Toxic Effect of Ganga pollution on fishes in Bhagalpur

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Abstract

The present study is an attempt to understand the "toxic effect" of ganga on fishes. Fishes are the first vertebrate animals. Fish out of water, is an extremely uncomfortable creature and in a few moments displays miserable agonies of death. A vast number of people are engaged in the business of fishes & fisheries. The Government of India and the state Government should co-ordinate and co-operate to ensure the life risk coverage of the people. The important things we noticed during our project work was water pollution, Small fishes being killed illegally, Low literacy role among children, Security of Dolphin & other foreign birds are in danger in this zone. In aquatic ecosystem small fishes from the secondary consumers. The killing of these fishes will affect the aquatic ecosystem, which in turn affect environment. Water is essential for all living organism. Due to nitrogenous fertilizers, which go to drinking water and become toxic when their concentration exceeds 90 ppm causes diarrohoea. There are some other metallic contaminates such as Cd, Ni, Cr, Ar, Antimony, Hg, Cu & Zn whose accumulations in body tissues could produces illness. Many forms of aquatic life have been greatly affected in this way.

Keywords: Ganga, Toxicity, fishes

Introduction

The Ganges Basin drains an area of approximately 814,400 km2, spans three countries, India, Nepal and Bangladesh and is occupied by around 200 million people. This project was directed towards an investigation of the basin-wide condition of the fisheries and the problems of their management in the context of the conditions prevailing in the basin as a whole. Integrated management of resources within river basins as a whole will ultimately be the only way forward, as pressure on resources increases. Most existing information on the Ganges has been carried out on a country basis. This has been assembled for the three constituent countries as a separate review document (Temple and Payne 1995), to facilitate understanding within the basin as a whole.

India coast has been divided into the biogeographical zone to study the distribution and bionomics of marine fishes inhabiting Indian waters and to assets the topographic conditions for the establishment of fisheries. Indian coast has been divided into 12 zones:

1. W.B. and Orissa
2. Andhara coast (Gopalpur –Visakhapatnam)
3.Andhara coast (Visakhapatnam-Masulipatnam-)
4. Andhara coast (Masulipatnam-pulikat lakes)
5.Coromandel coast (Pulikat lake to cuddalo)
6.Coromandel coast (Cuddolon-Devipatnam)
7.Palk Bay and Gulf of Mannar(Devipuran-Cape connorin)
8.Kerala and South Malabar(Cape Cape connorin to Ponnani river)
9.Malabar and South Kanara (Ponnai river to Manglore)
10.Konkan coast (Manglore to Ratangiri)
11.Bombay and Gujarat coast (Ratangiri to Brach)
12.Kathiwar coast

About 66% of fishes are obtained from the sea. About 50% of the total products are sun-dried, salted or pickled for future consumption. A good part of the landings in different parts of the country gets spoiled due to lack of adequate transport and preservations facilities.

There are two main types of tributaries in the upland zone, snow-fed and spring-fed rivers. The snow-fed are typically cold and silt laden, whilst the spring-fed tend to be clear, slightly warmer and to exist at rather lower altitudes. The main stem of the Ganges in the upland zone is snow-fed and typified by the heavy grey/white silt load coming down from a relatively recent mountain block, the Himalayas. There is a seasonal pattern to transparency. The river is clearest and turquoise in colour, due to refraction of mica flecks, during the winter, but as snow-melt begins in the montane glacier zone, the grey silt load increases through May becoming most intense during the rains, and can be maintained until early winter. The other main stem tributaries which arise at similar altitudes, the Trisuli and the Sun Kosi, are similar. Annual temperature variation of upland snow-fed rivers below 600 m ranged from 15oC to 18.7oC and even at the transitional zones at Haridwar and Naryanghat, rarely

exceeded 20.5oC and never went beyond 21oC. This temperature is probably very significant in the division of upland from lowland fisheries since it coincides with the tolerance limits of snow trout (see below). Spring-fed rivers may be warmer: for example, the Seti in the Gandak system had a temperature of 20°C to 22oC when the snow-fed Trisuli, which it joined, had a temperature of 15.8oC. The difference between snow-fed and spring-fed rivers is of great significance for the fisheries.

Once the river reaches beyond the transitional zone it becomes broad and meandering, although mainly between well defined banks. Exceptions are the northern tributaries, where seasonal overtopping gives expansive and occasional catastrophic flooding, such as can occur particularly in the North Bihar wetlands around the Gandaki. The water is generally warm and silt laden. Extreme river temperatures at Patna ranged from 18.6oC to 33oC, with a distinct seasonal cycle. Hydrographs also follow the seasonal rains pattern with a seasonal increase in depth of 3.5 m in the Ganges and 13.5 m in the Yamuna between dry season and the peak of the flood in August. Other limnological factors tended to follow this cycle. The dissolved mineral content of the Ganges water is relatively high with an essentially alkaline pH (8.08 to 8.7). Conductivity ranged from 164 to 362µS and total dissolved solids (TDS) 87 to 179 mg l-1. This is high compared to many tropical and sub-tropical river systems. A linear predictive relationship was found between the more conveniently measured conductivity and the more meaningful TDS.

