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Wasima Rahman
M.Sc. 4th Semester Student, Department of Zoology, Pandu College, Guwahati-12, Assam, India.

Rajashree Deka
B.Sc. 6th Semester, Department of Zoology, Pandu College, Guwahati-12, Assam, India.

Bodheswar Kalita
Associate Professor, Department of Zoology, Morigaon College, Morigaon, Assam, India.

Parag Deka
Assistant Professor (Sr.), Department of Zoology, Pandu College, Guwahati-12, Assam, India.

Correspondence
Parag Deka
Assistant Professor (Sr.), Department of Zoology, Pandu College, Guwahati-12, Assam, India.

A comparative study on ichthyofaunal resource of Charan and Manaha Beel of Morigaon District of Assam, India

Wasima Rahman, Rajashree Deka, Bodheswar Kalita and Parag Deka

Abstract
The study relates to the ichthyofaunal resource of two Beels of Morigaon District, Assam, India. Altogether 65 fish species including 5 exotic species belonging to 43 genera under 21 families from 7 orders is recorded from two Beels where 64 species are recorded from Charan Beel and 53 from Manaha Beel. In both the beels 1 species is recorded as endangered as well as data deficient. However, 51 species are recognised as LRlc, 6 as LRnt and other 5 are not evaluated in Charan Beel whereas in Manaha Beel, 44 species has been recorded as LRlc, 4 as LRnt and other 3 species are not evaluated. The taxonomic study shows that Cyprinidae is the dominant family with 23 species contributing 35.94% in Charan and 18 species (33.96%) in Manaha followed by Bagridae (10.94% and 11.32% in Charan and Manaha Beel respectively) and Channidae (7.81% in Charan and 9.43% in Manaha).

Keywords: Charan Beel, Manaha Beel, Ichthyofaunal resource, Morigaon District

1. Introduction
The Northeast India is blessed with varied type of water resources in the form of rivers (19,150 Km), reservoirs (23,792 ha); beels, lakes and swamps (143,740 ha); ponds and mini barrage (40,808 ha) and low laying paddy cum fish culture systems (2,780 ha) (Mahanta *et al.* 2003) [11]. Therefore, from the fish diversity point of view, this region of the country is very rich with 267 fresh water fish species belonging to 114 genera under 38 families and 10 orders (Mahanta *et al.* 2003) [11], which is 33.13% (approximately) of the total freshwater fishes of India (Sen, 2000) [14]. In Assam, Brahmaputra and Barak are the two major drainage systems with lots of flood-plain wetlands exhibiting enormous diversity of fish fauna supported by the subtropical climatic condition, favourable ecological and geographical condition with about 3.9 lakh hector of water area with wealthy aquatic biodiversity having the largest number of fish species (217), followed by Arunachal Pradesh (167), Meghalaya (165), Tripura (134), Manipur (121), Nagaland (68), Sikkim (52) and Mizoram (48) (Mahanta *et al.* 2003) [11].
The fishes not only provide nutrition but also generate economy and livelihood for the poor people. The wetlands and lakes are major fishery resources of Assam contributing to about 25% of the fish production (Chakravartty *et al*., 2012) [3]. The present study is therefore, an attempt to investigate the ichthyofaunal diversity of two beels *viz.* Charan Beel and Manaha Beel located at Morigaon District of Assam, India.

2. Materials and Method
2.1. Study area: During the study period the investigation were conducted on the two beel named Charan Beel and Manaha Beel of Morigaon district of Assam. Charan Beel (Latitude $25^0 30^{//}$ North and Longitude 92^0 $15^{//}$ East) is situated about 7 km away from the Morigaon town and Manaha Beel (Latitude $25^0 30^{//}$ North and Longitude 92^0 $15^{//}$ East) is about 4 km away from the same town. Both the Beels are in the Southern bank of the river Brahmaputra in Assam. The present work was based on the studies carried out for a period of 12 months, commencing from April, 2015 to March, 2016.

2.2. Landing sites: During the study period fish samples were collected from 4 different landing sites; two from Charan Beel (Bashnaghat and Baghara) and another two from Manaha Beel (Aujari and Manaha).

2.3. Data collection from local fisherman: Occurrence of the fish species other than collected directly from the four sites of two beels were collected and recorded from local fisher by interviewing them with the help of questionnaires.

