

This book is special for indigenous fish harvesting technology of Paschim Midnapur district of West Bengal, India. This book is written in memory of my respected teacher late prof. Samir Benerjee, Ex Hiralal Chowdhury Professor of Calcutta University. The book includes both both capture and culture fishery of the said district. Hope this book will be a handy instrument for fishery students and researchers who want to initiate their career in fishery science.

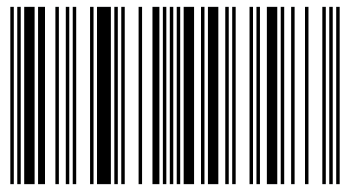


Angsuman Chanda



Author has published four international and one national book on fishery science and also published 28 research papers and written three book chapters. Now the author is engaged on a UGC sponsored major project on indigenous fish fauna of Paschim Medinipur District, West Bengal, India.

# Indigenous, Eco-friendly Technology of Freshwater Fish Harvesting



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**Indigenous, Eco-friendly Technology of Freshwater  
Fish Harvesting in Paschim Medinipur District of  
West Bengal, India.**

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**This book is dedicated to my respected  
teacher  
Late Professor Samir Benerjee**



**30.08.1947 to 01.01.2017**

# Contents

	Page no.
<b>1. RESUME</b>	<b>1</b>
<b>2. Introduction</b>	<b>1</b>
<b>3. Materials and Methods</b>	<b>5</b>
<b>4. Ecological importance of freshwater fish</b>	<b>6</b>
<b>5. Threats and strategies for conservation indigenous fish</b>	<b>10</b>
<b>6. Factors responsible for threatening the fish resources</b>	<b>10</b>
<b>7. Suggestions to safe guard the indigenous fish species</b>	<b>15</b>
<b>8. Freshwater Resources of Paschim Medinipur</b>	<b>18</b>
<b>9. Freshwater fishing gears</b>	<b>19</b>
<b>10.A. HOOKS</b>	<b>19</b>
<b>B. NEETS</b>	<b>22</b>
<b>C. TRAPS</b>	<b>28</b>
<b>11. Scientific harvesting in indigenous culture fishery</b>	<b>35</b>
<b>12. Harvesting fish without draining the water totally</b>	<b>35</b>
<b>13. Harvesting fish within a draining pond</b>	<b>37</b>
<b>14. Improving our harvesting</b>	<b>45</b>
<b>15. Conclusion</b>	<b>46</b>
<b>16. TABLES</b>	
<b>TABLE. 1. A Detail List of Selective Fishing Nets used on the Paschim Medinipur District</b>	<b>48</b>
<b>TABLE. 2. Interviews with Fish-catchers and Fisher men</b>	<b>49</b>



<b>17.ACKNOWLEDGEMENTS</b>	<b>51</b>
<b>18. REFERENCES</b>	<b>51</b>

## **Preface:-**

Bengalese and South Indians are very much lovers of fish prepared dishes. Of course, South Indians depend mainly on marine fishing and in some areas on inland fishing. Bengalese also depends on large supplies of fishes from marine Water. But nonetheless a large number of people live on their traditional methods of fish catching, from inland waters including rivers, canals, Ponds, streams and water-outlets. In their venture of fish catching they use the traditional technologies of fish-catching. These technologies are as great in number, they are also so great in varieties and innovations.

Being born and brought up in a remote village of Paschim Medinipur, I have had the opportunities to witness the indigenous technologies of fish catching of rural inhabitants. To me, it was a feast for the eyes, it was a pleasure for the mind, and it was great pastime recreation during my leisure period. During vacations and recess period of my student life I often used to go for fish catching with my friends. We often used our traditional fish traps like hooks, nets and various indigenous, locally made trapping instruments like Ghuni, Mugri, Pata etc. In those rural places there were wide scopes of witnessing fish catching with the help of self-made technologies. All these experiences gave me an initial impetus for future cultivation of these technologies. My future aim is to improve these traditional technique to a level so that the process will be a sustainable fish harvesting technology.



# **Indigenous, Eco-friendly Technology of Freshwater Fish Harvesting in Paschim Medinipur District of West Bengal, India.**

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## **Resume**

Present study is a survey work done on the indigenous technology adapted and designed by the village people for fish harvesting from their nearby aquatic bodies to compensate their daily protein requirement as well as their livelihood. Present study reveals that the indigenous technology of fish harvesting in Paschim Medinipur has mainly been categorized into three heads namely hooks, nets and traps. All these technologies are very ecofriendly and causing no environmental hazards. But these technology needs revision for sustainability of utilization of small indigenous fish fauna of the study area.

## **Introduction:**

India is a sub continent in the geographic map of the world. It is a land of diversity. It has a rich heritage of thousand and thousand years of ancient culture. Indian tradition, way of living, social activities, religion, political life all these elements makes it a unique

example in the history of civilization. It is rightly said that-“India is a miniature form of the world”.

