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Traditional Fishing Gears and Fishing Methods Used in Koshi River Basin

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Abstract

The paper describes wide range of traditional fishing gears used by professional fishers in the Koshi River. It attempts to document the occurrence of 5 different kinds of commonly used gears, i.e. cast net, gill net, fish barrier, ghorleng, hook lines to catch fishes in different seasons in the lower middle stretch of the Koshi River. Among5 different kinds of gears, hook line comes in recreational method while remaining ones viz. cast net, gill net, fish barrier, ghorleng are included under conventional method of fishing. The objective of study is to present the recent data of fishing methods, fishing gears and their distribution in different water bodies in the Koshi River. The primary data was collected through direct observation and secondary data through journals, books and interviews to local people. It was found that most of the fishing gears are made by locally available bio-degradable materials. It is supposed that this paper will support to the further researcher in their detail study on traditional fishing gears and for the conservation of local gears as well.

Keywords: *Koshi, Fishing gears, Gill nets, Cast nets, Tackle*

Introduction

The fishing water of Nepal's hydrographically unique. Many different kinds of gear used in different season. Although there are diverse fishing gears in Nepal, only some of them make a good catch. For the effective fishing gear, the study of the design construction and fishing success of a particular fishing gear is of paramount importance (Shrestha, 1995). Fishing gears are refers to those devices having different shapes and sizes and used in the aquatic bodies to capture different sizes of fish species. Fishing gear is any form of equipment used to catch, collect or harvest fish on the fishing grounds. Various types of materials are used to make these fishing gears

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include netting, plastic, polyethylene, nylon, cotton, mixed fibers, floats and sinkers, bamboo, wood etc. (Sebastian *et al.*, 2016).Traditional fishing gears is a device which could be defined as the fishing gear passed down from precursors to present generation. These gears have their significance because they inherit the traditional knowledge of the community (Bhattacharjee, 2017).Almost any instrument or gear that is used for fishing can be called fishing tackle. Fishing tackle is a general term that refers to the equipment used by fishermen while fishing (Karki and Subedi, 2018).

Nepal has three main river systems; The Gandaki system in the central Nepal, the Koshi system in the eastern Nepal and the Karnali system in the western Nepal. From the point of view of drainage area, the Koshi is the greatest river system in Nepal. It is said that it is as big as the Indus and the Brahamputra river of India. It flows particularly in the Eastern Nepal in the east of Gosainthan and west of Kanchenjunga area (Shrestha, 1981). Traditional arise from collective experience. Fishing is such a situation. Fishermen of Nepal in general have neither land nor asset of their own. They often receive their food and daily goods from fish wholesalers, and they pay for this with their catch (Shrestha, 1995). In Nepal fishery has its own history. Fish is considered as ‘‘Sagun’’ (good luck). The fishing based livelihood is one of the oldest systems in Nepal (Gurung and Sah, 2016). There are many tribes which have been traditionally parcticing fish farming since ancient time which are Tharu, Majhis, Kumal, Kewat,Mushar, Bote etc (Budhathoki and Sapkota, 2018). However, study ontraditional fishing gears has not received adequate attention in Nepal and only few literatures are available regarding the traditional fishing gears of Koshi River. So, an attempt has been made to investigate the major fishing methods and gear used by fishermen during the survey of Koshi River of Nepal. The present study has also tried to furnish the details about the traditional fishing knowledge in study area.