2.4. Collection, photography and identification of fish: Fishes were collected in live condition for photography. Photographs were taken by digital camera placing them in a clean paper with a scale along the length of the specimen. The collected fishes were preserved in 10% formaldehyde solution for further confirmation in identification. The specimens were identified following Talwar and Jhingran, 1991 [15]; Jayaram, 1999 [8]; Vishwanath, 2002 [16].

3 Results

A total of 65 species of fishes have been recorded from the studied beels belonging to 43 genera, 21 families and 7 orders (Table-1) with IUCN status.

Table 1: Fish fauna of Charan and Manaha Beel with their IUCN status (√ indicates presence and X indicates absence)

Sl. No.	Order (Family)	Species	Local Name	Iucn Status	Charan Beel	Manaha Beel
1	Beloniformes (Belonidae)	*Xenentodon cancila* (Ham.-Buch.)	Kokila	LRlc	√	√
2	Clupeiformes (Clupeidae)	*Gudusia chapra*(Ham.-Buch.)	Koroti	LRlc	√	√
3	Cypriniformes (Cyprinidae)	*Gibelion catla* (Ham.-Buch.)	Bhokua	LRlc	√	√
4	Cypriniformes (Cyprinidae)	*Cirrhinus reba*(Ham.-Buch.)	Lachim	LRlc	√	√
5	Cypriniformes (Cyprinidae)	*Cabdio morar* (Hamilton)	Boriola	LRlc	√	√
6	Cypriniformes (Cyprinidae)	*Labeo bata*(Ham.-Buch.)	Bhangone	LRlc	√	√
7	Cypriniformes (Cyprinidae)	*Labeo rohita* (Ham.-Buch.)	Rou	LRlc	√	√
8	Cypriniformes (Cyprinidae)	*Labeo calbasu* (Hamilton)	Bahu	LRlc	√	√
9	Cypriniformes (Cyprinidae)	*Labeo gonius* (Ham.-Buch.)	Kurhi	LRlc	√	√
10	Cypriniformes (Cyprinidae)	*Bangana dero*(Hamilton)	Naro	LRlc	√	X
11	Cypriniformes (Cyprinidae)	*Labeo nandina*(Hamilton)	Nandani	LRnt	√	X
12	Cypriniformes (Cyprinidae)	*Osteobrama cotio*(Ham.-Buch.)	Hato	LRlc	√	√
13	Cypriniformes (Cyprinidae)	*Puntius sophore* (Ham.-Buch.)	Puthi	LRlc	√	√
14	Cypriniformes (Cyprinidae)	*Pethia ticto* (Hamilton)	Kaniputhi	LRlc	√	X
15	Cypriniformes (Cyprinidae)	*Puntius javanicus* (Bleeker)	Java puthi	NE	√	X
16	Cypriniformes (Cyprinidae)	*Puntius chola*(Hamilton)	Puthi	LRlc	√	X
17	Cypriniformes (Cyprinidae)	*Rasbora daniconius* (Ham.-Buch.)	Darikona	LRlc	√	√
18	Cypriniformes (Cyprinidae)	*Rasbora elenga* (Hamilton)	Eleng	LRlc	X	√
19	Cypriniformes (Cyprinidae)	*Amblypharyngodon mola (Ham-Buch)*	Moa	LRlc	√	√
20	Cypriniformes (Cyprinidae)	*Systomus sarana* (Ham.-Buch.)	SeniPuthi	LRlc	√	√
21	Cypriniformes (Cyprinidae)	*Cirrhinus mrigala* (Ham.-Buch.)	Mirika	LRlc	√	√
22	Cypriniformes (Cyprinidae)	*Ctenopharyngodon idella* (Valenciennes)	Grass Carp	NE	√	√
23	Cypriniformes (Cyprinidae)	*Hypopthalmichthys molitrix*(Valenciennes)	Silver carp	NE	√	√
24	Cypriniformes (Cyprinidae)	*Cyprinus carpio* (Linnaeus)	Common carp	NE	√	X
25	Cypriniformes (Cyprinidae)	*Hypopthalmichthys nobilis*	Big head carp	NE	√	√
26	Cypriniformes (Cyprinidae)	*Salmostoma bacaila* (Hamilton)	Selkona	LRlc	√	√
27	Cypriniformes(Cobitidae)	*Lepidocephalichthys guntea (Ham- Buch)*	Batia	LRlc	√	√
