
**ISSN: 2347-5129**
(ICV-Poland) Impact Value: 5.62
(GIF) Impact Factor: 0.352
IJFAS 2016; 4(1): 95-100

www.fisheriesjournal.com
Received: 03-11-2015
Accepted: 04-12-2015

**Md. Mizanur Rahman**
Department of Fisheries Technology, Faculty of Fisheries, Patuakhali Science and Technology University, Dumki, Patuakhali-8602, Bangladesh.

**Md. Bokthier Rahman**
Department of Fisheries Technology, Faculty of Fisheries, Patuakhali Science and Technology University, Dumki, Patuakhali-8602, Bangladesh.

**Mst. Nazira Akhter Rithu**
Department of Geography and Environmental Studies, University of Rajshahi, Rajshahi-6205, Bangladesh.

**Md. Sazedul Hoque**
Department of Fisheries Technology, Faculty of Fisheries, Patuakhali Science and Technology University, Dumki, Patuakhali-8602, Bangladesh.

**Correspondence**
**Md. Mizanur Rahman**
Department of Fisheries Technology, Faculty of Fisheries, Patuakhali Science and Technology University, Dumki, Patuakhali-8602, Bangladesh.

# Observation on selectivity of fishing gears and ichthyofaunal diversity in the Paira River of Southern Bangladesh

**Md. Mizanur Rahman, Md. Bokthier Rahman, Mst. Nazira Akhter Rithu, Md. Sazedul Hoque**

**Abstract**
Paira River, a coastal water body of Patuakhali district having immense aquatic biota especially fishes. An attempt has been undertaken for a period of 7 months from March 2015 to September 2015 to estimate the fishing gears, their mesh size and ichthyofaunal diversity status in the Southern Bangladesh along with the globe. The study discovered total seven major types of fishing gears defined as gill nets (saine jal and current jal), lift nets (dharma jal), push net (thela jal and moiya jal), seine net (ber jal), fixed purse net (badha jal and gora jal), cast net (jhaki jal) and hook and line (chip barshi and chara barshi). A total of 57 species of fishes were identified belongs to 10 orders and 28 families of which Perciformes were of the highest occurrence (33.33%) order of the total fish population followed by 21.05%, 19.30%, 10.53%, 5.26%, and 2.51% for Cypriniformes, Siluriformes, Clupeiformes, Synbranchiformes and Beloniformes, respectively. Four orders *viz*., Cyprinodontiformes, Osteoglossiformes, Pleuronectiformes and Tetraodontiformes were found in the same percentage (1.75% for each) of the total number of fish species. Out of these 57 species about 8 species have to be found endangered and 3 to critically endangered in Bangladesh whereas in the globe total 4 species recorded as near threatened. Over fishing, use of restricted fishing gears and different forms of pollution are the most important factors for declining of fish diversity from the Paira River. For sustainability of these resources, an adequate knowledge of fishing gears, species composition, fish diversity and conservation status of available fish species must be understood.

**Keywords:** Paira River, Fishing gears, Mesh size, Conservation status, Ichthyofaunal diversity.

## 1. Introduction
Bangladesh is a riverine country, having 700 rivers including tributaries flow through the country and constituting a waterway of total length of about 24,140 km [1]. Along with potential of water resources, Bangladesh is also rich in the diversity of various fish species and other important aquatic species. Hence, it is ranked fourth in fish biodiversity in Asia behind China, India and Thailand [1], with approximately 800 species of fresh, brackish and marine waters [2]. The role of fisheries sector to the national economy of Bangladesh is always significant and main source of animal protein intake about 60% [1], food security, employment for fishing community and other personnel engaged in fisheries sectors, foreign exchange earnings and overall socio-economic improvement.
The coastal region of Bangladesh is rich in inland's open waterway of which Paira River is very important one, situated in the Patuakhali district under Barisal division. The river is the harbor of diversified fish fauna. Thus the rivers influence the life style of countless people living along and near the coast of the river.
Minority studies have been occurred on current worries, fish diversity and their availability status in the Paira River. Islam *et al.* [3] studied on status and current worries of fish diversity in the Paira River for a period of one year from April 2013 to March 2014 and identified 114 fish species under 12 orders and 36 families which were categorized as available, less available, rare and very rare. Further no effort seems to have been taken to study fishing gears including mesh size of respective gears, catch composition, diversity of fishes and conservation status of available fish species in the Bangladesh along with the globe. There is not a satisfactory

