

## Availability of Threatened fishes at different fish markets of Northeast Bangladesh

Marjana Jannat Munni, Md. Zamal Hussan, Sanjida Akther, Koli Rani Paul, Abul Hasnat Abdullah, Suhel Das, Toma Chowdhury, Tayeeba Ferdous Mahi, Taposi Sinha and Shamima Nasren\*

*Department of Fish Biology and Genetics, Faculty of Fisheries, Sylhet Agricultural University, Sylhet-3100.*

*\*Corresponding author: snasren-fbg@sau.ac.bd*

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### ABSTRACT

A four month survey was conducted in twelve fish markets of Narsingdi Sadar, Sylhet Sadar and Moulvibazar Upazila of Bangladesh. The survey was conducted from September to December 2020 in attempt to understand the current status of threatened fish species availability in those localities of Bangladesh. Fish markets were visited fortnightly. In Narsingdi Sadar fish markets, one (01) fish species of critically endangered, ten (10) endangered fish species and nine (09) vulnerable fish species were observed. In Sylhet Sadar fish markets one critically endangered fish species, eight endangered fish species and ten vulnerable fish species were found. Fish markets surveyed in Moulvibazar were observed with two critically endangered, eight endangered and five vulnerable fish species. Availability and price of fishes varied in all surveyed markets. Some conservation methods and consumers knowledge on awareness could improve the availability of endangered fishes.

**Keywords:** Availability; critically endangered; endangered; fish market; vulnerable

### INTRODUCTION

Bangladesh is bestowed with numerous rivers, haors, baors, beels and wetlands. This vast water body provides a great amount of fisheries resources that fulfill our food demand and contribute to national economy. The position of Bangladesh in fish production is 3rd around the world in inland capture production according to FAO [1] and 2nd in freshwater fish production around the world. Fisheries sector provides 60% of annual protein supply as well as employment facilities for about 11% of total population [2]. The country's inland open water fisheries are divided into the culture and capture fisheries. In the early 70s-80s capture fisheries used to provide more than culture fisheries in total fish production. But in the last two decades due to the development of aquaculture techniques and reduction in capture fisheries, culture fisheries provide more in total fish production than capture fisheries. Due to over exploitation of fisheries resources, illegal fishing methods, urban development and habitat destruction etc. reasons capture fisheries has significantly reduced over the past decades. Not only capture fish production have reduced but some indigenous fish species has become extinct and some faces the risk of extinction. According to IUCN [3], in the redlist, a total of 253 fishes were assessed of which 64 fish species are considered as threatened species. Several researchers [4-6] reported ichthyofaunal diversity from water resources of the north-eastern part of Bangladesh. Study about availability of endangered fish species through local market based survey in the Northeast Bangladesh is not enough and more research is needed to be carried out. The study was conducted to understand the current status of threatened fish species availability in selected markets of Northeast Bangladesh.

## MATERIALS AND METHODS

### Study site

The present study was conducted in twelve markets from three different Upazilas – Narsingdi Sadar (Noyabazar and Velanagar bazar fish market), Sylhet Sadar (Kazirbazar, Tilagor bazar, Shibgonj bazar, Kashdobir bazar, Lal bazar and Baluchor Noya bazar) and Moulvibazar (Chadnighat fish market, TC market, Poschim bazar fish market, KaminyGonj bazar and UttorVobanipur bazar) for the collection of data. The data was gathered over four months period from September to December, 2020. Data were analyzed using MS Excel. Threatened fish specimens were identified at the survey sites itself. Several unidentified fishes were brought to laboratory and kept in preservatives for further identification. The taxonomic keys were used for identification of the specimen [7-9].

### Fish Market process

A fish market is the set of suppliers and demander who's trading establishes the price of fish [10]. Local market of Narsingdi Sadar, Sylhet Sadar and Moulvibazar district were visited for the survey. Each day, these markets receive a considerable amount of fish from the local fisherman, local fish culture ponds, haor, beels, river and some other imported from different regions of Bangladesh. In most situations the simplified distribution chain for fish is fisherman – wholesaler – retailer – consumer [11].