28	Cypriniformes(Nemacheilidae)	*Acanthocobitis botia*(Hamilton)	Gethu	LRlc	√	X
29	Cypriniformes(Botiidae)	*Botia dario*(Hamilton)	Baghmach	LRlc	√	√
30	Perciformes (Ambassidae)	*Chanda nama*(Ham.-Buch.)	Chanda	LRlc	√	√
31	Perciformes (Ambassidae)	*Parambassis ranga*(Hamilton)	Chanda	LRlc	√	√
32	Perciformes(Anabantidae)	*Anabas testudineus* (Bloch)	Kawoi	DD	√	√
33	Perciformes(Nandidae)	*Nandus nandus*(Hamilton)	Gadgedi	LRlc	√	X
34	Perciformes(Channidae)	*Channa orientalis*(Bloch & Schneider)	Chengeli	LRlc	√	√
35	Perciformes(Channidae)	*Channa punctata*(Bloch)	Goroi	LRlc	√	√
36	Perciformes(Channidae)	*Channa gachua*(Ham.-Buch.)	Cheng	LRlc	√	√
37	Perciformes(Channidae)	*Channa striata* (Bloch)	Sol	LRlc	√	√
38	Perciformes(Channidae)	*Channa marulius*(Hamilton)	Sal	LRlc	√	√
39	Perciformes(Gobiidae)	*Glossogobius giuris* (Ham.-Buch.)	Patimutura	LRnt	√	√
40	Perciformes(Osphronemidae)	*Trichogaster fasciata* (Schneider)	Kholihona	LRlc	√	√
41	Perciformes(Osphronemidae)	*Trichogaster lalius*(Ham.-Buch.)	Kholihona	LRlc	√	√
42	Perciformes(Osphronemidae)	*Trichogaster chuna*(Hamilton)	Vesseli	LRlc	√	√
43	Perciformes(Osphronemidae)	*Trichogaster labiosa*(Day)		LRlc	√	X
44	Siluriformes(Bagridae)	*Mystus cavasius* (Ham.-Buch.)	Singora	LRlc	√	√
45	Siluriformes(Bagridae)	*Mystus tengara* (Ham.-Buch.)	Singora	LRlc	√	√
46	Siluriformes(Bagridae)	*Mystus carcio*(Hamilton)	Singora	LRlc	√	√
47	Siluriformes(Bagridae)	*Mystus vittatus* (Bloch)	Singora	LRlc	√	√
48	Siluriformes(Bagridae)	*Mystus bleekeri*(Day)	Singora	LRlc	√	√
49	Siluriformes(Bagridae)	*Sperata seenghala* (Sykes)	Ari	LRlc	√	√
50	Siluriformes(Bagridae)	*Rita rita*(Hamilton)	Ritha	LRlc	√	X
51	Siluriformes(Clariidae)	*Clarias magur* (Linnaeus)	Magur	EN	√	√
52	Siluriformes(Heteropneustidae)	*Heteropneustes fossilis* (Bloch)	Singhi	LRlc	√	√
53	Siluriformes(Schilbeidae)	*Pachypterus atherinoides* (Bloch)	Bordowa	LRlc	√	X
54	Siluriformes(Schilbeidae)	*Clupisoma garua* (Hamilton)	Neria	LRlc	√	√
55	Siluriformes(Schilbeidae)	*Ailia coila* (Hamilton)	Kajoli	LRnt	√	X
56	Siluriforme (Siluridae)	*Wallago attu* (Schneider)	Barali	LRlc	√	√
57	Siluriformes(Siluridae)	*Ompakpabda*(Hamilton)	Pavo	LRnt	√	√
58	Siluriformes(Siluridae)	*Ompak bimaculatus* (Bloch)	Pavo	LRnt	√	√

59	Siluriformes(Sisoridae)	*Bagarius bagarius*(Hamilton)	Goruamach	LRlc	√	√
60	Synbranchiformes(Synbranchidae)	*Monopterus cuchia* (Ham.-Buch.)	Kuchia	LRlc	√	√
61	Synbranchiformes(Mastacembelidae)	*Mastacembelus armatus* (Lacepede)	Bami/Gosi	LRlc	√	√
62	Synbranchiformes(Mastacembelidae)	*Macrognathus aral* (Bloch & Schneider)	Turi	LRlc	√	√
63	Synbranchiformes(Mastacembelidae)	*Macrognathus pancalus* (Ham.-Buch.)	Turi	LRlc	√	√
64	Osteoglossiformes(Notopteridae)	*Notopterus notopterus*(Ham.-Buch.)	Kandhuli	LRlc	√	√
65	Osteoglossiformes(Notopteridae)	*Chitala chitala*(Pallas)	Chital	LRnt	√	√

