AACL BIOFLUX
Aquaculture, Aquarium, Conservation & Legislation
International Journal of the Bioflux Society

Impact of Sariakandi fish pass on fisheries diversity of Bangali river, Bogra, Bangladesh

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Abstract. The present study was conducted to know the impact of Sariakandi fish pass on fisheries diversity of Bangali river, Bogra, Bangladesh. Data were collected directly from fishermen, fish traders and organizations related to this field. A total of 59 fin fish species and 9 non fin fishes were recorded in Bangali river after construction of fish pass whereas the number was low before establishment of fish pass. Our results indicate that fish pass has positive impact on fisheries diversity of Bangali river at Sariakandi Upazila, Bogra Bangladesh.
Key Words: Fresh water ecosystem, water development structure, fisheries resources, Bangladesh.

Introduction. The country Bangladesh abounds in a large variety of fish species (DoF 2008). While fisheries are a prospective sector of Bangladesh contributing 5.7% of the total export earning and 4.92% to the GDP (BBS 2003-2004), this sector has been facing serious problems due to unplanned water development structures (dam, polder, sluice gate etc.). The water development structures block the movement of fish to and from the floodplain, which serves as the spawning and nursery ground for fish and throw thousands of fishermen out of work (Kabir & Sharmin 2003; Mondol et al 2006). Fish pass is a structure which helps to overcome this problem by facilitating upstream or downstream migration of fish.

Bangali river is one of the perennial rivers of Bangladesh. It maintains connection with the Jamuna in the east and with the Karatoya (through the Katakhali) in the west. The Bangali river flows close down to Sariakandi Upazila. During the rainy season the water level increased and flow of water comes from the upstreams. Again it starts decreasing during the winter season and ultimately during lean season it goes down to the minimum flow of water. In order to facilitate the fish migration between the river Jamuna and Bangali Sariakandi fish pass was established in 2001 at Sariakandi Upazila, Bogra. As the river crosses Sariakandi Upazila of Bogra district, many people of this region are dependent on fisheries resources of this water body. However, till today very little is known about the impact of 'fish pass' on the fisheries diversity of Bangali river. Therefore, our aim was to address the impact of Sariakandi fish pass on fisheries diversity of Bangali river, Bogra Bangladesh.

Material and Method. The field study was conducted in Bangali river at Sariakandi Upazila Bogra, Bangladesh during a period of 6 months from May 2009 to October 2009 (Figure 1). To perform this study interview, case study, structured questionnaire and eye observation methods were used.

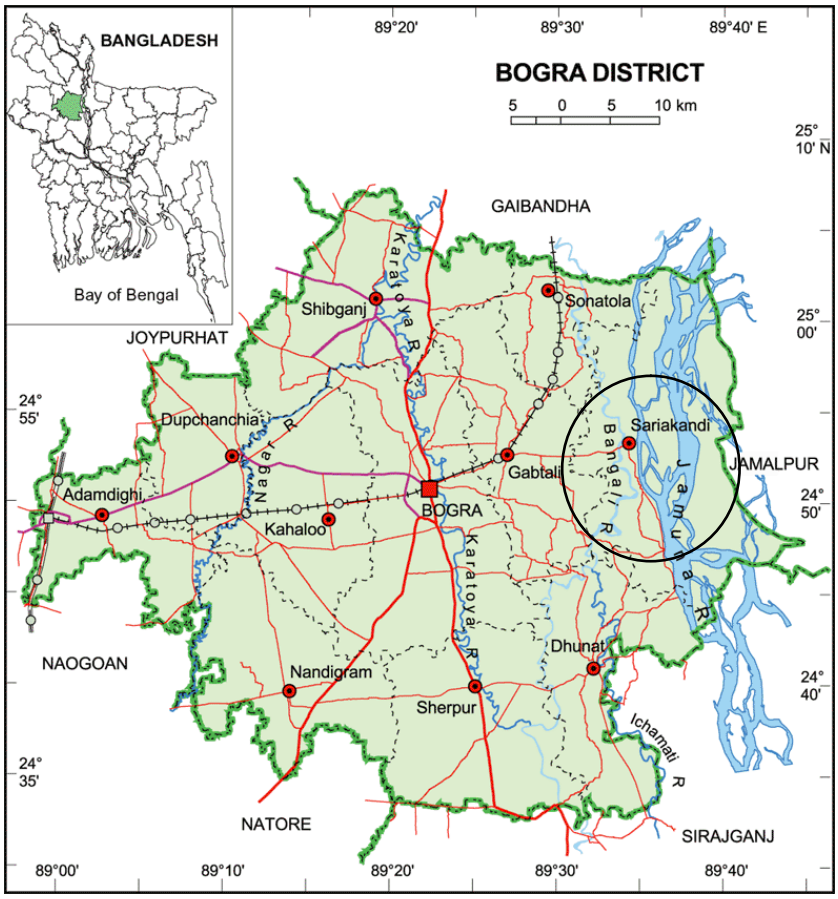

Figure 1. Map of Bogra district indicating the study area: Bangali river at Sariakandi Upazila, Bangladesh (Source: http://www.banglapedia.org).