information found in the literature regarding the recent fish fauna and fishing gears used to capture fish of the Paira River. So record of fishing gears, their mesh sizes, catch composition of individual gears, fish diversity and their conservation status of Paira River has become very much central aspect to understand the river ecosystem. Finally this study investigates the fish fauna of the river to present much needed baseline data for improved and sustainable exploitation and management of the fisheries resources.

## 2. Materials and methods

**2.1 Study area:** The study area i.e., Paira River is situated in the southern part of the geographical region known as the Patuakhali district, Bangladesh (Fig 1). The river originated from the Tetulia River via the Karkhana River and finally falls into the Bay of Bengal by the name of Burishwar River. Its center lies between 22º35'N latitude and 90 º26'E longitude. The river also known as the Rajganj River. Total length of the river is approximately 45 kilometer and width is 1-1.5 kilometer [3].

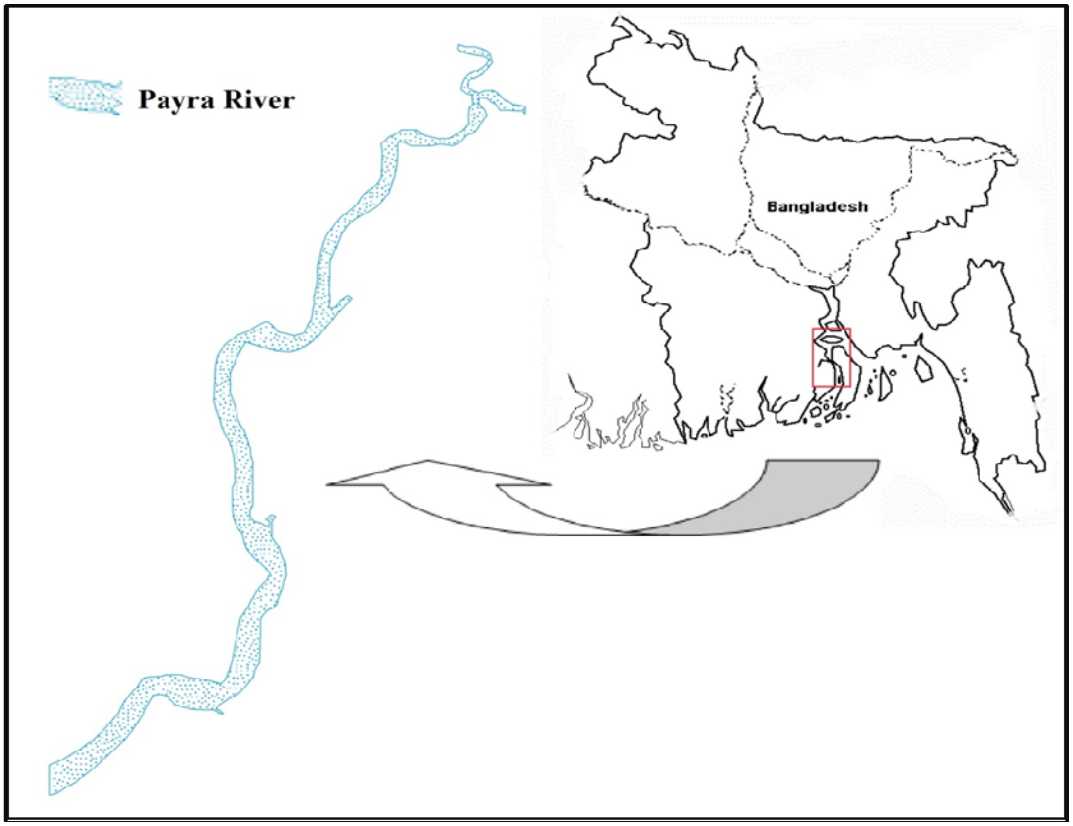


**Fig 1:** Geographical position of study area (Paira River)

### 2.2 Data collection

The fishing gears including their mesh size, catch composition of individual gear and fish species were surveyed fortnightly from the fishermen fishing in the river. The fishing gears were classified followed by Ahmed [4]. The freshly caught unsorted samples were weighted using digital balance and pan balance to know the catch composition of different gears and expressed in kg. For laboratory study, 10% of the total catch was taken and preserved in 10% buffered formalin solution in separate specimen jar marked previously according to the size of specimen. In the laboratory, the collected specimens were identified to species level with the help of standard taxonomic keys of Talwar and Jhingran [5], Francis [6], Shrivastava [7], Rahman [8] and Hossain *et al.* [9].

Global conservation status and population trend were detected following IUCN [10]; whereas following IUCN [10], conservation status of recorded fish in Bangladesh was used.