LRnt= Lower risk near threatened; LRlc=Lower risk least concern, VU= Vulnerable; DD=Data deficient; NE= Not Evaluated; EN-Endangered

Among the 65 fish species recorded from present study; 64 fish species under 21 families are present in Charan Beel and 53 fish species under 19 families in Manaha beel. It has also been observed that Cyprinidae family is the most dominant, which includes 23 species accounting a percentage of 35.94% in Charan Beel and 18 species (33.96%) in Manaha Beel. Next followed by Bagridae family with 7 species holding 10.94% share in Charan Beel and with 6 species (11.32%) in Manaha Beel. Channidae family is the third dominant family with 5 species in both the beels. The number of species and percentage of dominance of all the families recorded in both the beels were demonstrated in Figure-1.

Among the recorded fish species, some were most abundant, some were abundant and some were least abundantly found. It was observed that the species like *Channa striata, Macrognathus pancalus, Cirrhinus reba, Sperata seenghala, Notopterus notopterus, Chitala chitala, Gibelion catla, Mystus tengara* were most abundantly found and species like *Labeo gonius, Osteobrama cotio, Glossogobius giuris, Wallago attu, Trichogaster fasciata*, *Xenentodon cancila, Macrognathus aral, Mastacembelus armatus, Channa spp.* were abundant. On the other hand, the species such as *Heteropneustes fossilis*, *Trichogaster lalius, Clarias magur etc.* were recorded as the least abundant. Further, the local fishermen reveals that the occurrence of *Nandus nandus* and *Rasbora elanga* has been gradually declining because of some unknown reasons.