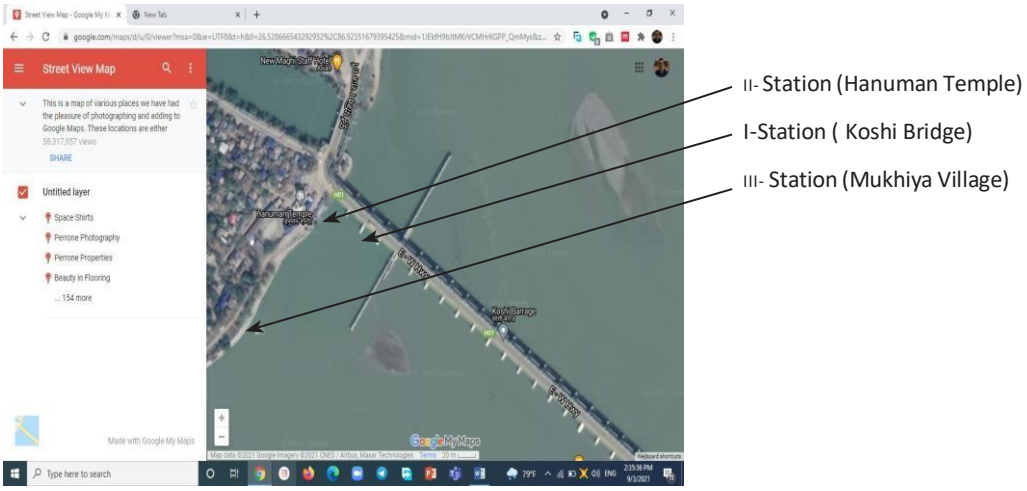
Materials & Methods

Study area:

The study was conducted in Koshi Barrage, Ward No. 1 of Saptakoshi Municipality of Saptari District. Koshi River drains most of the eastern part of Nepal. Altogether, Koshi River drains 71,500 km^2 in Tibet, Nepal, and north Bihar. It extends 160 km north to south (Shrestha, 2015).

Sampling sites:

For this survey, three sampling stations (figure 1) were selected i.e. I-station at the Koshi Bridge at a distance of 500 m from 1st gate of river, II-station at Hanuman Mandir at a distance of 450 m towards south from bridge, and III-station Mukhiya village at a distance of 500 m far from II-station in the Koshi Barrage in Saptari.



(Source: Google map)

Figure 1. Map showing sampling stations in the Koshi River System, Nepal.

Data collection

The work is primarily based on the direct field observation and photography while secondary data is based on journals, books and interviews to local people. Monthly visits were done from February 2017 to December 2019 to study the types of fishing gears used by the local fishermen in the Koshi River. Simple random sampling method was adopted for the study. Monthly field survey at Koshi River basin was conducted to study the types of fishing gears used by the fishers in this river.

Results

A total of five different traditional fishing gears i.e. Jaal (cast net), Mahajal (gill net), Ghorleng (dip net), along with fish barrier and hook lines (Balchi) were documented in different seasons in the Koshi Barrage (Table 1 and Photo. 1-6).

Table1. A detailed list of conventional and recreational methods of fishing gears usedin the Koshi River.

S.N.	Common Name	English Name	Size of gears	Area of operation	Fishing seasons	Major catch
Conventional Methods						
1.	Jal	Cast net	Mesh size 1.0 to 2.5 cm. Usually 5-8m dimention	rapids and run water, shoreline	Summer, Winter, Autumn Monsoon	*Labeo dero, Tor-tor, Labeo angra, Labeo dero, Labeo calbasu, Labeo rohita*
2.	Tiyari or Mahajal	Gill net	Mesh size 2.5 cm.15-18m length and 3-4 m deep.	lowlands	Winter, Autumn Monsoon	*Barillus, Schizothorax Catla catla, Notopterus chitala, Wallago attu, Clupisoma gaura*
3.	Fish barrier with net	-	Fence is with variable length	medium water phase	Winter (September-December)	*Clarius batrachus, Anguillabengalensis,* Minor carps
4.	Ghorleng	dip net	It is about 2 m long and about 1m breadth handled	bankful of flood	Monsoon flood (June - July)	*Clupisoma gaura*, *Notopterus notopterus*, *Eutropichthys vacha,*
Recreational Method						
5.	Bansi	Hook lines	Nylon thread, iron hooks, 3-6 m long bamboo stick	Shallow water, mid channel	Summer, Winter, Autumn	*Schizothorax, Pseudochenesis*, *Anguilla bengalensis Mystus tengra*

Photo 1

Photo 2

Photo 3

Photo 4


Photo 5


Photo 6

Photo of different types of fishing gears used during study area

Photo: 1. Local net, 2. Sticks put across to stop migratory fish, 3. Cast net, 4. Sticks and Jal, 5. Tiyari 6.A cast net is thrown from boat.