Results and Discussion

Fisheries diversity in Bangali river before establishment of fish pass. A total of 12 fish species comprising 8 families were recorded in the Bangali river before establishment of fish pass. Similar result was reported by Mondol et al (2006). A checklist of fish species is furnished in Table 1.

Table 1

List of fishes in Bangali river at Sariakandi Upazila before establishment of fish pass

Family	*Serial no.*	*Scientific name*	*Local name*
Cyprinidae	1	*Labeo rohita* (Hamilton, 1822)	Rui, Rohit
	2	*Catla catla* (Hamilton, 1822)	Katla, Katol
	3	*Cirrhinus cirrhosus* (Bloch, 1875)	Mrigal, Mirka
	4	*Puntius sophore* (Hamilton, 1822)	Jat punti, Jati punti
Siluridae	5	*Wallago attu* (Bloch & Schneider, 1801)	Boal
Bagridae	6	*Mystus tengara* (Hamilton, 1822)	Bujuri tengra
Schilbeidae	7	*Ailia coila* (Hamilton, 1822)	Kajuli
Anabantidae	8	*Trichogaster fasciata* Bloch & Schneider, 1801	Kholisha
Centropomidae	9	*Ambassis nama* (Hamilton, 1822)	Chanda
Gobiidae	10	*Glossogobius giuris* (Hamilton, 1822)	Baila, Bele
	11	*Mugil corsula* (Hamilton, 1822)	
Mastacembelidae	12	*Mastacembelus armatus* (Lacepède, 1800)	Gonti

Fisheries diversity in Bangali river after establishment of fish pass. During the study period, a total of 59 species of fin fishes (Table 2) and 9 species of non fin fishes (Table 3) were recorded. Among them fin fishes from families Cyprinidae and Bagridae comprised more than 40% of the total catch. The detailed catch composition of fishes is furnished in Figure 2.

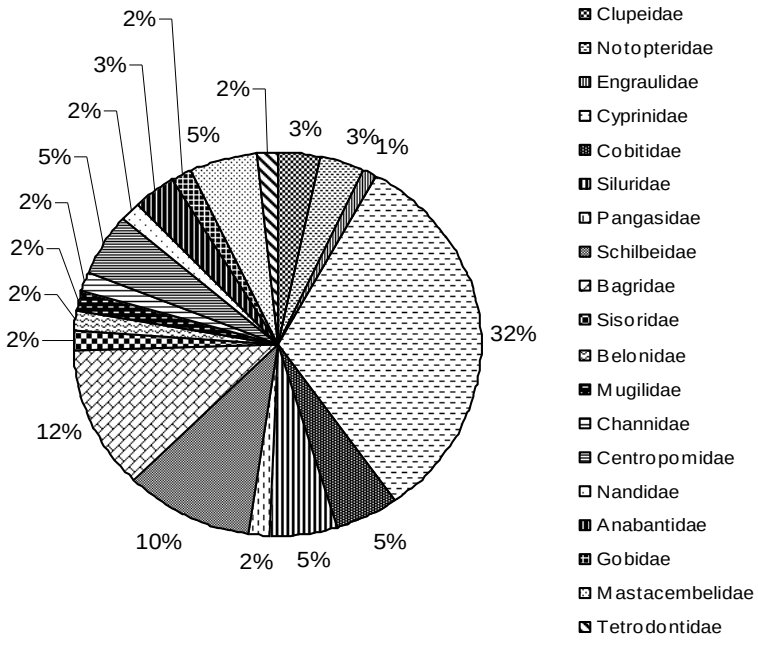

Figure 2. Percentage composition of fishes in different families from the total catch of Bangali river at Sariakandi Upazila, Bogra, Bangladesh.

Although the number of recorded species is increased after establishment of fish pass, there are some species recorded as endangered or threatened species (Table 4). In Bangali river few causes are identified for this declination namely:

(i) habitat degradation and change of natural habitat: due to man made causes like water pollution through agricultural wastage, destroyed the spawning, nursing and grazing ground of fish species of the Bangali river;

(ii) uses of the river Bangali and its adjacent area: the Bangali river and its adjacent area were used for various purposes. December to February mainly IRRI and Boro (high yield variety of paddy) were cultivated along the river side and when the water level was low other paddy, wheat, jute, maize, mustard oil were cultivated in the river. In winter, the river became dry and the farmers used the river for winter cropping;

(iii) fishing methods used in the Bangali river: the fishery of the Bangali river is multispecies and multi-gear in nature. Different fishing methods are employed in different seasons for fishing and usually, fishermen select the gear types, design, and mesh size to capture the desired fishes. As they do not have proper knowledge on the spawning or breeding season of the fish they capture fishes erroneously and losses has been occurred.