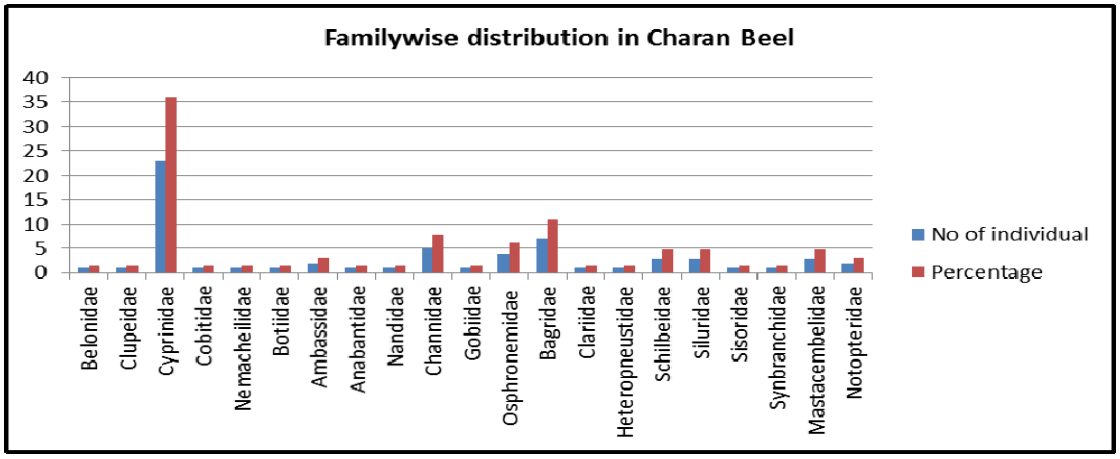


Fig 1(a): Family wise distribution of fish species of Charan Beel

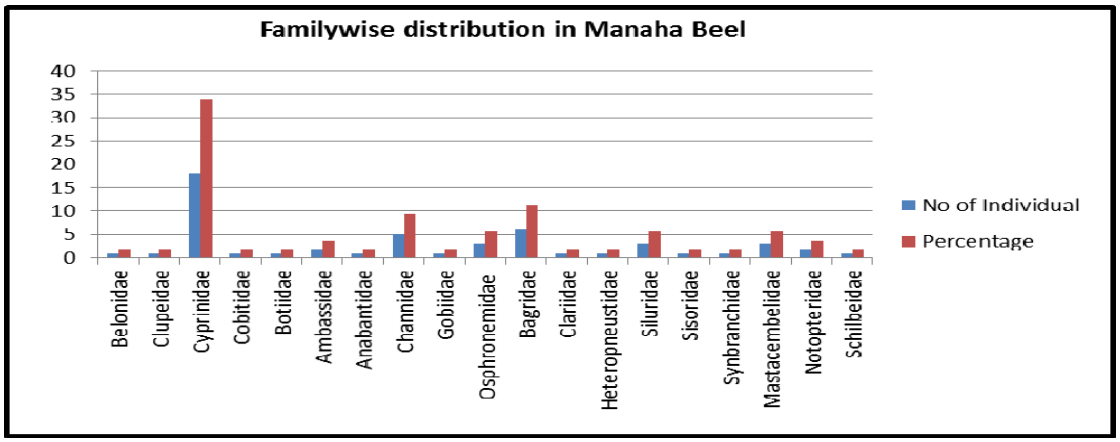


Fig 1(b): Family wise distribution of fish species of Manaha Beel

The conservation status of the recorded fishes have been classified into five category *viz.,* LRnt= Lower risk near threatened; LRlc=Lower risk least concern, VU= Vulnerable; DD=Data deficient; NE= Not Evaluated; EN=Endangered of which no species is recorded as vulnerable, 1 species as endangered, 1 species as Data Deficient in both cases. However, 51 species are recognised as lower risk-least concern, 6 species as lower risk near threatened and other 5 species are not evaluated in Charan Beel whereas in Manaha Beel, 44 species has been recorded as lower risk-least concern, 4 species as lower risk near threatened and other 3 species are not evaluated (Figure-2).

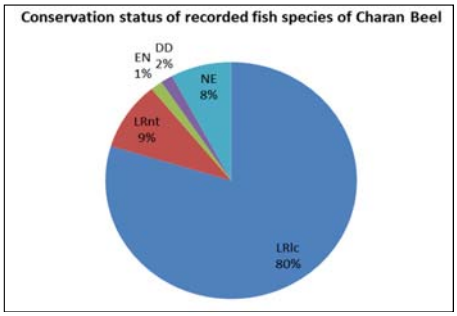


Fig 2 (a): Percentage distribution of conservation status of recorded fish species of Charan Beel

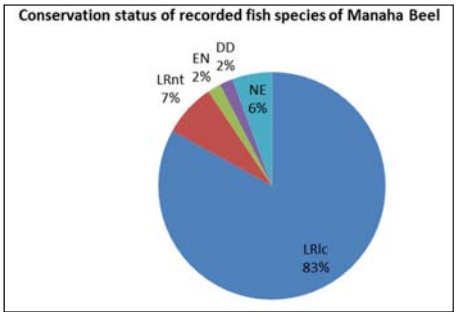


Fig2 (b): Percentage distribution of conservation status of recorded fish species of Manaha Beel