Fishing is carried out in fresh water bodies where the methods employed for catching fish can be broadly classified into two groups based on the operation and catch of fish. They are as follows:

Conventional methods: Conventional methods are also called traditional methods because of being used since ancient time. It includes nets in the Koshi River.

Nets:

Fishing net is a net that is used for catching fishes. Fishing nets are meshes generally made of knitting a relatively thin but strong thread. Modern threads are generally made up of polyamides like nylon, although nets of organic polyamides such as wool or silk are also common and are still in use. Nets are generally prepared by the local fishermen from the fibres extracted from fiber plants such as sisnu (*Utria dioca*), Nigalo (*Arundinaria intermedia*). The prepared gears are kept directly over a smoke oven in order to expose them to smoke fumes. It is said that the fumes make the gears waterproof and durable and avoid rotting. Nowadays, the nylon thread is also used for preparing nets. A net is a piece of webbing where cotton, silk, nylon are used to make the meshes of definite sizes. There are different types of nets in Nepal i.e. Gill net, Cast net, Ghorleng.

Cast net:

This type of net is commonly used for catching fishes all over Nepal. Locally, it is called 'Jaal'. It is handled by one man when the net is small. Large cast

net is operated by a number of persons. Fishermen must drive in order to set the net. The net is also set from the moving boat. It is used for catching fishes like *Labeo dero, Tor-tor, Labeo angra, Labeo calbasu, Labeo rohita*. A cast net is a different type of net which is conical in structure and has weighted perimeter. It is thrown by hands and immediately pulled back up again. It can be easily operated by single fisherman. When it is thrown in water, the net settles down/sinks into the water due to its weighted perimeter, hence fishes are trapped immediately. The fishes are trapped on the bottom of the net. There is a thread attached to the top of the net, so that the fisherman can pull back the net. The cast net is nowadays generally made up of nylon thread or similar plastic thread. Generally, cast nets are about 5 to 8 meter long and mesh size 1.0 to 2.5 cm.

Gill net:

This is a fabricated net. It is a type of fishing gear which is used to catch fish in the Koshi River. Gill net is locally known as "Mahajal'' and is especially used for catching fishes like *Barillus, Schizothorax Catla catla, Notopterus chitala, Wallago attu* etc. This net is rectangular in shape. In the lower border of the net, sinkers are tied so as to make the net sinkable. In two ends of the upper boarder of the net two coloured rubber floating are also seen attached which indicates the place and position of the net. The net is tied across the water and is fixed horizontally for overnight. Next morning the fishes are collected. More than two fishermen operate this type of net. The net is about 15-18 m. long and 3-4 m. deep and mesh size 2.5 cm. This net is also known as Teyari. Generally, this net is used in February, March, April and May when there is less water current velocity in Koshi River.

Fish barrier with net:

It is a structure, either natural or man-made, that prevents the upstream movement of fishes. It is set across the river and parallel to it, depending upon the fish runs. It has variable length and breadth. It is generally about 6 to 8 feet in length and 2-4 bamboo sticks are fixed by an anchor. In this method the current is influenced in such a way that the fish is allured in a desired direction. It is kept in position by attaching with fence so that its mouth is facing against the current. It is wider at the mouth but tapering at the code end and has no return value set at the mouth of gear. This net is generally used for catching *Clarius batrachus, Anguilla bengalensis* and minor carps *(Puntius sophero, Puntius ticto, Puntius sarana)* etc.

Ghorleng:

Ghorleng is a dip net. It consists of long wooden handle of about 2 m. in length. The handle is joined to a wooden circular frame made of two pieces. The first forked piece joined with the handle is known as 'Thale' and the other is semicircular known as "kudlo".It is used for catching fishes like *Pseudeutropius, Golhi, Bachwa, Buduna, Kosiya* etc. It is about 2m long and about 1 m breadth. It is handled by a single man.This net is mostly seen being used in the months of June, July and August when there is bankful of flood in the Koshi River.