### 2.3 Data processing and analysis

For the analysis of data tabular technique was applied by using simple statistical tools like averages and percentages. Processed data were transferred to a master sheet from which classified tables were prepared revealing the finding of the present study. For processing and analysis purpose computer software MS Excel was used.

## 3. Result and discussion

### 3.1 Fishing gears

Table 1 represent different types of fishing gears with their mesh size, shape and average catch composition were recorded from Paira River during the present study. From the study, total sixteen types of fishing gears were identified under seven major categorizes described as Gill nets (Saine jal and Current Jal), Lift nets (Dharma jal), Push net (Thela jal and Moiya jal), Seine net (Ber jal), Fixed purse net (Badha jal and Gora jal), Cast net (Jhaki jal) and Hook and line (Chip Barshi and Chara Barshi).

The present findings were supported by Flowra *et al.* [11] who found Cast net, Seine net, Gill net, Lift net, Push net, traps and Hook and line from Baral River. But 11 fishing gears under 7 major groups were observed by Ali *et al.* [12] from Lohalia River which were of lower numbers than existing results.

Mesh size of the nets were varied depending on targeted fish species. However, maximum (8-11cm) and minimum (0.5 cm) mesh size was found in case of Chandi jal and Chor jal under

the group of gill net and fixed purse net, respectively. The obtained result from this study was supported with the finding of Siddique *et al.* [13] who found mesh size 2.2 to 3.5 cm for Punti jal, 4 to 4.5 cm for Ilish net, 3.5 cm for Poa jal, 0.5 to 2.3 cm for Jagat ber jal, 0.5 to 1.25 cm for Behundi jal, 0.625 to 1.25 cm for Jhaki jal and 0.5 to 2 cm for Dharma jal in the Meghna River estuary.

The highest catch composition was found for Chandi jal was 20 kg/haul/day and lowest catch was found for Chhip Barshi about 0.5kg/day (Fig 2). Sayeed *et al.* [14] also observed the mean CPUE from Gillnet, Jhakijal, Seine net, Thela jal, lift net, Traps, Wounding gears, Moijal, Hook and line and Sutijal was 2.83 ± 0.92, 2.05 ± 0.81, 48.99 ±12.34, 2.60 ± 1.56, 2.66 ± 1.46, 4.69 ± 2.11, 1.83 ± 1.07, 3.03 ± 1.76, 3.11 ± 1.76 and 224.54 ± 126.89 kg, respectively in the Chalan beel.