## RESULTS

### Availability of Fish in Narsingdi Sadar, Sylhet Sadar and Moulvibazar Upazila

A total of 23 fish species from 64 threatened fish species were found from all survey areas. The cumulative data from study sites are provided in Table 1.

**Table 1:** Available critically endangered, endangered and vulnerable fish species observed in fish markets of Narsingdi Sadar, Sylhet Sadar and Moulvibazar Upazila

Sl No.	Scientific Name	English Name	Local Name	Status	Source	Narsingdi Sadar	Sylhet Sadar	Moulvibazar
1.	<i>Bagariusbagarius</i> (Hamilton, 1822)	GangeticGoonch , Devil Catfish	Baghair, Baghari, Bagh Mach	CR	River	+	++	+
2.	<i>Ompokpabo</i> (Hamilton, 1822)	Pabo Catfish	Kala Pabda	CR	River, beel	-	-	+
3.	<i>Botiadariorio</i> (Hamilton, 1822)	Necktie Loach, Queen Loach	Rani Mach, Bou Mach	EN	River, beel	++	++	++
4.	<i>Botialohachata</i> (Chaudhuri, 1912)	Y-loach, Reticulate Loach	Rani, Putul, Beti	EN	River, beel	-	-	+
5.	<i>Clupisomagaruua</i> (Hamilton, 1822)	GaruaBacha, Gagra	Ghaura, Gharua	EN	River	++++	++	-
6.	<i>Chitalachitala</i> (Hamilton, 1822)	Clown Knife Fish	Chital	EN	River	++++	++++	++++
7.	<i>Channamarulius</i> (Hamilton, 1822)	Giant Snakehead	Gajar, Gajal, Gajori	EN	River	++	++	++
8.	<i>Rita rita</i> (Hamilton, 1822)	Rita	Rita	EN	River	++	+++	++