Recreational methods:

Hook line:

It is the simplest form of gear used by Nepalese fishermen since the pre-historic period**.** This gear is popular right from rural folks to utilize this method as a hobby during leisure time. Local hook and line is known as "Bansi". It is used for catching fishes like *Schizothorax, Pseudochenesis, Anguila bengalensis, Mystus tengra* etc. The simplest form of gear consists of baited hooks attached at the end ofthe line (locally called dori) held in hand. Bansi is referred to the hook and is prepared generally by the fishermen from the rims of the umbrella. Nylon thread, iron hook and 3-6 m long bamboo stick are used to prepare this type of hook. It is suspended hook baited with earthworms, rotten fish etc. for the attraction of fish. Fishermen engage it mostly to catch fish for domestic consumption. This net is mostly seen being used in the months of June, July, August and September in the Koshi River when there is medium water phase in Koshi River.

Discussion

The traditional fishing methods and gears study revealed that Jaal (cast net), Mahajal (gill net), Ghorlang (dip net), along with fish barrier and hook lines (Balchi) are used in different seasons in Koshi Barrage, Ward No. 1 of Saptakoshi Municipality of Saptari district. Similar to this study, Dhital and Jha (2001) have stataed traditional fishing methods of the Narayani River system uses cast net, gill net, loop-line and hook and basket. They have also stated that explosives, electricity, and poison that have adverse impact on aquatic life are used in Narayani River system. Professional fishermen had suggested that the cast net become more effective in clear water during winter in Rupa Lake (Gautam *et al.,* 2016). Limbu *et al.,* (2018) stated that the fishermen collect fish by using cast net, bamboo fish traps and mosquito nets in Bakraha River of Morang district. Tharu and Magars were mostly engaged

in fishing but not Brahmin and Chhettri. A majority of them use traditional fishing nets like tiyari, balchi (hooks), Chhatijaal, Khepnijaal, Haatejaal, Khokrijaal for fishing in Nepal. Devkota *et al.* (2015) discussed that livelihood of thousands of people of Nepal and India is dependent on the water availability in the Koshi River. According to Shrestha (1995), the fishermen in Nepal continue to be active at the onset of monsoon flood and fish become more available from October onwards as the water clears up and current velocity lessens, and fishing conditions become optimum. He also discussed that the fishing conditions are not suitable during the entire period of flood (July-September) due to high turbidity and strong current of water. In the Koshi River, gill net is operated maximum in summer and minimum during onset of monsoon while moderately operated during winter. Similarly, other fishing gears like cast net were used throughout the year. Ghorleng was used during bankful of water in the river as well and fish barrier and Bansi were used maximum during summer. Fishing activities continued throughout the year except the monsoon period during which people were engaged in agriculture. The fishing pressure increased during summer season because people were free from agricultural loads (K.C., 2015).

Hence, conservation of local gears and their details study on traditional fishing gears might be another possibility for future. According to Gupta (2016), among traditional gears, the nets must be thoroughly washed with running water and dried in shade by hanging or spreading them on the banks. They may also be dipped into brine or sufficient amount of salt to be sprinkled over them in order to avoid loss to the gears. However, the study on traditional fishing gears has not yet received adequate attention in Nepal. So, the fundamentals of many of traditional gears are to be studied in long term which will provide the essential background knowledge for understanding, improvement and exploitation in any fishery.

Conclusion

This study found that about 5 different types of fishing gears with their size, varied length, diameter along with area of operation, fishing seasons and major catch were investigated in the Koshi River. Most of the fishing gears were used in all seasons and a few of them were used especially when water level was found to be suitable for their use. It was also found that most of the indigenous fish catching devices made up of locally available bio-degradable materials have less construction cost which is affordable

for small scale fishermen. Therefore, local fishermen must be encouraged to preserve old cultural heritage of fishing in the Koshi River, which is now rapidly vanishing due the development of technology.

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