**Table 1:** Illustration of available fishing gears with their mesh size, shape and catch composition documented from Paira River

| Gear types | Local name | Mesh Size (cm) | Shape of nets | ACC/ Haul/ Day/ Gear (Kg) |
|---|---|---|---|---|
| Gill net | Poa jal | 3-6 | RS | 5 |
| | Shahin jal | 4-7 | RS | 6.5 |
| | Current jal | 0.2-0.4 | RS | 4.5 |
| | Chandi jal | 8-11 | RS | 20 |
| | Sutar jal | 6-8 | RS | 5.5 |
| Seine net | Jagat ber jal | 0.5-2.0 | RS | 7.5 |
| Fixed purse nets | Behundi jal | 0.5-2 | CS | 6.5 |
| | Badha jal | 1.0 | RS | 2.5 |
| | Gora jal | 0.2-2.5 | RS | 4.5 |
| | Chor jal | 0.5 | FS | 5 |
| Cast nets | Jhaki jal | 0.5-1 | CS | 2 |
| Lift nets | Dharma jal | 0.5-1.5 | SS | 3 |
| Push nets | Moia jal | 0.5-1.0 | RS | 2 |
| | Thela jal | 0.5-1.0 | TS | 1.5 |
| Hooks and line | Chhara Barshi | - | - | 1.5 |
| | Chhip Barshi | - | - | 0.5 |

*RS= Rectangular Shape, SS= Square Shape, CS= Conical Shape, TS= Triangular shaped, FS= Funnel Shape, ACC= Average Catch Composition*

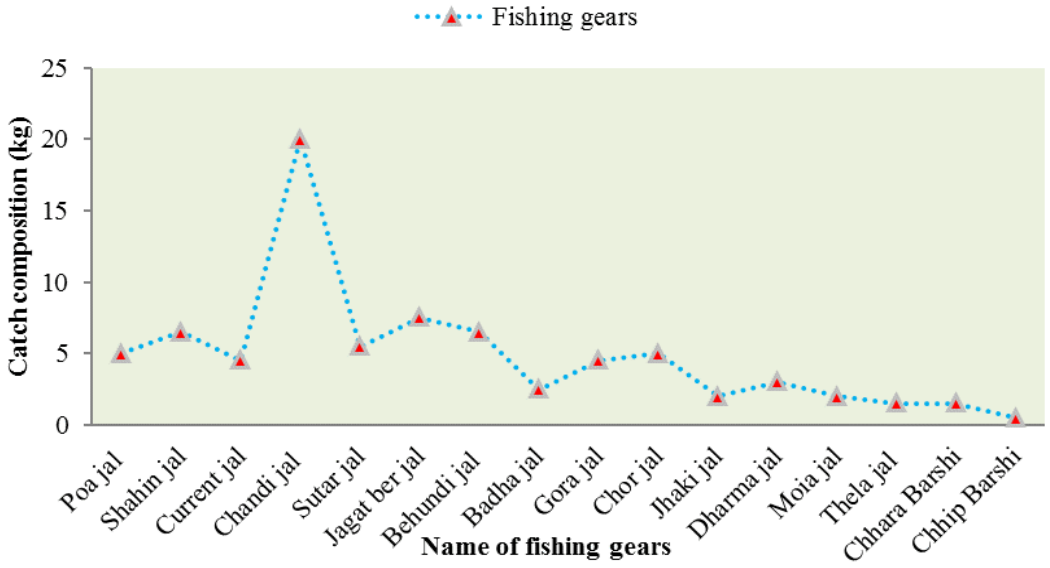


**Fig 2:** Catch composition of different gears

### 3.2 Fish diversity

The river is the harbor of plentiful aquatic organisms especially fishes. The present study described total 57 species of fishes under 10 orders and 28 families which presented in the Table 2 with their scientific name, common English and local name and IUCN red list status of Bangladesh along with global. Out of 10 orders Perciformes were found as the highest occurrence (33.33%) of the total fish population followed by 21.05%, 19.30%, 10.53%, 5.26%, and 2.51% for Cypriniformes, Siluriformes, Clupeiformes, Synbranchiformes and Beloniformes, respectively. Four orders *viz.*, Cyprinodontiformes, Osteoglossiformes, Pleuronectiformes and Tetraodontiformes were found in the same percentage (1.75% for each) of the total number of fish species (Fig 3).