The history of any country is not only an amalgamation of its historical or geographical features like its mountains, rivers, forests etc. rather it is the history of man, because man is the propeller of history. The famous Nobel laureate Rabindra nath Tagore has aptly said-“Indians history is whose history? It is the history of man”( ‘Purba-Paschim’ Vishabharati Sanskaran; Vol-6; Page-553-54)

India’s culture is a pluralistic culture. The people of different regions have different food habits. Major part of Indian sub continent is non-vegetarian. Among other foods, Bengalese has special preference on fish prepared plates. To meet the demand of huge amount of fish, fisherman and other general public tap all sources of fish supplies-ocean, rivers, ponds, reserves, water outlets etc. but the people living in remote rural areas still depend upon their ponds, canals, water outlets etc.

While fish is undoubtedly an important source of animal protein, in south and Southeast Asia, where the diet is mainly cereal-based, the principal source of protein is actually rice, which contributes about 8-10 per cent of an individual's average protein intake. This, along with other foods like pulses, milk and milk products, is often adequate to meet the total protein requirement of an individual. By concentrating on fish as a source of protein, one really misses the point that it is an

important source of micronutrients—minerals like calcium and zinc, and vitamins such as vitamin A. For human nutrition, though protein is essential, it is not a limiting nutrient. Micronutrient deficiency, sometimes termed 'hidden hunger' since it is difficult to see, is a big problem in south and Southeast Asia. About 250 million children worldwide, for example, are estimated to be at risk of vitamin A deficiency, and an equal or more numbers are at risk of deficiencies of other minerals like iron, zinc and calcium. Experiments undertaken on the micronutrient content of locally available fish and cultured species in Bangladesh, found that *mola*, a locally available small indigenous fish, contained about 89 times more vitamin A than did grass carp, a fish that is widely cultured in Bangladesh. Most of the vitamin A found in *mola* occurs near the eye. Traditionally, *mola* is cooked whole, boiled along with vegetables to form a curry savoured by the local people. This form of cooking, where the fish is boiled and consumed whole, ensures maximum nutritional benefit. The process of cooking and cleaning, and which part of the fish is eaten or discarded, determines how much nutrition is actually derived from fish. In countries of south and Southeast Asia, small indigenous freshwater fish species (SIFFS) form a major component of the food consumed by families, especially by those living closer to freshwater resources. This locally available, highly nutritious component adds diversity to the rice-based diet. National statistics, however, usually fail to take into account the production and consumption patterns of these species, as production and marketing take place at a very local

level, carried out by family members. There is need for better information on the production, marketing and consumption of SIFFS. It is equally important to get information about intra-household consumption patterns, particularly on who consumes what within the household, with a particular focus on women and children.

In the rainy seasons, when rain water overflows throughout the paddy-field particularly in the Village areas, fishes find their playground all round. The situation became amazing when river water overflows the paddy fields, ponds, canals due to breakage of river bank caused by floods. Fishes coming out from rivers, ponds, canals spread all over paddy fields, water outlets etc. The quantity of fish also increases due to procreation of fishes, in the wide-spread paddy-fields in rain Water, specifically in fertile flood-waters of river.

Under this general background; authors would like to throw some light upon the techniques of fish catching adapted by the people of Paschim Medinipur district. The geography of Paschim Medinipur covers an area of 9,345kms. Its population according to 2011 census is 5943300. Paschim Medinipur has four sub-divisions like kharagpur, Medinipur sadar, Ghatal and Jhargram.

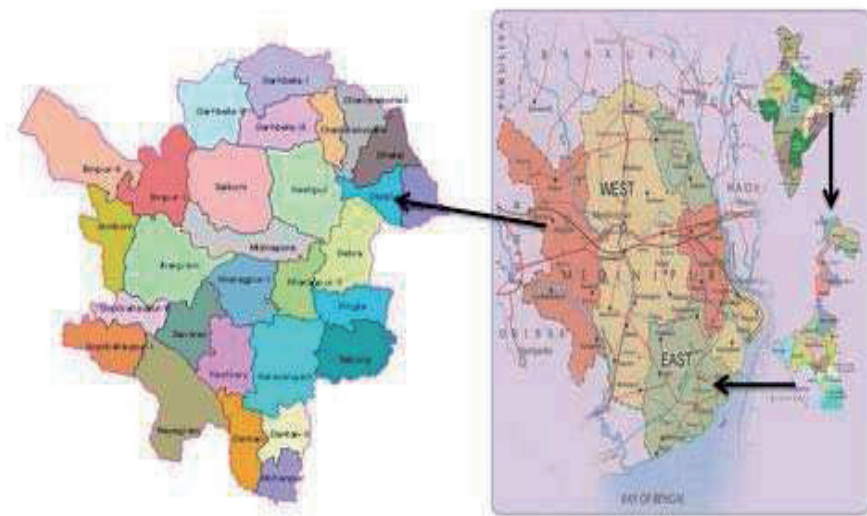
Regarding technologies of fish catching in Paschim Medinipur district there are varieties of techniques and technologies. Let us examine these varieties one by one. The fishermen use their pre-designed nets to catch fishes in ocean, rivers and ponds. But the

general public use indigenous instruments made by themselves. These include varieties of fishing nets, and instruments made up of bamboos, nylon threads etc. The varieties of these instruments have their interesting names. Also the names of the same instruments vary from region to region, and these are all local names given by people of a particular area. Now we shall take into account the techniques and names of instruments used for fish-catching by different people at different regions.

