalita *et al*, 2010). The information on indigenous fishing gears and methods of fishing in Arunachal Pradesh is scanty owing to difficult terrain and remoteness of predominantly hilly state (Dutta and Bhattacharjya,

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2008). The indigenous knowledge system of the villagers of the West Siang district related to fishing gears and fishing methods is yet to be documented. In view of the above, the present study was planned to describe the variety of fishing gears used and unique methods employed for fishing by the Galo tribe of West Siang district with special reference to Kamba circle.

## **MATERIALS AND METHODS**

The study was conducted in 4 villages viz., Karga, Kamki, Kato and Nomuk of Kamba circle of Aalo sub-division under West Siang district, Arunachal Pradesh. These villages are inhabited by Galo tribe which is the main tribe of West Siang district, who are fond of eating fish. Hiru river is flowing by the side of kamki and karga and Hirik is flowing by the side of Kato and Nomuk. The study was conducted in the above mentioned 4 villages with an idea to document the traditional knowledge associated with the indigenous fishing gears and methods employed by the Galo tribes for catching fish. Personal interview with the fishermen and random field surveys were conducted at Karga, Kamki, Kato and Nomuk villages and the data on related aspects were gathered.

## **RESULTS AND DISCUSSION**

The major fishing gears and methods employed in the rivers and other water bodies of the district were gill net, cast net, encircling gear, hooks and line, *edir, raju, takom, lipum*, etc. *Edir, Raju, Takom* and *Lipum* are indigenously designed fishing gears which are used in different water bodies for catching fish. The selection of fishing gears and methods of fishing are influenced by various factors including nature of application (Saha and Nath, 2013), physiographic condition of the water body, nature of fish stock, characteristics of the materials from which gears are fabricated and living standard of fishers (Gurumayum and Choudhury, 2009). So, variation in application of gear can be observed in different rivers and streams, which have characteristics of their own unique nature of the

water resources in a particular region (Lalthanzara and Lalthanpuui, 2009).

Different types of indigenous fishing gears used by Galo tribe of Kamba circle/tehsil in fishing are described below

### **Machua jal (Gill net)**

Gill net is locally called as *Machua jal*. This method of net fishing is very common in the Galo tribe of Kamba circle. These nets are used to catch a great variety of fishes especially the hill stream fishes like *Garra spp.*, *Tor spp.*, *Barilius spp.*, *Crossocheilus latius* etc., where fishes are caught in it by the gills. Gill nets are usually operated at the surface or column of the rivers, streams and other water bodies. Fishers ply the nets in the evening and take out the catch next morning. During day time the nets are dried and repaired to be used further in the evening. The net may be made of nylon or made from indigenous fibre having various mesh sizes to catch specific fish. The length, width and mesh size of the net depends on groups of targeted fish of the rivers and streams. Weaving of gill net is skilled work so fishermen or villagers sometimes purchased it from nearby market or wove by fishers themselves.

### **Esap (Cast net)**

Cast net is one of the common fishing gears used in shallow rivers, streams and other water bodies. It is locally called as *Esap* in Galo tribes. The net is made from either indigenous fibre of Tamak trees or from cotton or nylon twine by the fishers itself. They used to carry locally prepared fish holding unit called *Lechchu* (Fig. 1) which is made from locally available materials such as cane and bamboo. On the periphery of the cast net metallic sinkers are attached to make the net sink. The cast net is used throughout the year and widely operated in the rivers and streams. The fishers cast the net either from boat or river bank. Most of fishers preferred to cast the net during night time as they believed that catch is more at night. Mainly small hill stream fishes like *Garra*, *Barilius*, *Danio*

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and other small catfish varieties are usually caught in all seasons. Similar type of cast net is known as *len den* in Mizoram which are used for catching fish in rivers and streams by the Mizos (Lalthanzara and Lalthanpuui, 2009).

### Takom

*Takom* is a conical shaped fishing trap made of a single piece of bamboo having one way entry. It is fixed against the water current with stone barrier or by damming with stone, wood and leaves, and the open mouth of the trap face the current. Once the fish entered inside, they remained entangled in the base with the pressure of water current. This method is very common in this region and it does not need to guard the traps. They simply fixed the trap against the water current by damming with stone, wood, leaves, etc. in the evening/night and pull out the trap next morning and collect the fish catch. This trap is also operated in inundated paddy fields and shallow water bodies during monsoon season. The size (length, width and mesh) of the trap varies depending on the group of fish species to be caught, water current, depth of the river/stream where trap is being fixed. In Assam, the traps are widely used in the *beels* and other wet land areas, which are designed and fabricated by the traditional fishers, taking into consideration the area, location and behaviour of fishes to be caught (Baruah *et al.*, 2013).