**Table 2:** Systematic position of finfish species with their common English and local name and IUCN red list status recorded from Paira River

| Order | Family | Scientific Name | Common English Name | Local Name | Conservation Status | |
|---|---|---|---|---|---|---|
| | | | | | Bangladesh | Global |
| Beloniformes | Belonidae | *Xenentodon cancila* (Hamilton, 1822) | Freshwater garfish | Kakila | NA | LC |
| | Hemiramphidae | *Dermogenys pusilla* (Kuhl & van Hasselt, 1823) | Wrestling halfbeak | Ek thota | EN | LC |
| Clupeiformes | Clupeidae | *Tenualosa ilisha* (Hamilton, 1822) | Hilsa shad | Ilish | NA | NA |
| | | *Tenualosa toli* (Valenciennes, 1847) | Toli shad | Chandana ilish | NA | NA |
| | | *Corica soborna* (Hamilton, 1822) | Ganges river sprat | Kachki | NO | LC |
| | | *Gudusia chapra* (Hamilton, 1822) | Indian river shad | Chapila | NO | LC |
| | Engraulidae | *Setipinna phasa* (Hamilton, 1822) | Gangetic hairfin anchovy | Phaisa | NO | LC |
| | | *Thryssa purava* (Hamilton, 1822) | Oblique-jaw thryssa | Ramchos | NO | NA |
| Cypriniformes | Cobitidae | *Lepidocephalichthys guntea* (Hamilton, 1822) | Guntea loach | Gutum | NO | LC |
| | Cyprinidae | *Puntius sophore* (Hamilton, 1822) | Spot fin swamp barb | Jatpunti | NO | LC |
| | | *Puntius ticto* (Hamilton, 1822) | Ticto barb | Tit punti | VU | LC |
| | | *Salmostoma bacaila* (Hamilton, 1822) | Large razorbelly minnow | Chela | NO | LC |
| | | *Esomus danricus* (Hamilton, 1822) | Flying barb | Darkina | NO | LC |
| | | *Labeo bata* (Hamilton, 1822) | Bata | Bata | EN | LC |
| | | *Labeo rohita* (Hamilton, 1822) | Rohu | Rui | NA | LC |
| | | *Gibelion catla* (Hamilton, 1822) | Catla | Catla | NO | LC |
| | | *Devario devario* (Hamilton, 1822) | Sind danio | Baspata | NO | LC |
| | | *Puntius chola* (Hamilton, 1822) | Swamp barb | Chala punti | NO | LC |
| | | *Rohtee cotio* (Hamilton, 1822) | Cotio | Dhela | EN | LC |
| | | *Amblypharyngodon microlepis* (Bleeker, 1853) | Indian carplet | Mola | NO | LC |
| Cyprinodontiformes | Aplocheilidae | *Aplocheilus panchax* (Hamilton, 1822) | Blue panchax | Kanpona | NA | LC |
| Osteoglossiformes | Notopteridae | *Chitala chitala* (Hamilton, 1822) | Clown knife fish | Chitol | EN | NT |
| Perciformes | Ambassidae | *Chanda nama* (Hamilton, 1822) | Elongate glassy perchlet | Lamba chanda | VU | LC |
| | | *Chanda ranga* (Hamilton, 1822) | Indian glassy fish | Lal chanda | VU | LC |
| | Anabantidae | *Anabas testudineus* (Bloch, 1792) | Climbing perch | Koi | NO | DD |
| | Channidae | *Channa punctatus* (Bloch, 1793) | Spotted snakehead | Taki | NO | LC |
| | | *Channa marulius* (Hamilton, 1822) | Giant snakehead | Gozar | EN | LC |