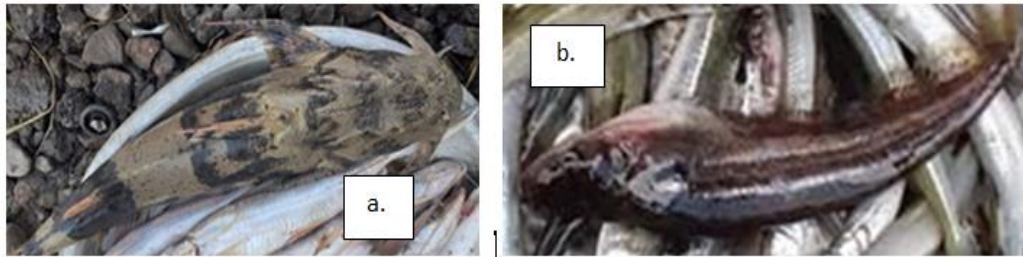
9.	<i>Chacachaca</i> (Hamilton, 1822)	Square Head Catfish	Chaka, Gangainna, Chaka Veka	EN	River	+	-	-
10.	<i>Ompokbimaculatus</i> (Bloch, 1794)	Butter Catfish, Two Spot Glass Catfish	KaniPabda, BoaliPabda	EN	River, Culture pond	++++	++++	++++
11.	<i>Ompokpabda</i> (Hamilton, 1822)	Pabda Catfish, Two Stripe Gulper Catfish	Pabda, Madhupabda, Paibba	EN	River, beel	+	-	-
12.	<i>Pangasius Pangasius</i> (Hamilton, 1822)	Pungas, Yellowtail Catfish	Pangas, Pangwash	EN	River, Culture pond	++++	++++	++++
13.	<i>Mastacembelusarmatus</i> (Lacepède, 1800)	Tire-track Spiny Eel	Baim, Sal Baim,	EN	River	++++	++++	++++
14.	<i>Gudusiachapra</i> (Hamilton, 1822)	Indian River Shad	Chapila, Chaipila	VU	River, beel	++++	++++	++++
15.	<i>Lepidocephalichthysannandalei</i> (Chaudhuri, 1912)	Annaldale Loach	Gutum, Puiya	VU	River, beel	++++	+++	-
16.	<i>Notopterus Notopterus</i> (Pallas, 1769)	Grey Feather back, Fresh water Knife Fish	Foli, Haila, Kanla	VU	River, haor	++++	++++	++++
17.	<i>Eugnathogobius Oligactis</i> (Bleeker, 1875)	Tiger Goby	Bele	VU	River, beel	++++	+++	-
18.	<i>Sperataaor</i> (Hamilton, 1822)	Long whiskered Catfish	Air, Ayre, Bhangat, TallaAyre	VU	River, haor	+++	++	+++
19.	<i>Speratasenghala</i> (Sykes, 1839)	Giant River Catfish	Guji, Guijja, GuijjaAyre, Bhangat	VU	River, haor	++	++	++
20.	<i>Wallagoattu</i> (Bloch & Schneider, 1801)	Freshwater Shark	Boal, Boali,, Patari, Boyari, Boyair, Keyali	VU	River, haor	++++	++++	++++
21.	<i>Pethiaticto</i> (Hamilton, 1822)	Two-spot Barb, Firefin Barb, Ticto Barb	Tit punti	VU	River, beel	+++	++++	-
22.	<i>Labeoariza</i> (Hamilton, 1807)	ArizaLabeo	Lasso, Raik, Bata	VU	River	++	+	-
23.	<i>Monopterusucuchia</i> (Hamilton, 1822)	Gangetic Mud Eel; Swamp Eel	Kuchia, Cuchia, Kuicch	VU	River, culture	-	+	-

(CR = Critically endangered, EN = Endangered, VU = Vulnerable)

(Symbol used: '++++' = highly available, '+++ = moderately available, '++' = less available, '+' = rarely available '-' = not available)

**Critically endangered fish species**

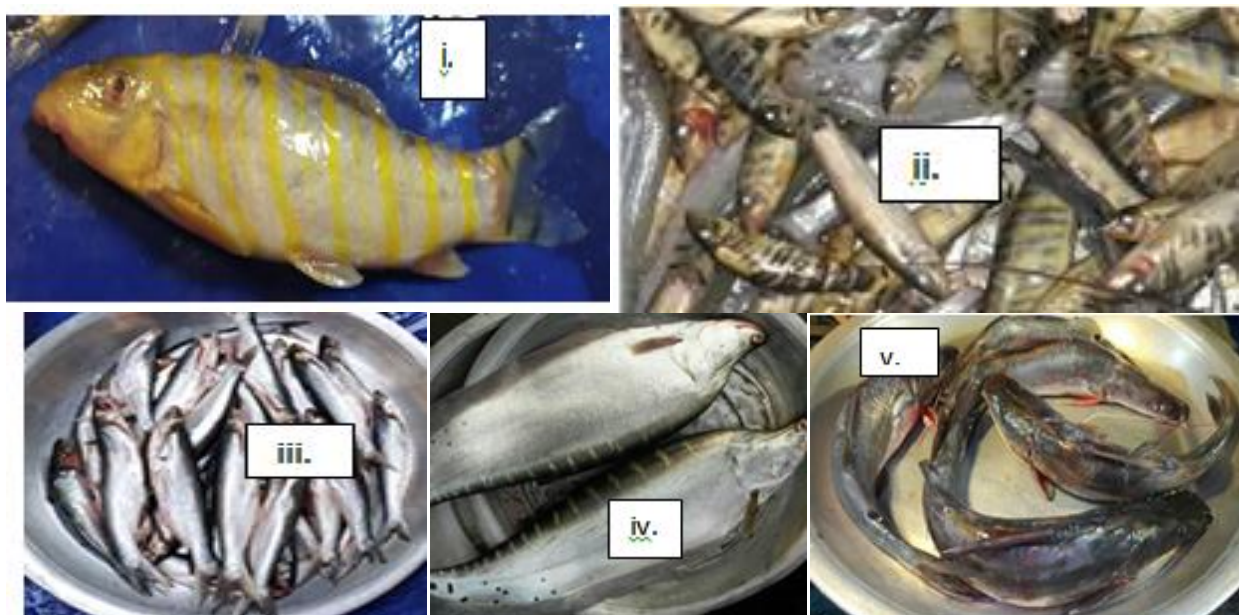
According to IUCN (2015) [3], there are 9 fish species which fall into critically endangered criteria. Two critically endangered fish species *Bagariusbagarius* (Hamilton, 1822) and *Ompokpabo* (Hamilton, 1822) were observed during the study. *Bagariusbagarius* (Hamilton, 1822) was found in fish markets of all three areas. This species was less available in fish markets of Sylhet Sadar and was rarely available in fish markets of Narsingdi Sadar and Moulvibazar Upazila. *Ompokpabo* (Hamilton, 1822) was observed in only fish markets of Moulvibazar Upazila and rarely available in Moulvibazar Upazila whereas it was not available in Narsingdi Sadar and Sylhet Sadar fish markets.