### Edir / Idir

*Edir* is an indigenous fishing device made from bamboo splits in the form of cylindrical basket (Bagra and Das, 2010) with one end open (Fig. 2). The bamboo splits are fastened by cane. This trap is mainly used for catching small fishes like *Garra*, *Crossocheilus*, *Barilius*, *Amblyceps*, *Glyphothorax*, *Pseudecheneis*, *Aborichthys* etc. Once the fish get entered inside, it will block from coming out by small conical spiny valve inside. Fishes ranging from 2-25 cm body length can be trapped with this gear (Bagra and Das, 2010). The trap is set against or with the current and secured in position with bamboo strips and is hummed in with

stones. Operation is carried out during evening, the trap is kept for whole night and catches are harvested in the early morning by detaching cod end. The trapped fish is removed from an opening at the posterior extremity. It is also operated in day time. It is generally operated in small rivers and streams.

### Raju

*Raju* is another indigenous fishing gear used by Galo women folk (Bagra and Das, 2010) (Fig. 3). It is funnel shaped fishing gear/trap made from bamboo strips stitched intermittently with bamboo strips. The trap is without a trap door and anterior end forms mouth for letting the fish in. The mouth part is stitched with thin strips in circular fashion to provide rigidity. Once the fish get entered in the trap it is pulled out immediately and catches are collected. It is used in small rivers and streams to collect prawns, crabs and small fishes, especially bottom dwellers. The operation of gear is easy. Here, women fisher folk set the trap in water or hold the trap by one hand and disturbed the vegetation in bank of streams and small rivers or also by removing the boulders and stones where fish used to hide. During this process fishes are being caught in trap and the traps are pulled out immediately from water so that fish cannot escape.

### Lipum (Stone pilling)

*Lipum* is a fishing method in which the flat stones are piled one on other in the pool or slow flowing river of approximately 1 m depth. An appropriate pool site was selected in the river where stones or boulders are piled up or arrange in tier. The stone or boulders are piled in such a way that forms a round shape of aggregated stone block called lipum. The diameter of the lipum ranges from 1.2 to 2.0 m and height ranges from 0.4 to 0.5 m. Lipum is generally made in winter season and is allowed to remain undisturbed for 2-3 months where fish used to take shelter. The aggregated fishes are then collected by un-piling stones just after cordoning the lipum with a circular screen made of bamboo. In circular screen an opening is made where trap is being fixed.

In this way fishes are being caught in trap when they try to escape from the screen. This fishing method is specially done for catching *Garra* spp., *Glyptothorax* spp., *Shistura* spp. and *Aboreichthys elongates* which lives under the gaps of boulders or rocks hole.

### **Hibok Penam (Water Diversion)**

*Hibok penam* is an indigenous fishing method where a stream is diverted into a small channel by blocking the stream with mud, stones, boulders, plants and leaves so that water from the stream is bailed out and the fishes are caught easily. In this method stream is blocked by stone, boulders, mud, plants, leaves of banana etc. and is diverted to another stream or nearby river. If the stream is properly blocked then fishes are caught easily by hand or using axe. When stream is not well blocked then some local indigenous poisonous herbs are used to poison the fish. These poisonous materials are obtained from the leaves, fruits or bark of poisonous plants such as Polygonaceae, Fabaceae etc. These plant product or fruits are ground first along with sand and then it is applied in water. When ground fruits or herbs are applied in water then juice or toxic material is released in water which stupefies fishes. After 5-10 min fishes starts dying and is caught (Fig. 4 & 5). Those fishes which are still alive after poisoning because of low doses are killed by using axe. But now a day, local people start using bleaching powder to kill the fish. The fishes that are caught by herbal products are consumed by man without any problem and are found to be safe for human consumption.

### **Gegu (Hook and line)**

*Gegu* is a fishing gear which consists of thin flexible bamboo rod or pole where nylon twine or cotton thread with a barbed metallic hook at one end is tied at the tip of the pole. The baits are placed on a hook in order to attract and catch fish. In this method, the fish is attracted by natural or artificial bait placed on a hook, on which they get caught. Generally earthworm, grasshopper, insects and

wheat flour are used as bait to attract fish. To catch large carnivorous predatory fishes like *Clarias* sp., *Channa* sp. etc., small frogs and small fishes are used as bait. Sometimes a small float or stick is attached in the middle of the twine which indicates that fish is hooked or not. The baited hooks are then thrown in the water and the floats or thread line used are observed for its movement (Fig. 6). The float will move when fishes are hooked. When fishes are hooked then the thread is pulled with a little jerk. The fish which is caught is then removed from the hook. This method of fishing is operated in stagnant as well as running water bodies. The cost of nylon varies from Rs. 5-10 depending upon the thickness of twine.