### **Materials and Methods:**

Present study is mainly based on the field record of traditional indigenous fishing methods operated by the local fisher- men of Paschim Medinipur. The study was conducted from January to June, 2016. A number of fisher-men in the fishing villages were interviewed for several times and their experience has been recorded throughout the study. During the study all available fishing traps has been photographed and described in the result and discussion part of the present dissertation. Though this type of work is a pioneering study for the area, a very short bibliography of literature consulted has been enlisted at the end of the manuscript like Panday & Sukla (2005); Madhusudan Manna (10<sup>th</sup> June, 2015); Paul, B. and Chanda, A. (2014 & 2015) etc .





**Fig.1 : Map of study area**

### **Ecological importance of Freshwater fish**

Fishing remains the largest extractive use of wildlife in the world. In 2010, the annual capture, combining both wild capture and aquaculture, was 149 million tonnes (FAO, 2012).

About 94% of all freshwater fisheries occur in developing countries (FAO, 2007). They provide food and a livelihood for millions of the world's poorest people, and also contribute to the overall economic wellbeing by means of export commodity trade, tourism and recreation (World fish Center, 2002).

It is estimated that freshwater fishes make up more than 6% of the world's annual animal protein supplies for humans (FAO, 2007). There are serious threats to this valuable resource with most wild fisheries near maximum sustainable exploitation levels (Delgado *et al.*, 2003). Fishing provides a lasting vestige of utilizing the resources of a global commons, which are often part of maintaining traditional and cultural customs (Clausen and York, 2008).

It is estimated that the global values of ecosystem goods (e.g. fish as food and fresh water to drink), ecosystem regulation (e.g. creation of climate and rain through the hydrological cycle), ecosystem support (e.g. nutrient recycling), and cultural considerations (e.g. recreation), yields a value measured in trillions of dollars (Reid *et al.*, 2013).

### **Regulating carbon flux**

Fish communities can regulate the carbon-fixing capacity of nutrient-rich lakes, and thus, indirectly mediate the flux of carbon between a lake and the atmosphere. A study in Wisconsin, USA showed that a nutrient-rich lake with zooplanktivorous fish became a carbon sink, because zooplankton were suppressed, and primary producers (carbon fixers) were released from grazing pressure ([www.iucnffsg.org](http://www.iucnffsg.org)).

### **Regulating sediment processes**

Through bioturbation (the physical disturbance of sediment associated with foraging or burrowing activities by consumers), fishes can modify the structure of bottom conditions in rivers and lakes. For example, benthic algivorous fishes like *Campostoma anomalum*, *C. oligolepus*, and *Notropis nubilus*, resuspend silt, detritus, and other particulate organic matter from the bottom into the current while feeding, and thereby maintain a rapidly growing algal community and enhance food availability for collector-filterers (aquatic animals that filter small particles of organic matter from the water flowing over them). In turn, detritivorous such as *Prochilodus* and *Semaprochilodus*, widely distributed in South American large rivers are key components of fluvial ecosystem energetic pathway due to their capability for recycling organic matter ([www.iucnffsg.org](http://www.iucnffsg.org)).

### **Fish as active links between ecosystems**

Fish generate a large number of services related to their movement patterns, including daily, seasonal, and yearly migration patterns in lakes, rivers, estuaries, and oceans. Fish that are consumed also transport nutrients across spatial boundaries and thereby link different ecosystems. It has been found that carcasses of coho salmon (*Oncorhynchus kisutch*) constituted a food source for 22 species of mammals and birds living near the river. There is also considerable evidence for the importance of fish as "mobile links" between

ecosystems at short distances, relating to their daily migrating between feeding and resting areas. In lakes, fish transport and redistribute phosphorus and other essential nutrients between the shore, pelagic, and deeper bottom zones.

### **Fish as bio-indicators**

Fish communities, and specific species, are excellent indicators of biological and ecological integrity due to their continuous exposure to water conditions. Fishes display an array of biotic responses, such as changes in growth, distribution and abundance related to water pollution, critical habitat degradation, eutrophication, organic enrichment, chemical toxicity, thermal changes and food availability; thus fish should be key elements of ecosystem monitoring programs.

### **Fish in biotechnology**

Scientists have been able to extract antifreeze proteins from pond snail (*Hypomesus nipponensis*) that can be used to protect the internal structure of products containing water (hydrated substances e.g. meat, vegetables, processed foods, blood, cells, tissues and organs).

### **Fish in medicine**

Fish are used in management to mitigate vector borne diseases like