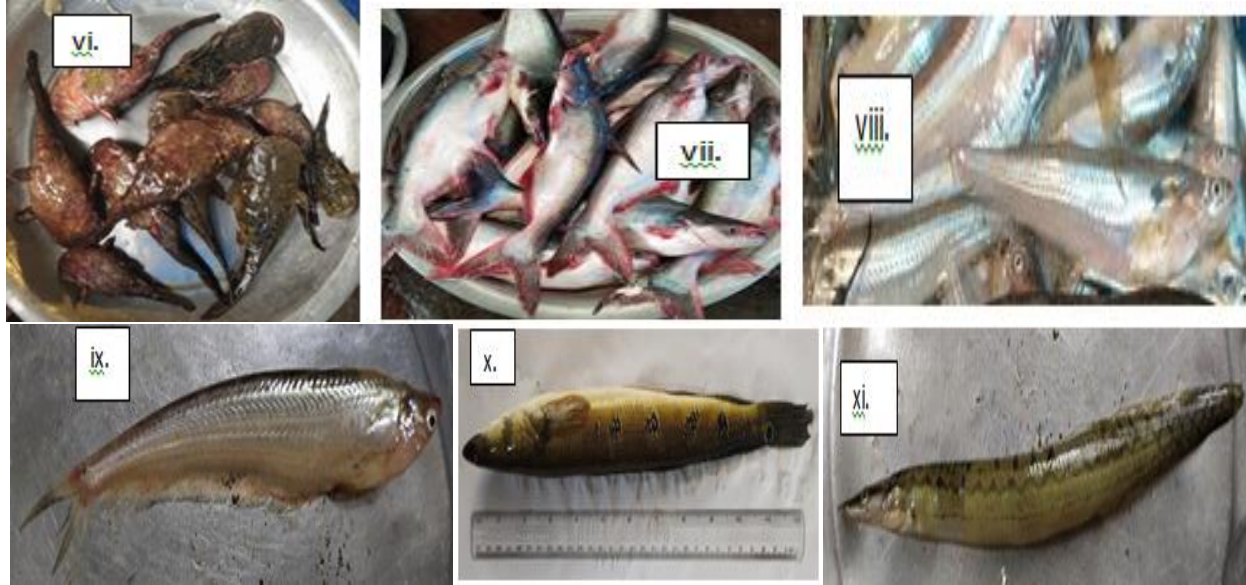
**Figure 1:** a. *Bagariusbagarius* (Hamilton, 1822) and b. *Ompokpabo*(Hamilton, 1822)