### **Eggo Ernam**

In this method of fishing, a bamboo pole and line is used (Fig. 7). Here, one end of the line is fixed at the tip of the pole and another end of line is looped into a noose. Around 2-5 noose are made and a stone is placed at few inches below it as a sinker. The looped line is then thrown in the water and waits for few minutes. When the fishes are passing through or touch the loop, they are caught by noose behind the gills, fins and body. No bait is used in this type of fishing method.

### **Hito ternam**

This is an indigenous fishing method where the passage of water is blocked by barrier made of bamboo screens supported by wooden poles (Fig. 8). However a small passage is provided so that fish can pass through the barrier. In this small passage, trap is fixed in such a way that fishes passing through this passage to upstream or downstream are caught. This trap is set in the evening time and kept for 3-4 d. The trap is then removed in the morning hours and the fishes are collected. Similar practice of fish catching methods followed in Tirap district of Arunachal Pradesh, locally known as *Bheta* fishing, where cyprinids were caught by taking the advantage of their migratory behaviour (Dutta and Dutta, 2013).

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### Donik rinam

*Donik rinam* is a traditional fishing method in which hook and line are used. In this method barbed hooks are fixed at one end of the line and baits are placed on a hook to attract and catch fish. The baited hooks fixed at one end of line are thrown in the water during evening time and the other end of line is fastened at the shore. The line is then taken out from the river during the next morning. When fish is hooked, then it is removed from the hook. Generally, fishes like eel are caught in this method of fishing. Small frogs, small fish, insects and some fruits called *Takuk* are used as a bait to catch fish.

### Encircling gear

In this method of fishing, gill net is used to capture the fish by placing the net to block the escape of fish. The rivers and streams of West Siang district have numbers of big boulders and stones where fish used to hide or take shelter. Here, the particular water areas with big boulders and stones are selected. Prior to selection of area, small stones are thrown in the water to see whether the fish is there or not by observing the movement of fish. After confirming the availability of fish, the net is encircled the stones or boulders and then the water, small stones or boulders are disturbed by using strong wooden pole and iron rod. During this, fishes are entangled or gilled in net while trying to escape and the fish is caught by hand from the net. In Manipur, encircling net used for catching fish from large water bodies is known as *moirang lang*, which is operated when water level is at minimum (Devi *et al*, 2013).

### Hoom Dinam

*Hoom Dinam* is an indigenous traditional fishing method employed by Galo tribe of West Siang district. In this method, the narrow stalk of *Ekkam* (*Phyrium pubinerve*) is used, where one end of ekkam stalk is split into 5-10 numbers of fine fibrous thread in which worms locally called as *Tanyi* are placed as bait (Fig. 9). These worms are obtained from bamboo. Here, no hooks are used and worms are fixed at fibrous thread of stalk. The

ekkam stalk baited with *Tanyi* is dipped in water or inside the hole between boulders and stones. When fish swallowed the worm then the stalk is pulled with a little jerk and the fish is caught. This is mainly operated in small streams. Fishes like *Glyptothorax* spp., *Aboreichthys elongates*, *Amblycep* spp., *Channa* spp. etc. and crustaceans like crabs are caught.

## CONCLUSION

A wide number of indigenous traditional fishing gears and methods were developed by the Galo tribes of West Siang district of Arunachal Pradesh to catch fishes for their livelihood and food security. These indigenous fishing gears and methods are indigenously designed and fabricated by the local fisher folk using locally available materials like bamboo and wood. Selection of fishing gears and methods are based on various factors like area, location, topography of river/stream, behaviour of fishes and the material from which gears are fabricated. Majority of the fishing gears are made of locally available materials like bamboo and wood, which are cheap and efficient. The traditional fishing methods employed by Galo tribe ensure good fish catch where fishing with conventional fishing gear is difficult and ineffective because of large volume of water, strong water current and uneven topography. Fishing is an important occupation of Galo tribes next to agriculture and become an integral part of cultural heritage the Galo tribe of West Siang district. However, the success of fishing methods depends on the various factors like selection of suitable site, time, efficiency of gear used and availability of fishes. These eco-friendly indigenous fishing gears and methods used by the fisher folk of Galo tribe should be encouraged and promoted for sustainable utilization of fishery resources of these hill streams.

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Fig. (1) Lechchu; (2) Idir; (3) Woman fishing with Raju; (4) Hibok penam; (5) Water diversion fishing (Hibok penam) ; (6) Gegu (Hook and line); (7) Eggo (Noose fishing); (8) Hito ternam; (9) Hoom dinam.

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