| | | *Channa orientalis* (Bolch & Schneider, 1801) | Asiatic snakehead | Cheng | VU | NA |
| | | *Channa striatus* (Bloch, 1793) | Striped Snaked | Shol | NO | LC |
| | Eleotridae | *Eleotris fusca* (Forster, 1801) | Dusky sleeper | Kuldi | NA | LC |
| | Gobiidae | *Glossogobius giuris* (Hamilton, 1822) | Tank Goby | Bele | NO | LC |
| | | *Brachygobius nunus* (Hamilton, 1822) | Bumblebee goby | Nuna bailla | NO | NA |
| | | *Pseudapocryptes elongatus* (Cuvier, 1816) | Lanceolate goby | Cheua | NA | LC |
| | | *Odontamblyopus rubicundus* (Hamilton, 1822) | Rubicusdus eelgoby | Lal cheua | NO | NA |
| | | *Taenioides cirratus* (Blyth, 1860) | Whiskered Eel Goby | Dogri | NO | DD |
| | Latidae | *Lates calcarifer* (Bloch, 1790) | Giant perch | Koral | NA | NA |
| | Nandidae | *Nandus nandus* (Hamilton, 1822) | Mottled Nandus | Vheda | VU | LC |
| | Osphronemidae | *Trichogaster fasciata* (Bloch & Schneider, 1801) | Banded gourami | Khailsa | NO | LC |
| | Polynemidae | *Polynemus paradiseus* (Linnaeus, 1758) | Paradise threadfin | Tapasi | NO | NA |
| | Sciaenidae | *Otolithoides pama* (Hamilton, 1822) | Pama croaker | Lal Poa | NA | NA |
| | Sillaginidae | *Sillaginopsis panijus* (Hamilton, 1822) | Flathead sillago | Tular dandi | NA | NA |
| Pleuronectiformes | Cynoglossidae | *Cynoglossus cynoglossus* (Hamilton, 1822) | Bengal tongue sole | Kukur jeeb | NO | NA |
| Siluriformes | Bagridae | *Mystus vittatus* (Bloch, 1794) | Striped River Catfish | Rani Tengra | NO | LC |
| | | *Sperata aor* (Hamilton, 1822) | Long-whiskered Catfish | Ayr | VU | LC |
| | | *Mystus tengara* (Hamilton, 1822) | Tengra catfish | Kalo bujuri | NO | LC |
| | | *Rita rita* (Hamilton, 1822) | Rita | Rita | CR | LC |
| | Heteropneustidae | *Heteropneustes fossilis* (Bloch, 1794) | Stinging catfish | Shing | NO | LC |
| | Pangasiidae | *Pangasius pangasius* (Hamilton, 1822) | Yellowtail catfish | Pangas | CR | LC |
| | Siluridae | *Ompok pabda* (Hamilton, 1822) | Pabdah catfish | Madhu Pabda | EN | NT |
| | | *Wallago attu* (Bloch & Schneider, 1801) | Freshwater Shark | Boal | NO | NT |
| | Schilbeidae | *Silonia silondia* (Hamilton, 1822) | Silond catfish | Silon Tengra | EN | LC |
| | | *Clupisoma garua* (Hamilton, 1822) | Garua bachcha | Garua | CR | LC |
| | | *Ailia coila* (Hamilton, 1822) | Gangetic ailia | Kajuli | VU | NT |
| Synbranchiformes | Mastacembelidae | *Mastacembelus armatus* (Lacepède, 1800) | Zig-zag eel | Shal Baim | EN | LC |
| | | *Macrognathus aculeatus* (Bloch, 1786) | Lesser spiny eel | Tara baim | VU | NA |
| | Synbranchidae | *Monopterus cuchia* (Hamilton, 1822) | Swamp eel | Cuchia | VU | LC |
| Tetraodontiformes | Teraodontidae | *Tetraodon fluviatilis* (Hamilton, 1822) | Green puffer fish | Potka | NO | LC |