**Endangered fish species**

According to IUCN (2015) [3], 30 fish species fall into endangered criteria and only 11 endangered fish species were observed during the study. *Chitalachitala* (Hamilton, 1822), *Pangasiuspangasius* (Hamilton, 1822), *Ompokbimaculatus* (Bloch, 1794) and *Mastacembelusarmatus* (Lacepède, 1800) were found in fish markets of all three areas and were highly available in all areas. *Botia Dario* (Hamilton, 1822), *Rita rita* (Hamilton, 1822) and *Channamarulius* (Hamilton, 1822) were also found in fish markets of all three areas but less available in all areas; whereas only *Rita rita* (Hamilton, 1822) were moderately available in SylhetSadar compared to other two areas. *Botialohachata* (Chaudhuri, 1912) was only found in fish markets of Moulvibazar Upazila and rarely available in that area. *Chacachaca* (Hamilton, 1822) and *Ompokpabda* (Hamilton, 1822) were only observed in fish markets of Narsingdi Sadar while both were rarely available. *Clupisomagarua* (Hamilton, 1822) was not observed in fish markets of Moulvibazar Upazila but was moderately available in fish markets of Sylhet Sadar and Narsingdi Sadar.



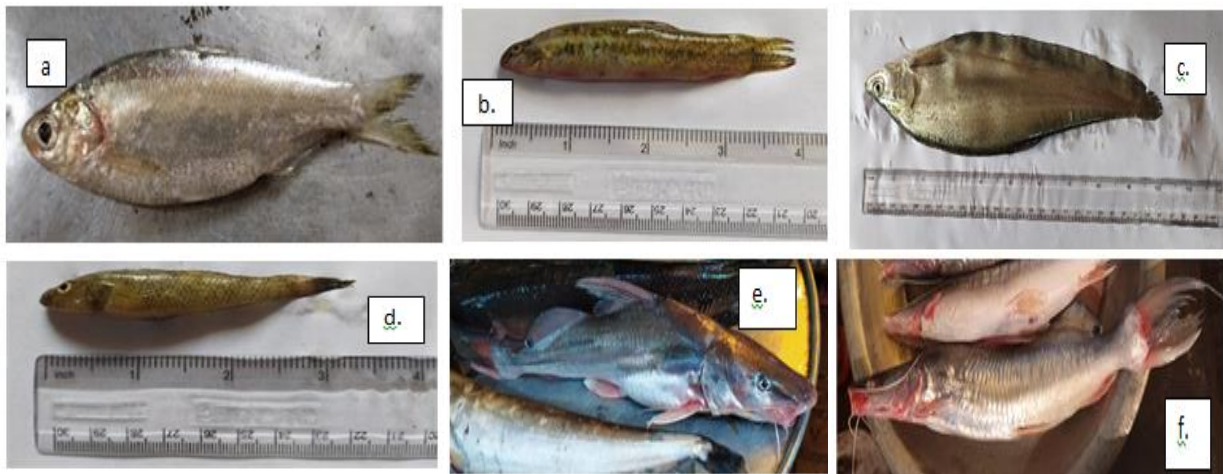




**Figure 2:** i. *Botia Dario* (Hamilton, 1822), ii. *Botialohachata* (Chaudhuri, 1912), iii. *Clupisomagarua* (Hamilton, 1822), iv. *Chitalachitala* (Hamilton, 1822), v. *Rita rita* (Hamilton, 1822), vii. *Chacachaca* (Hamilton, 1822), vii. *Pangasiuspangasius* (Hamilton, 1822), viii. *Ompokbimaculatus* (Bloch, 1794), ix. *Ompokpabda* (Hamilton, 1822), x. *Channamarulius* (Hamilton, 1822), xi. *Mastacembelusarmatus* (Lacepède, 1800).