The social and economic structure of the fisheries is strongly influenced by culture, faith and tradition within the basin. The strong trend towards vegetarianism in the Hindu faith means that local markets for fish throughout the basin in India and Nepal are patchy, although restrictions in the upland regions are less marked. By contrast, the people of Bengal in the delta, both east Bengal (Bangladesh) and West Bengal (India), are renowned eaters of fish and Calcutta provides an insatiable market. The existence of Calcutta and the few other urban centres, combined with the relative lack of local and peripheral demand, serves to centralise the fish landing and distribution systems, at least in India. In Bengal, by contrast, demand is widespread and markets are much more diffuse. There are also considerable social restrictions as to who should participate in the fishery. Within India only sub-groups of category 4 caste can traditionally do fishing and this still largely holds. The same is also true in Nepal although divisions are less distinct. In Bangladesh the Muslim majority traditionally do not fish and leave this activity to sectors of the residual Hindu population. This, however, is changing as population pressure increases on the land and more people, including Muslims, are forced into fishing as a last resort.

To an unusual extent, therefore, socio-religious pressures influence access to and participation in the fishery. The free-for-all open access to common property resources seen in other regions need not be the case in the Ganges Basin. The concern with the upland, cold water fisheries as largely being for sport purposes, has distracted attention from the robust artisanal fishery which exists in the upland region. In the upland regions of both India and Nepal, wherever markets exist fishing goes on. Markets depend upon local centres of population or where roads cross or run alongside rivers. The torrential nature of most rivers in the upland region makes fishing very difficult and has led to considerable ingenuity in developing fishing methods. A particularly effective device used in the upland areas of the Ganges in India and also in some rivers in Nepal, such as the Sun Kosi, is the mountain gill net or "paso". This is a longline to which are attached not hooks, but monofilament traces each ending in a noose tied with a slipknot. These nooses are placed on the line at intervals of a metre. The fish swim into the nooses, which automatically tighten around them. This and the cast net are probably the commonest gears. Dynamite, however, is also frequently used, both in India and Nepal, and is particularly damaging and wasteful. It is a practice, which must be stopped.

Classification

The fishes are under the branch Gnathostomata meaning “mouth with jaws”. All fishes have gills in the adult stage. Fishes are divided into four classes –

(1) Elasmobranchii
(2) Holocephali
(3) Teleostomi
(4) Dipnoi
Last two classes include almost all the fresh water genera.

The production of fish in India is very low in comparison to other countries.

B. FISHING APPLIANCES (Net):

Big net (maha jal)
Bag nets (conical and without wing)
Dol-A bag net of bombay

Dip net
Drift net-provided with sinkers &floats
Stringed cast net
Launching net
Drag net for channa
Been net of Bihar for C.mrigala
Khalpatta net of sunderbans for Anabas
Stake net- (high tides)
Purse net (hand net) of Bihar
Cast net (In the combination of stake net &Rangoon nets)
Wall net
Mani jal
Ber jal & Jagat ber jal
Sahelo jalo, Patna jalo

Moi jal, Shanglo jal
Karal or catla jal (Drift net)
Kochai jal, chhandi jal

AUNTA: It is a fishing craft made of nylon net and bamboo stick. It looks like cylindrical in shape. Internally,it is made of bahi, deep nets, bandhan.
Fishes collide with bahi to enter the net. Fishermen open the mouth of the net and collectthe fishes. This type of fishing net is left in water for 24 hours. The collection of fish by this process is 1 K.g to 2 K.g in unfavourable condition.

TAPI: A small craft looks like large cap and conical in shape .Its perimeter is loaded with stone, which made the lower end in contacts with ground during the fishing period. At the time of fishing this net has been taken into the hand then the net is thrown away over water. It is a very easy means of catching fishes.

HOOKS AND BANSHI: A bamboo stick with attached rope (thread) and hook used to catch fish. Generally, eastern pieces or flour is introduced a frod of fishes. The hook is fixed bythe string to a strong bamboo stick. It is an easy craft & gear to catch fish.

EGG COLLECTION NET: It is used to collect eggs during rainy season. It is a special type of craft &Gear meant for the collection of eggs of fishes, small in size.

FISHING NET: Fishing net is in rectangular shape. One side it has numerous floats made up of very light log or plastics hollow box or lighter objects. This net is generally used when the water level is generally high.

DEMERITS: -
•Lack of adequate transport and preservation facilities.
•Topographic conditions.
•In marketing Managements & trade facilities.
•Non-availability of developed & modern fishing techniques.
•Lack of Preservation & storage facilities.
•Lack of Trawlers & Power vessel.

