



Appendix

Annexure 1

Fish Species in the Kushiara River 2017

SL#	Scientific Name	Local name	Fish base name	Availability status	IUCN Bangladesh 2015. Red List of Bangladesh Volume 5: Freshwater Fishes.
1	<i>Labeo rohita</i>	Rui	-	Abundant	Least Concern (LC) ver 3.1
2	<i>Catla catla</i>	Katal	-	Abundant	Least Concern (LC) ver 3.1
3	<i>Lepidocephalus guntea</i>	Gutum	Guntea loach	Common	Least Concern (LC) ver 3.1
4	<i>Puntius sophore</i>	Punti	Punti	Common	Least Concern (LC) ver 3.1
5	<i>Clarias batrachus</i>	Walkig catfish	Magur	Abundant	Least Concern (LC) ver 3.1
6	<i>Wallago attu</i>	Boal	Wallago	Rare	Vulnerable (VU) A2cd ver 3.1
7	<i>Silonia silondia</i>	Shillong	Silond catfish	Rare	Least Concern (LC) ver 3.1
8	<i>Pangasius</i>	Yellowtail catfish	Pangas	Abundant	Endangered (EN) A2bcd ver 3.1
9	<i>Eutropiichthys</i>	Bacha	-	Common	Least Concern (LC) ver 3.1
10	<i>Clupisoma</i>	Garu bacha	Gharua	Rare	Endangered (EN) A2bcd ver
11	<i>Rita rita</i>	Rita	Rita	Rare	Endangered (EN) A2bcd ver
12	<i>Sperata aor</i>	Ayre	Long Whiskered	Common	Least Concern (LC) ver 3.1
13	<i>Mystus cavasius</i>	Kabashi tengra	Gangetic mystus	Common	Near Threatened (NT) ver 3.1
14	<i>Chitala chitala</i>	Chital	Clown knife	Rare	Endangered (EN) A2bcd ver
15	<i>Corica soborna</i>	Kachki	Ganges river spral	Abundant	Least Concern (LC) ver 3.1
16	<i>Mastacembelus armatus</i>	Baim	Zigzag eel	Abundant	Endangered (EN) A2bcd ver 3.1
17	<i>Rhinomugil corsula</i>	Halla	-	Common	Least Concern (LC) ver 3.1
18	<i>Trichogaster fasciata</i>	Khalisha	Bandedgourami	Common	Least Concern (LC) ver 3.1
19	<i>Anabastestudineu</i>	Koi	Climbing perch	Common	Least Concern (LC) ver 3.1
20	<i>Monopterusuchia</i>	Cuchia	Kunche	Rare	Vulnerable (VU) A2cd ver 3.1
21	<i>Xenentodon cancila</i>	Kaikka	-	Rare	Least Concern (LC) ver 3.1
22	<i>Channa striatus</i>	Shol	Snakehead murrel	Abundant	Least Concern (LC) ver 3.1
23	<i>Channapunctatu</i>	Lata, Taki	Spotted snakehead	Abundant	Least Concern (LC) ver 3.1
24	<i>Psilorhynchus sucatio</i>	Titari	River stone	Common	Near Threatened (NT) ver 3.1
25	<i>Salmostoma</i>	Katari	Large	Rare	Least Concern (LC) ver 3.1
26	<i>Esomus danricus</i>	Darka	Flying barb	Common	Least Concern (LC) ver 3.1
27	<i>Chela laubuca</i>	Chela	Indian glassbarb	Rare	Least Concern (LC) ver 3.1
28	<i>Megarasbora elanga</i>	Along	Bengala barb	Common	Least Concern (LC) ver 3.1
29	<i>Danio rerio</i>	Anju	-	Abundant	Near Threatened (NT) ver 3.1

30	<i>Chagunius</i>	Utti	Chaguni	Rare	Vulnerable (VU) A2cd ver 3.1
31	<i>Labeo gonius</i>	Ghainna	Karia labeo	Rare	Near Threatened (NT) ver 3.1
32	<i>Labeo calbasu</i>	Kalibaus	Orange fin labeo	Common	Least Concern (LC) ver 3.1
33	<i>Labeo angra</i>	Kharsa	-	Common	Least Concern (LC) ver 3.1
34	<i>Botia dario</i>	Bou mach	-	Rare	Endangered (EN) ver 3.1
35	<i>Heteropneustes fossilis</i>	Shing	-	Common	Least Concern (LC) ver 3.1
36	<i>Macrobrachi umsp.</i>	Chingri	-	Abundant	Least Concern (LC) ver 3.1
37	<i>Oreochromis niloticus</i>	Tillapia	Tillapia	Abundant	Not Assessed
38	<i>Barbonem us</i>	Sarpunti	-	Common	Not Assessed
39	<i>Hypophthalmic hthys molitrix</i>	Silver carp	Common carp	Abundant	Not Assessed
40	<i>Ctenopharyngo donidellus</i>	Grass carp	Grass carp	Common	Not Assessed

Table 1: Fish Species in the Kushiara River 2017.