Cirrhinus mrigala

Gibelion catla

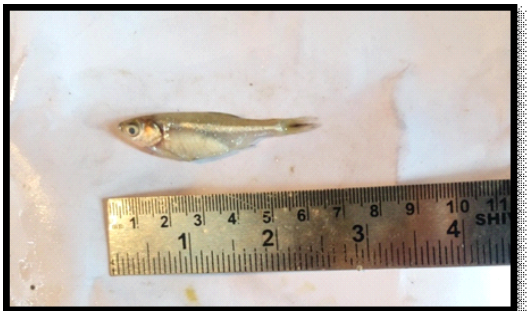
Notopterus notopterus

Labeo calbasu

Labeo rohita

Labeo gonius

Mystus cavasius



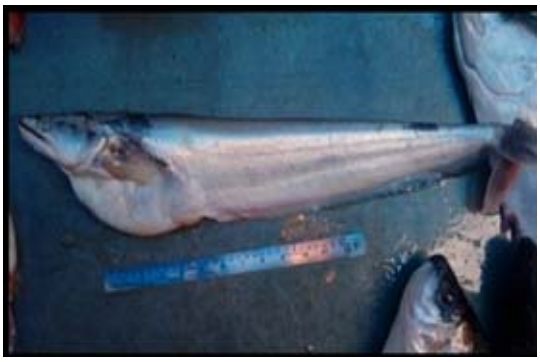
Amblypharyngodon mola

Photo plate I

Anabas testudineus

Mystus vittatus

Ailia coila



Wallago attu

Mystus bleekeri

Glossogobius giuris

Channa punctata

Ctenopharyngodon idella

Photo plate II

Lepidocephalichthys guntea

Cabdio morar

Pachypterus atherinoides

Chitala chitala

Acanthocobitis botia

Cyprinus carpio

Clarius magur

Sperata seenghala

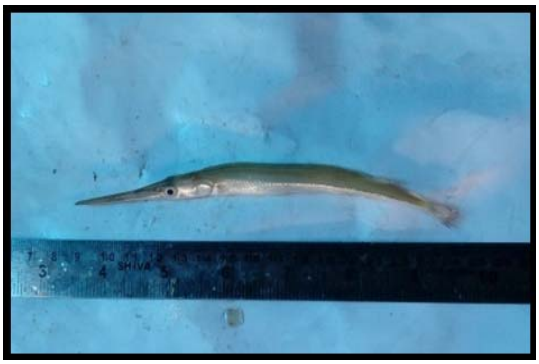
Photo plate-III

Heteropneustes fossilis

Trichogaster fasciata

Ompak pabda

Parambassis ranga



Xenentodon cancila

Puntius sophore

Macrognathus pancalus

Trichogaster lalius

Photo plate 1V

Chanda nama

Macrognathus aral

Mastacembelus armatus

Nandus nandus

Channa striata

Channa orientalis

Pethia ticto

Cirrhinus reba

Photo plate V

Some of the fishes were also found in the studied beel but were not recorded by photograph during the study period. The information about their occurrence was found from the local fishermen and by the socio-economic survey done among the people of the adjoining area to the beels. The fishes includes *Gudusia chapra, Labeo bata, Bangana dero, Labeo nandina, Osteobrama cotio, Puntius javanicus, Puntius chola, Rasbora daniconius, Rasbora elenga, Systomus sarana, Hypopthalmicthys molitrix, Hypopthalmicthys nobilis, Salmostoma bacaila, Botia derio, Channa marulius, Channa gachua, Trichogaster chuna, Trichogaster labiosa, Mystus tengara, Mystus carcio, Rita rita, Clupisoma garua, Ompok bimaculatus, Bagarius bagarius, Monopterus cuchia.*

4. Discussion

Beels are natural ecosystem with high productivity which can convert the solar energy into organic matter in presence of rich nutrients accessible from natural sources. Along with high productivity, the high fish diversity of the beels of Assam like Chandubi (57 species), Dora (62 species), Deepor (41 species), Tamranga beel (63 species), Urpod (60 species) and Sone beel (70 species) was reported from previous works (Dey, 1981; Lahon, 1983; Goswami,1985; Kar and Dey 1993; Agarwala, 1996 ; Saud *et al.,* 2012) [6, 10, 7, 9, 1, 13] which were more or less corroborate with the findings of the present study where 64 species were recorded from Charan Beel and 53 from Manaha Beel from Morigaon district. Sarma *et al.*, 2012 [12] also reported 77 fish species from Goronga Beel of Morigaon district.

Five exotic fish species *viz. Cyprinus carpio, Ctenopharyngodon idella, Hypopthalmichthys molitrix, Hypopthalmichthys nobilis and Puntius javanicus* have been recorded in the present study. The first three exotic carps have also been listed by Sen, 2000 [14] in different parts of the state.

The commercially important fish species found in the wetland are *Labeo rohita, Labeo gonius, Labeo bata, Gibelion catla, Cirrhinus mrigala, Notopterus notopterus, Chitala chitala, Wallago attu, Channa striata, Cirrhinus reba, Heteropneustes fossilis, Clarias magur, Anabas testudineus, Sperata seenghala, Mystus tengara, Macrognethus pancalus* etc.

The study reveals that in both the beels, Cyprinidae family stands as the most dominant family which is also reported by earlier workers from Assam (Chakravartty *et al.,* 2012; Deka and Dutta, 2013 ; Bordoloi and Hazarika, 2015; Chhetry and Deka, 2016) [3, 5, 2,4].

Charan and Manaha Beel support the habitat of variety of fish species with ornamental ones which is playing an important role for the livelihood for the local people by producing animal protein in the form of fish.

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