Table 2

List of fishes in Bangali river at Sariakandi Upazila after establishment of fish pass

Family	*Ser. no.*	*Scientific name*	*Local name*
Clupeidae	1	*Gudusia chapra* (Hamilton, 1822)	Chapila, Khoira
	2	*Corica soborna* Hamilton, 1822	Kachki, Gura mach
Notopteridae	3	*Notopterus notopterus* (Pallas, 1769)	Phali, Pholui
	4	*Chitala chitala* (Hamilton, 1822)	Chital
Engraulidae	5	*Setipinna phasa* (Hamilton, 1822)	Phasa
Cyprinidae	6	*Chela cachius* (Hamilton, 1822)	Chela, Pat-chela
	7	*Rasbora daniconius* (Hamilton, 1822)	Darkani
	8	*Osteobrama cotio cunma* (Day, 1888)	Dhela
	9	*Amblypharyngodon mola* (Hamilton, 1822)	Mola
	10	*Amblypharyngodon microlepis* (Bleeker, 1854)	Mola, Molangi
	11	*Puntius sarana* (Hamilton, 1822)	Sarputi
	12	*Puntius chola* (Hamilton, 1822)	Chola puti
	13	*Puntius stigma* (Valenciennes, 1844)	Vanti Punti
	14	*Puntius conchonius* (Hamilton, 1822)	Kanchan puti
	15	*Puntius ticto* (Hamilton, 1822)	Tit-punti
	16	*Puntius sophore* (Hamilton, 1822)	Jat punti, Jati punti
	17	*Aspidoparia morar* (Hamilton, 1822)	Peoli
	18	*Labeo rohita* (Hamilton, 1822)	Rui, Rohit
	19	*Labeo calbasu* (Hamilton, 1822)	Kalibaus
	20	*Labeo bata* (Hamilton, 1822)	Vangna
	21	*Labeo boga* (Hamilton, 1822)	Bhangon, bata,
	22	*Catla catla* (Hamilton, 1822)	Katla, Katol
	23	*Cirrhinus cirrhosus* (Bloch, 1875	Mrigal, Mirka
	24	*Cirrhina reba* (Hamilton, 1822)	Raikhor
Cobitidae	25	*Botia dario* (Hamilton, 1822)	Rani, Bau
	26	*Lepidocephalichthys guntea* (Hamilton, 1822)	Puiya
	27	*Canthophrys gongota* (Hamilton, 1822)	Gutum, Pahari gutum
Siluridae	28	*Wallago attu* (Bloch & Schneider, 1801)	Boal
	29	*Ompok pabda* (Hamilton, 1822)	Pabda, Paba
	30	*Ompok bimaculatus* (Bloch, 1794)	Kani pabda
Pangasidae	31	*Pangasius pangasius* (Hamilton, 1822)	Pangus
Schilbeidae	32	*Clupisoma garua* (Hamilton, 1822)	Ghere, Gharua
	33	*Neotropius atherinoides* (Bloch, 1794)	Batasi
	34	*Eutropius taakree* (Sykes, 1839)	Tin-kata
	35	*Silonia silondia* (Hamilton, 1822)	Shilong
	36	*Ailia coila* (Hamilton, 1822)	Kajuli
	37	*Ailiichthys punctata* Day, 1872	Banshpata
Bagridae	38	*Sperata aor* (Hamilton, 1822)	Guji air
	39	*Sperata seenghala* (Sykes, 1839)	Taila air
	40	*Mystus tengara* (Hamilton, 1822)	Bujuri tengra
	41	*Mystus vittatus* (Bloch, 1794)	Tengra
	42	*Mystus cavasius* (Hamilton, 1822)	Kabshi tengra
	43	*Mystus bleekeri* (Day, 1877)	Gulsha tengra
	44	*Rita rita* (Hamilton, 1822)	Rita
Sisoridae	45	*Bagarius bagarius* (Hamilton, 1822)	Baghair
Belonidae	46	*Xenentodon cancila* (Hamilton, 1822)	Kaikka, Kakila
Mugilidae	47	*Rhinomugil corsula* (Hamilton, 1822)	Korsula, Urol
Channidae	48	*Channa punctata* (Bloch, 1793)	Taki
Centropomidae	49	*Chanda nama* Hamilton, 1822	Chanda
	50	*Pseudambassis baculis* (Hamilton, 1822)	Phopha chanda
	51	*Parambassis ranga* (Hamilton, 1822)	Lal chanda
Nandidae	52	*Nandus nandus* (Hamilton, 1822)	Veda
Anabantidae	53	*Anabas testudineus* (Bloch, 1792)	Koi
	54	*Trichogaster fasciata* Bloch & Schneider, 1801	Kholisha
Gobiidae	55	*Glossogobius giuris* (Hamilton, 1822)	Baila, Bele
Mastacembelidae	56	*Mastacembelus armatus* (Lacepède, 1800)	Gonti
	57	*Mastacembelus pancalus* Hamilton, 1822	Guchi
	58	*Macrognathus aculeatus* (Bloch, 1786)	Tara baim
Tetraodontidae	59	*Tetraodon cutcutia* Hamilton, 1822	Potka

