Journal oi the Indian Fisheries Association
8+9, 1978-79, 44-48.

A PRELIMINARY STUDY ON THE FISHERY RESOURCES OF THE MANGROVE SWAMPS OF SUNDARBANS, WEST BENGAL

KALYAN CHAKRABARTI
Office of the Chief Consevator of Forests, New C.I.T. Building, Calcutta-700073.

ABSTRACT

West Bengal holds an important position in fisheries development as the state has all types of captive. culture fresh water and brackish water fisheries. A survey of forest areas of Sundarbans indicates the total annual catch of fish to be 2500 metric tonnes On an average 4000 persons are engaged in daily fishing with 1.5 kilogrammes of fish catch per fisherman per day and during the 6 months from September to February on an average 6000 persens are engaged in fishing. About 70% of total catch of fish is collected during this period. Statistical analysis of the data colleeted for the study has clearly indicated that a rational and scientific exploitation of fish species inhabiting the rivers and creeks of Sundarbans estuary has immense economic potentialities.

STATUS OF THE FISHERY

Catch of fish during the different months during 1979

		Catch in Tonnes
January	....	305
February	.....	300
March	.....	125
April	....	115
May	.....	90
June	....	95
July	....	150
August	....	175
September	....	294
October	....	276
November	....	285
December	....	290

The following facts account for the sharp decline in fish catch in Sundarbans estuaries

(i) There is a sharp competion amongst the fishermen, the number having increased 8 times since 1962 (500 fishemen per day during 1962 to 1965as per Mitra, 1967) The sharp competition leads to overfishing which, in a biological sense, is a condition of the stock in which, due to excessive catches, the numbers of individuals (fish) which are capable of reproducing under the optimal (average) conditions cannot maintain the stock at a viable i. e., when the reproductive capacity of the population cannot compensate for the losses due to fishing and other sources of mortality.

(ii) Rate of siltation has made rivers/creeks rather shallow and difficult for fishing.

(iii) Salinity percentage has shown a steady rise in all the rivers/creeks, which is detrimental of fish breeding.

(iv) Catch of brood and immature fish in the estuaries is on the increase.

LENGTH WEIGHT RELATIONSHIP OF FISH SPECIES

Statistical analysis was carried out to find the length-weight relationship and coefficients of condition were established for 4 economic fish species viz., *Hilsa ilisha, Mugil parsia, Mugil tade and Lates calcarifer.*

The following length-weight relationships were obtained :-

$W=166.0\ (L)^5$ for *Lates calcariter*

$W=.015\ (L)^3$ for *Mugil parsia*

$W=0.46\ L^2$ for *Hilsa ilisha*

Where W is weight in grammes and L is length in centimetres.

HILSA (HILSA ILISHA)

Average length of fish varied between 24 and 48 cm. while the weight varied between 125 and 1950 g, the coefficient of condition was 1.29 at 29 cm length while it is 1.93 at a length of 46 cm which was the maximum met in the study.

BHETKI (LATES CALCARIFER)

The length varied between 20 cm and 97 cm and the weight between 100 g and 4100 g, the coefficient of condition was 2.55 at length between 38 and 46 cm, the value falls off.

BHANGAN (MUGIL TADE)

Average length varies between 15 cm and 62 cm while the weight varies between 30 g and 3000 g, the coefficient of condition (maximvm 2.74) at a length of 28 cm.

Significance of coefficient of condition :-
The coefficient of condition is given by the formula :-

$$\frac{K=10^5 xW}{L^3}$$ where W is weight in g and L is length in mm.

The coefficient of condition is dependent upon the food supply and calorific value of food apart from other factors. The maximum coefficient of condition is apparently indicative of maturity. Such study for evaluation of coefficient of condition has, so far, not been made for the fishes of Sundarbans estuaries.

FISH AND VEGETABLE FOOD

Preliminary investigations have shown the presence of about 50 species of diatoms, 30 species of green algae and about 18 species of bluegreen algae in the eastern Sundarbans region.

Coelathrum and *Ulva* are very abundant on the pneumatophores and tree trunks in the periodically inundated areas. These two algae have been found in the stomachs of *Periopthalmus* and *Bolepthalmus* (mudskippers), *Pangasius pangasius, Pampus chinensis, Muqil tade* and several other fish species.

Plotosus canius and *Pangasius pangasius* fishes have been found to feed on the fruits of the keora (*Sonneratia apetala)* and the bain *(Avicennia sp)*.

During August, September and October tonnes of these fruits fall on water when these fishes concentrate near the bank to feed on them. On *Pangasius pangasius* fish weighing 12 kg was found to have eaten about 1 kg of *Avicennia* fruit. The fact that this fish had layers of yellow fat its viscera perhaps suggests that these fruits are highly nutritive and facilitate much faster growth. A new type of non-nitrogenous growth hormone (tetrahydro-gibberallic acid) has been found in the leaves of keora (communicated by Dr. S. M. Sircar, Director, Bose Institute, Calcutta).