**Vulnerable fish species**

According to IUCN red list 2015 [3], 25 fish species fall into vulnerable criteria and among which only 9 fish species were observed during the study. *Gudusia chapra* (Hamilton, 1822), *Notopterus notopterus* (Pallas, 1769) and *Wallago attu* (Bloch & Schneider, 1801) were observed in fish markets of all three areas and were highly available in all three areas. *Lepidocephalichthysannandalei* (Chaudhuri, 1912) and *Eugnathogobius Oligactis* (Bleeker, 1875) were observed in fish markets of Sylhet Sadar and Narsingdi Sadar. Both species were highly available in Narsingdi Sadar and moderately available in Sylhet Sadar. *Sperata aor* (Hamilton, 1822) was found in fish markets of all three areas and was moderately available in Narsingdi Sadar and Moulvibazar Upazila and less available in Sylhet Sadar. *Sperata seenghala* (Sykes, 1839) was found in fish markets of all three areas and is less available in all three areas. *Pethia ticto* (Hamilton, 1822) was found in fish markets of Narsingdi Sadar and Sylhet Sadar and was highly available in Sylhet Sadar and moderately available in Narsingdi Sadar. *Labeo ariza* (Hamilton, 1807) was found in fish markets of Narsingdi Sadar and Sylhet Sadar and was less available in those fish markets. *Monopterusuchia* (Hamilton, 1822) was only found in fish markets of Sylhet Sadar and are rarely found.



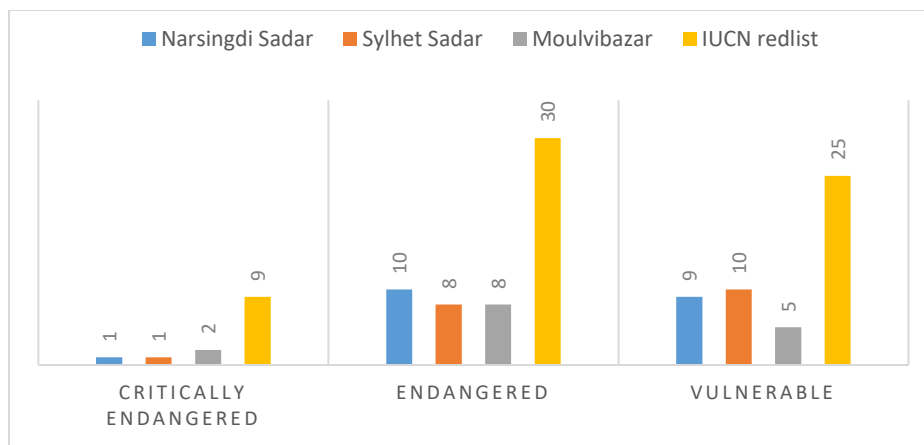


**Figure 3:** a. *Gudusia chapra* (Hamilton, 1822), b. *Lepidocephalichthys annandalei*(Chaudhuri, 1912), c. *Notopterus notopterus* (Pallas, 1769), d. *Eugnathogobius oligactis*(Bleeker, 1875), e. *Sperata aor* (Hamilton, 1822), f. *Sperata seenghala* (Sykes, 1839), g. *Wallago attu* (Bloch & Schneider, 1801), h. *Pethia ticto* (Hamilton, 1822), i. *Labeo ariza* (Hamilton, 1807).