Table 3

List of other fisheries items in Bangali river at Sariakandi Upazila, Bogra, Bangladesh

Class	*Serial no.*	*Scientific name*	*English name*	*Local name*
Amphibia	1	*Euphlyctis hexadactylus* (Lesson, 1834)	Bull frog	Sona bang
	2	*Hoplobatrachus tigerinus* (Daudin, 1803)	Frog	Kola bang
Reptilia	3	*Aspideretes gangeticus* (Cuvier, 1825)	Tortoise	Kachim
	4	*Chitra indica* (Gray, 1831)	Tortoise	Kachim
Crustacea	5	*Macrobrachium rosenbergii* De Man, 1839	Freshwater prawn	Golda chingri
	6	*Macrobrachium lamarrei* (Milne-Edwards, 1837)	Freshwater prawn	Gura chingri
Mollusca	7	*Pila globosa* (Swainson, 1822)	Snail	Shamuk
	8	*Unio crassus* Philipsson, 1788	Mussel	Jhinuk
	9	*Cancer pagurus* (Linnaeus, 1758)	Crab	Kakra

Table 4

Endangered and threatened fish species of Bangali river at Sariakandi Upazila, Bogra, Bangladesh

Family	*Serial no.*	*Scientific name*	*Local name*
Tetraodontidae	1	*Tetraodon cutcutia* Hamilton, 1822	Potka
Cyprinidae	2	*Puntius sarana* (Hamilton, 1822)	Sarputi
	3	*Labeo calbasu* (Hamilton, 1822)	Kalibaus
	4	*Labeo bata* (Hamilton, 1822)	Bata, Vangna
Cobitidae	5	*Botia dario* (Hamilton, 1822)	Rani, Bau
Bagridae	6	*Mystus bleekeri* (Day, 1877)	Gulsha tengra
Notopteridae	7	*Notopterus notopterus* (Pallas, 1769)	Phali, Pholui
Nandidae	8	*Nandus nandus* (Hamilton, 1822)	Veda
Channidae	9	*Channa striata* (Bloch, 1793)	Shol
Centropomidae	10	*Chanda nama* Hamilton, 1822	Chanda
Schilbeidae	11	*Eutropius taakree* (Sykes, 1839)	Tin-kata
Mastacembelidae	12	*Mastacembelus pancalus* Hamilton, 1822	Guchi
Schilbeidae	13	*Silonia silondia* (Hamilton, 1822)	Shilong
Siluridae	14	*Ompok bimaculatus* (Bloch, 1794)	Kani pabda

Conclusions. It is clear from the present study that fish pass has a positive impact on fish diversity of Bangali river. However, in order to evolving sustainable management of fisheries diversity of Bangali river the following issues need to be considered:

- it is essential to provide suitable habitat for food, shelter and breeding of endangered fish species;
- proper implementations of fisheries regulations are necessary;
- overfishing must be stopped;
- fish pass maintenance committee should be more strengthened and active;
- educational institution should be set up in fishermen's village to improve their educational status;
- some rules should be implemented in the use of gears, so that fishermen should not catch fingerlings, brood fish randomly through the use of different gears;
- local, regional, national and international NGOs should provide technical knowledge, credit support and alternative income sources to the fishermen;
- awareness should be grown in general villagers.

Acknowledgements. Thanks to all participating fisheremen who spent their valuable time and experience with us during data collection. The authors would like to thank Department of Fisheries (DoF) Sariakandi Upazila, Bogra for their cooperation and support during data collection. The authors wish to extend their gratitude to an anonymous reviewer and Dr. Claudiu Gavriloaie for useful suggestions and comments. This study was supported by Universiti Kebangsaan Malaysia through research grant "UKM-FST-OUP-2011".

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Received: 10 October 2011. Accepted: 20 October 2011. Published online: 12 November 2011.
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How to cite this article:
Moumita D., Hussain M. A., Alam M. M., Mazlan A. G., Simon K. D., 2011 Impact of Sariakandi fish pass on fisheries diversity of Bangali river, Bogra, Bangladesh. AACL Bioflux **4**(5):621-626.