*LC = Least Concern, NT = near Threatened, DD = Data Deficient, NO = Not threatened, CR = Critically Endangered, EN = Endangered, VU = Vulnerable, NA = Not Assessed*

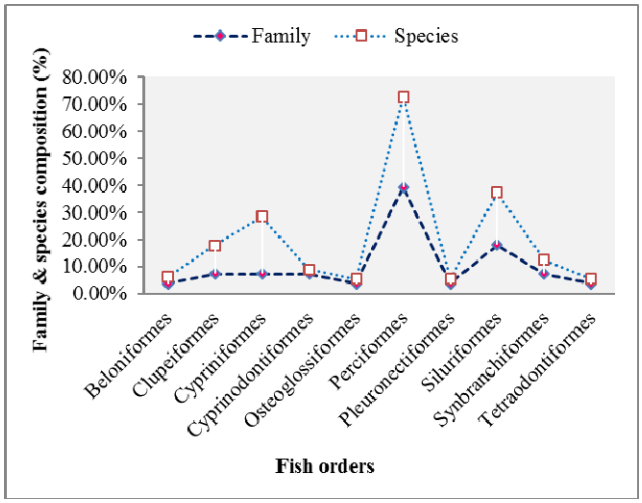


**Fig 3:** Family and fish species composition under different fish orders

The previous study by Islam *et al.* [3] revealed that the total number of fish species (114) under 12 orders and 36 families which were of higher in numbers than present findings from the Paira River. But 42 species of fishes belonged to 7 common groups were recorded by Khan *et al.* [15] from Tista River which were of lower than present works. Out of these 57 species critically endangered, endangered and vulnerable were 3, 8, and 8, respectively in Bangladesh whereas in the globe total 4 species identified as near threatened (Fig 4). But Mohsin *et al.* [16] identified 2 critically endangered, 3 endangered and 5 vulnerable fish species from Andharmanik River. Galib *et al.* [17] recorded 10 vulnerable, 10 endangered and 6 critically endangered species from river Choto Jamuna.

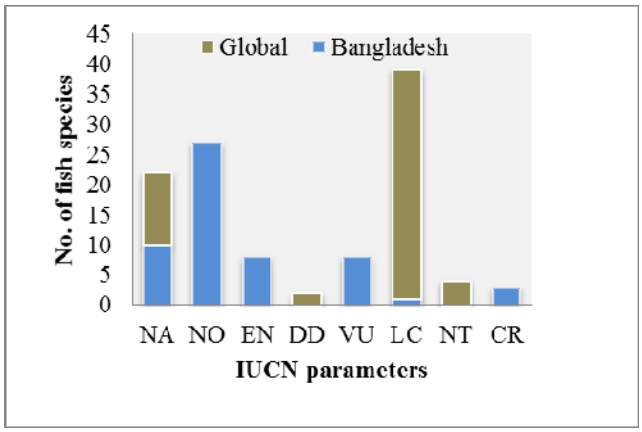


**Fig 4:** Red list status of available fishes

## 4. Conclusion

Paira River plays a significant role by providing a considerable amount of fish to the local people as their source of protein. During the study period from March 2015 to September 2015 manmade activities were found as dominant decline causes of fish species in the Paira River. Indiscriminate fishing by using different nonselective fishing gears mainly badha jal and behundi jal was observed as major threat for the diversity of fishes. Therefore, it may be concluded that preparation of zone wise database of these information and their implementation through government and non-government organization would be the key tools for conservation of freshwater fish biodiversity.

## 5. Conflict of interests

The authors declare that they have no conflict of interests.