**DISCUSSION**

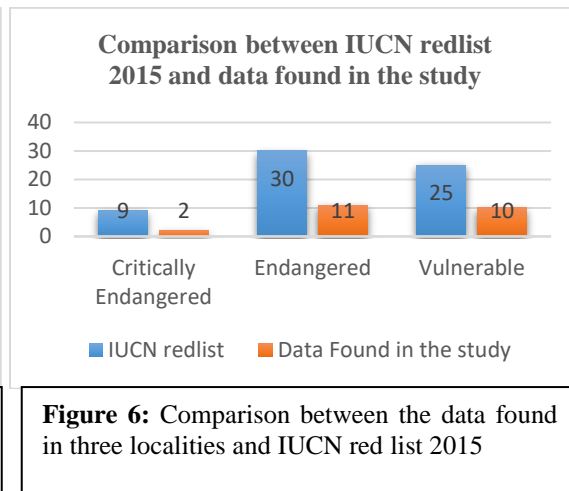
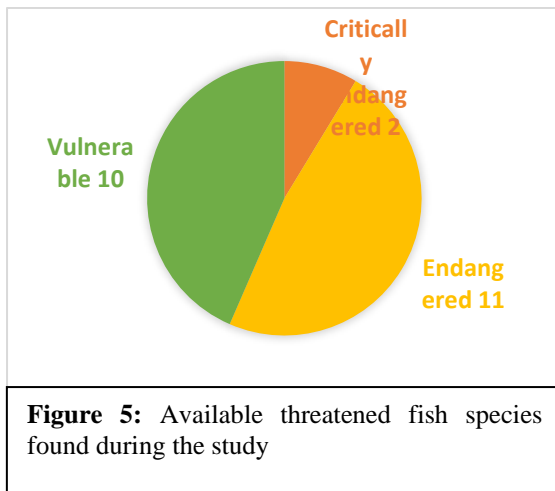
All the 23 threatened fish species observed from all the twelve markets during the study was provided in the table 1 with dominance of availability and biodiversity criteria was followed by Lakra et al. [12]. Even though there are several methods of assessing fish conservation status followed the five criteria set by IUCN redlist and any one of the five criteria needed to fulfilled for a species to be considered threatened [12]. These five criteria are: (a) Population reduction, (b) Restricted distribution, (c) Population estimates, (d) Restricted population and (e) Probability of extinction. Twelve (12) vulnerable, 18 endangered and 11 critically endangered freshwater fish species were found from a study conducted in Hakalukihaor, Sylhet [4]. Pandit et al. [13] found 3 critically endangered, 11 endangered and 10 vulnerable fish species in Dekharhaor in Sunamganj District. Maria et al. [14] documented 17 endangered, 13 were vulnerable and 8 critically endangered fish species. Islam et al. [15] found 10 endangered, 10 vulnerable and 3 critically endangered fish species in SylhetSadar. Ahammad et al. [16] identified 4 vulnerable, 3 endangered in Shatghari point of Surma River in Golapgonj, Sylhet. Majumdar et al. [17] identified 5 vulnerable fish species in ChinadiBeel in Narsingdi District. Begum et al. [18] identified only 1 vulnerable fish species *Notopterusnotopterus* (Pallas, 1769) in Meghna river in Narsingdi district. Hasan et al. [19] identified 5 endangered and 2 vulnerable fish species in Kishoreganj District.

According to IUCN red list 2015, 9 fish species fall into critically endangered criteria, 30 fish species into endangered criteria and 25 fish species into vulnerable criteria. In our present study in Narsingdi Sadar Upazila 1 critically fish species, 10 endangered fish species and 9 vulnerable fish species were observed. In Sylhet Sadar Upazila 1 critically endangered fish species, 8 endangered fish species and 9 vulnerable fish species were observed. In Moulvibazar Upazila 2 critically endangered fish species, 8 endangered fish species and 5 vulnerable fish species were observed (Figure 4).