MERITS: -
•Employment opportunities for poor fishermen, salesmen, businessmen.
•Rich resources of Proteineous food.
•Cold livers of several fishes yield oil rich in Vit. A & D. Body oils are used in tannin, soap making & tempering steel.

The interest in fish and fishery in India can be seen from the paintings of fishes on earthen vessels of ancient Indian history. Fish culture has great importance to human beings since long. Fish is a good source of proteins. These days, protein deficiency is the world's most serious problem and about 40 to 90% of the world population is suffering from protein deficiency. In India, the intake of meat and milk is low, so fish has special importance as a supplement to ill balanced cereal diets. In India, inland water with potentialities of fish culture is approximately 7.5 million hectares or 2.34% of the total area of the country. Many of the water resources remain either unused or not properly used for fish culture. In recent years, research conducted by the Central Inland fisheries Research Institutes have revolutionized fish culture in India and a net production of 8500 Kg./hectare/year has already been achieved.

The social and economic condition of the fishermen is very miserable. They live at hand to mouth. Most of them are below poverty line. They are unable to send their children school. They do not have proper shelter.

Most of the time the economic conditions of fishermen in India is not good. They are happy only in rainy season (July to August). During this period, water level remains high and fish productions are generally satisfactorily. For the rest of the period of year, the fish production level is low due to low level of water.

Conclusions

Fishes are the first vertebrate animals, which adapted to live through out their life in water. Therefore, proverbially "fish out of water" is an extremely uncomfortable creature and in a few moments displays miserable agonies of death. Fishes have streamlined shape. The skin of fishes are covered with scales in different fashion e.g. smooth, rough, horny, tooth like e.t.c. They have limbs represented by fins. The different colours of fishes are due to presence

chromatophores, which contain pigments. A vast number of people are engaged in the business of fishes &fisheries. The Government of India and the state Government should co-ordinate and co-operate to ensure the life risk coverage of the people.

The important things we noticed during our project work was:-

(1). Water pollution

(2). Small fishes being killed illegally.

(3). Low literacy role among children.

(4). Security of Dolphin & other foreign birds are in danger in this zone.

In aquatic ecosystem small fishes from the secondary consumers. The killing of these fishes will affect the aquatic ecosystem, which in turn affect environment. Water is essential for all living organism. Due to nitrogenous fertilizers, which go to drinking water and become toxic when their concentration exceeds 90 ppm causes diarrohoea.

There are some other metallic contaminates such as Cd, Ni, Cr, Ar, Antimony, Hg, Cu & Zn whose accumulations in body tissues could produces illness. Many forms of aquatic life have been greatly affected in this way.

References

APHA (1992). American Public Health Association: Standard Methods for examination of Water and Waste Water.

Bowen, S H (1983). Detritivory in neotropical fish communities. *Env. Biol. Fish*. **9** : 137-144.

Indian Standards Institution (1982). Indian Standard: Tolerance Limits for Inland Surface Waters subject to Pollution (Second Revision). Indian Standards Institution, New Delhi, 18 pp.

Jha, P K (1992). Environment and Man in Nepal. Know Nepal Series, No. 5. Craftsman Press, Bangkok, 110 pp.

Jhingran, V G (1991). Fish and Fishes of India (Third Edition). Hindustan Publishing Company, Delhi, 713 pp.

Kahn, H A and M Y Kamal,(1980). On a collection of fish from the Kosi (Bihar). *J. Bombay Nat. Hist. Soc*. **76** : 530-534.

Knowles, P and D Allardice, (1993). White Water Nepal. Rivers Publishing, Surbiton, 280 pp.

Linfield, R S J (1985). An alternative concept to home range theory with respect to populations of cyprinids in major river systems. *J. Fish. Biol*. **27** : (Suppl. A) 187-196.

Lowe-McConnell, R H (1975). Fish communities in Tropical Freshwaters. Longmans, London.

Negi, S S (1994). Himalayan Fishes and Fisheries. Ashish Publishing, New Delhi, 291 pp.

Payne, A I, J Crombie, A Halls, and S A Temple, (1993). Synthesis of simple predictive models for tropical river fisheries. ODA Fisheries Management Science Programme (R.5030). MRAG London, 85 pp.

Talwar, P K (1991). Pisces. In "*Faunal Resources of the Ganga, Part 1*" pp 59-145.

Temple. S A and A I Payne, (1995). “The Ganges Basin: An Overview for Fisheries” ODA Fisheries Management Science Programme, June 1995.

Welcomme, R L and D Hagborg,(1972). Towards a model of a floodplain fish population and its fishery. *Env. Biol. Fish* **2** : 7-22.

Welcomme, R L (1974). Some general and theoretical considerations of the fish production of African Rivers. *CIFA Occasional Paper* **3**. FAO, Rome, 26 pp.

Welcomme, R L (1985). River Fisheries. *FAO Fish. Tech. Pap*. **262**, FAO Rome, 330 pp.