## 6. Acknowledgements

The authors express their sincere thanks to the fishermen in the Paira River and Upazilla Fisheries Officer for providing valuable information to accomplish this paper successfully. The author's also thanks to the Department of Fisheries Technology, Patuakhali Science and Technology University, Bangladesh for providing laboratory facilities.

## 7. References

1. DoF. National fish week compendium. Department of Fisheries, Ministry of Fisheries and Livestock, Government of the People's Republic of Bangladesh, 2015, 1-144.
2. Hussain MG, Mazid MA. Genetic improvement and conservation of carp species in Bangladesh. Bangladesh Fisheries Research Institute and International Center for Living Aquatic Resources Management, Penang, Malaysia, 2001, 1-74.
3. Islam MA, Hossain MM, Ahsan ME, Nahar A. Status and current worries of fish diversity in the Paira River, Patuakhali, Bangladesh. International Journal of Fisheries and Aquatic Studies. 2015; 2(3):160-165.
4. Ahmed N. Government of East Pakistan Directories of Fisheries: Fishing gear of East Pakistan. East Pakistan Fishery Department, East Pakistan. 1971.
5. Talwar PK, Jhingran AG. Inland fishes of India and adjacent countries, vol. 2. IBH publishing Co. Pvt., Ltd., New Delhi. 1991, 1158.
6. Francis D. The Fishes of India, Jagmander Book Agency, New Delhi, 1994.
7. Shrivastava G. Fishes of U.P. and Bihar, Sevnth edition, Vishwavidalaya Prakashan, Chowk Varanasi India Pub 1998.
8. Rahman AKA. Freshwater fishes of Bangladesh, second edition. Zoological Society of Bangladesh, Department of Zoology, University of Dhaka, Dhaka-1000, 2005, 263.
9. Hossain MS, Das NG, Chowdhury MSN. Fisheries management of the Naaf River. Chittagong, Coastal and Ocean Research Group of Bangladesh, 2007, 257.
10. IUCN World Red List of Threatened Species, 2015. <www.iucnredlist.org>. IUCN Bangladesh. Bangladesher Bipanno Bonno Prani (Threatened wild animals of Bangladesh). International Union for Conservation of Nature and Natural Resources, The world conservation Union, Dhaka, 2003, 294.
11. Flowra FA, Islam MA, Jahan SN, Samad MA, Alam MM. Status and decline causes of fishing activities of the Baral river, Natore, Bangladeh. Journl of Science Foundation 2011; 9(1&2):115-124.
12. Ali MM, Das BC, Islam SMA, Masud MA, Rahman MZ. Fishing gears and crafts used by the fishers at Lohalia River in Patuakhali. Journal of Environmental Science & Natural Resources. 2014; 7(2):169-175.
13. Siddique AB, Saha D, Rahman M, Hossain MB. Fishing gears of the Meghna river estuary of Chandpur region, Bangladesh. Trends in Fisheries Research, an International Peer Reviewed Journal. 2013; 2(1):2319–4758.
14. Sayeed MA, Hashem S, Salam MA, Hossain MAR, Wahab MA. Efficiency of fishing gears and their effects on fish biodiversity and production in the Chalan Beel of

Bangladesh. European Scientific Journal. 2014; 10(30):1857-7431.
15. Khan MAR, Miah MI, Hossain MB, Begum A, Minar MH, Karim R. Fish biodiversity and livelihood status of fishing community of Tista River, Bangladesh. Global Veterinaria, 2013; 10(4):417-423.
16. Mohsin ABM, Yeasmin F, Galib SM, Alam B, Haque SMM. Fish fauna of the Andharmanik River in Patuakhali, Bangladesh. Middle-East Journal of Scientific Research. 2014; 21(5):802-807.
17. Galib SM, Naser SMA, Mohsin ABM, Chaki N, Fahad FH. Fish diversity of the River Choto Jamuna, Bangladesh: Present status and conservation needs. International Journal of Biodiversity and Conservation, 2013; 5(6):389-395.