**Figure 4:** Available threatened fish species in all the Upazilas

In this study total 2 critically endangered fish species, 11 endangered fish species and 10 vulnerable fish species were found in all the Upazilas. Among 2 critically endangered fish species observed *Bagarius bagarius* (Hamilton, 1822) was less available and *Ompokpabo* (Hamilton, 1822) was rarely found. While other 7 critically endangered species was not available indicates that these species are not abundant in these areas and only can be rarely found. Among 11 endangered fish species observed some are highly available and some are less or rarely available. Less or rare availability of species like *Botia Dario* (Hamilton, 1822), *Rita rita*(Hamilton, 1822) and *Channamarulius* (Hamilton, 1822), *Botialohachata* (Chaudhuri, 1912), *Chacachaca* (Hamilton, 1822) and *Ompokpabda* (Hamilton, 1822) indicates population reduction and their decreasing abundance in nature. Among 10 vulnerable fish species observed only 3 species *Gudusia chapra* (Hamilton, 1822), *Notopterus notopterus* (Pallas, 1769) and *Wallago attu* (Bloch & Schneider, 1801) were highly available. *Lepidocephalichthysannandalei* (Chaudhuri, 1912) and *EugnathogobiusOligactis* (Bleeker, 1875) were highly available in Sylhet Sadar and Narsingdi Sadar. Even though it is not found in MoulvibazarUpazila, it is not rare there and lack of availability may be due to the limited study period. Though *Monopterusuchia* (Hamilton, 1822)is found in all three areas, but always not available in markets due to lack of poor consumer acceptability. The result found in this current study is significantly less compared to the IUCN red list 2015. This may be due to the limited study time period. All species are not available all the year-round and some are only found rarely. A more frequent and more extended period study could give better results as during questionnaire survey with the seller it was found that some more species like *Monopterusuchia* (Hamilton, 1822), *Amblyceplaticeps* (McClelland, 1842),*Awaousgrammepomus*(Bleeker, 1849), *Sicamugilcascasia*(Hamilton, 1822) are found sometimes. In contrast, species like *Ophisternonbengalense* (McClelland, 1844), *Microphisuncalus*(Hamilton, 1822), *Microphisdeocata*(Hamilton, 1822),*Channabarca*, *Neoecirrhichthysmaydelli* (Bănărescu&Nalbant, 1968) are hardly found.



The price range of the fishes varies according to time, season and abundance. A price list of some fishes which were highly abundant during the study period conducted is given below.

**Table 2:** Fish species price list

Species name	Price(Tk/Kg)
<i>Ompokbimaculatus</i> (Bloch, 1794)	300-350
<i>Chitalachitala</i> (Hamilton, 1822)	500-600
<i>Clupisomagarua</i> (Hamilton, 1822)	300-350
<i>Notopterusnotopterus</i> (Pallas, 1769)	250-300
<i>Rita rita</i> (Hamilton, 1822)	500-600
<i>Wallagoattu</i> (Bloch & Schneider, 1801)	550-600

<i>Mastacembelusarmetus</i> (Lacepède, 1800)	500
<i>Chaka chaka</i> (Hamilton, 1822)	200-250
<i>Gudusiachapra</i> (Hamilton, 1822)	200-250
<i>Pangasiuspangasius</i> (Hamilton, 1822)	120-130

Species like *Bagariusbagarius* (Hamilton, 1822), *Channamarulius* (Hamilton, 1822), *Eugnathogobiusoligactis* (Bleeker, 1875) have high market demand and are less abundant so prices vary due to abundance. Small species like *Botiadari*(Hamilton, 1822), *Lepidocephalusguntea*(Hamilton, 1822), *Lepidocephalichthysannandalei*(Chaudhuri, 1912), *Pethiaticto* (Hamilton, 1822) are sold in a mixture with various small fish species.

## CONCLUSION

Conservation of fish species is very much essential not only for consumption purpose but also for biodiversity concerns. Threatened fish species are at great risk of extinction as they are overexploited and less has been done to conserve them. To understand the current status of threatened fish species frequent survey all over Bangladesh can be a great tool. Understanding the reason of threat and taking conservation method can only protect these fish species. Breeding program has been developed for many threatened fish species and wide spread culture of them can help in enhancing the species. In this study we have observed the current status of these threatened species in three different areas local fish markets. The data found was alarming and indicated that preventive measures needed to be taken immediately to protect these species.

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