The bain leaves defoliate when heavily infested by an insect pest (Hymenoptera) and defoliation is likely to affect flower and fruit production as a result of which the *Pangasius pangasius* and *Plotosus canius* populations in the mangrove swamps are likely to be seriously affected.

FISH AND BIRD

Fish forms the principal food for many bird species of this tract. Almost 100% of food of little cormorant consists of fish. An adult of the little cormorant consumes about 100 g fish per day, while the estimated food of its fledgling is about 30 g. *Channa punctata* and *Anabas testudineus* form the food of the open-

bill. While *Pangasius pangasius, Mystus qulio, Aplo cheilus panchax, Anguilla bengalensis, Muraena tile, Strongylura, strongylura, Chela spp* and several other species of fish form the food of the large egret. In the case of the little cormorant, the food consists mostly of the following fish species : *Mystus gulio, M. vittatus, Chela spp, Puntius sarana, P. ticto, Catla, Labeo bata, Mugil tade, Anabas testudeneus, Channa punctatus etc.*

HILSA FISHERIES

Though the life history of this fish in the Bay of Bengal is under study for years not enough has been done on its food, feeding, breeding and migratory habits.

During 1962-63 the annual hilsa catch was 1158.89 tonnes from the Sundarbans, but gradually the quantity of catch showed a declining trend and at present the catch is very meagre. A sample survey indicates the current catch to be 150 tonnes from the estuaries of Sundarbans. The reasons for the low output may be due to (i) siltation of river mouths near the sea and formation of sand bank, and, (ii) no closed season has been observed in rivers/creeks during July to September to save the brood fish.

This calls for an immediate and detailed research on this dwindling species.

DRY FISH INDUSTRY AT JAMBUDWIP

During June to October enormous masses of water run into the rivers carrying into them huge quantities of biogenic material. When this biogenic material enters the sea, enormous masses of planktonic algae facilitate production of crustaceans. These planktonic algae and crustaceans form the food of the Bombay dnck *(Harpodon nehereus. Trichiurus sp. Osteogeneosus militaris,* etc.

The vast quantity of fish (2,000 metric tonnes) collected by the fishermen (6,000 in number, is dried and disposed of through middle men. The success of catch and the improvement of the financial status of the fishermen are intimately connected with their safety inside the reserve forests. They are not afraid of dangers from crocodiles or other dredators, but want dacoities to completely stopped.

ORGANIZING A RATIONAL FISHERY FOR THE ESTUARINE TRACT OF SUNDARBANS

In organizing a rational fishery which might ensure sustained productivity of the stock of commercial fishes, the following measures need be instituted,

(i) capture of fish only when they have reached the commercial size, thereby safegarding the fish population.

(ii) ensuring the necessery revival of over exploited stocks by protecting the breed spawning grounds.

(iii) imposing restriction on the mesh size of nets as well as the total number of fishing units after determining the total allowable catches.

(v) the idea of rotational fishing can be given suitable trials to obviate overfishing.

(vi) a suitable legislation need be framed in this regard, introducing new commercial species and also even by transplanting food organisms for the fish.

SOCIO ECONOMIC SITUATION

The socioeconomic aspects of the fishing industry in the Sundarbans need careful consideration since the fish trade in the estuarine tracts of the Sundarbans is largely controlled by middlemen who seze the fruits of the entire fish trade themselves. The fishing labourers eke out a miserable existence for themselves and also to face the hazards of man-eaters, attack of daring dacoits and other natural and man-made calamitous situation in the wildernees of the Sundarbans.

PISCICULTURE

The Sundarbans, with its rich mangrove vegetation, well set-out seasons on the basis of tidal cycles and salinity regions, offer a unique environment for farming of prawn and other brackish water fishes to augment the production of this valuable source of protein food for the people of West Bengal. Silvo-pisciculture scheme introduced in the Sundarbans during 1978-79 is an aquatictaungya where the inter crop raised is fish against an agricultural or horticultural crop as practised in forestry. This scheme offers profound economic possibilities.

CONCLUSION

It is thus clear that in Sundarbans, the study of fisheries cannot be made in isolation. On the other hand, any such study forms only a part of the entire mass of a closely knit string. An integrated scientific investigation of plant and animal can be more meaningful in such a study. The organisation of a rational fishery in the Sundarbans does not brook any delay and holds bright promise for the future to make a significant headway in the economy of West Bengal.

REFERENCES

Chaudhury, A. B and Chakrabarti, K. 1973 Wild life biology of the Sundarbans, Botanical Society of Bengal, 26 (1) 63-66

Mitra,, G. N. 1945 A note on the estuarine and foreshore fisheries in the Sundarbans Forest Division, Govt. of West Bengal, 37,

Mitra, G. N. 1967, Development of Fisheries in the Sundarbans and the Bay of Bengal, Project Report No. 1, Govt. of India, 63,