Annexure 2

Fish Diversity of Kushiara River on 2021

S.N.	Family	Common Name	English Name	Scientific Name	IUCN Red List Status**
1	Clupeidae	Chapila	Indian River Shad	<i>Gudusia chapra</i>	VU
2	Clupeidae	Mola	Mola Carplet	<i>Amblypharyngodon mola</i>	LC
3	Siluridae	Kalo Pabda	Pabo Catfish	<i>Ompok pabo</i>	CR
4	Siluridae	Modhu Pabda	Pabdah Catfish	<i>Ompok pabda</i>	EN
5	Cyprinidae	Jat Punti	Pool Barb	<i>Puntius sophore</i>	LC
6	Clupeidae	Ganges river sprat	Kachki	<i>Corica soborna</i>	LC
7	Cyprinidae	Deshi Shar Punti	Olive Barb	<i>Puntius sarana</i>	NT
8	Bagridae	Menoda catfish	Ghagla, Gang Tengra	<i>Hemibagrus menoda</i>	NT
9	Channidae	Taki	Spotted Snakehead	<i>Channa punctata</i>	LC
10	Channidae	Shoal	Striped Snaked	<i>Channa striata</i>	LC
11	Channidae	Gozar	Great Snakehead	<i>Channa marulius</i>	EN
12	Nandidae	Meni/Veda	Gangetic Leaffish	<i>Nandus nandus</i>	NT
13	Bagridae	Tengra	Tengara Mystus	<i>Mystus tengara</i>	LC
14	Centropomidae	Chanda	Elongate Glass-perchlet	<i>Chanda nama</i>	LC
15	Bagridae	Bagha Air	Long- Whiskered	<i>Bagarius</i>	CR
16	Cyprinidae	Kalbaosh	Orange Fin	<i>Labeo calbasu</i>	LC
17	Mugilidae	Bhangan Bata	Flathead Mullet	<i>Mugil cephalus</i>	LC
18	Mastacembelidae	Tara Baim	Lesser Spiny Eel	<i>Macrogathus aculeatus</i>	NT
19	Cyprinidae	Cotio	Dhela	<i>Osteobrama cotio</i>	NT

20	Mastacembelidae	Shal Baim	Zi-Zag Eel	<i>Mastacembelus armatus</i>	EN
21	Mastacembelidae	Guchi Baim	Barred Spinyeel	<i>Macrogathus pancalus</i>	LC
22	Sciaenidae	Coitor Poa	Panna Croaker	<i>Johnius coitor</i>	LC
23	Cyprinidae	Kalabans	Kursha	<i>Bangana dero</i>	DD
24	Cobitidae	Bou	Bengal Loach	<i>Botia dario</i>	EN
25	Cobitidae	Rani	Gangetic Loach	<i>Botia rostrata</i>	DD
26	Schilbeidae	Vacha	Garua Bachcha	<i>Clupisoma garua</i>	EN
27	Schilbeidae	Muri bacha	Indus Garua	<i>Eutropiichthys murius</i>	LC
28	Schilbeidae	Batchwa vacha	Bacha	<i>Eutropiichthys vacha</i>	LC
29	Cyprinidae	Rui	Rohu Carp	<i>Labeo rohita</i>	LC
30	Cyprinidae	Katol	Catla	<i>Catla catla</i>	LC
31	Cyprinidae	Mrigel	Mrigal	<i>Cirrhinus cirrhosus</i>	NT
32	Siluridae	Boal	Freshwater Shark	<i>Wallago attu</i>	VU
33	Notopteridae	Chital	Clown Knifefish	<i>Chital chitala</i>	EN
34	Bagridae	Air	Long- Whiskered Catfish	Sperata aor	VU
35	Bagridae	Rita	Rita	<i>Rita rita</i>	EN
36	Schilbeidae	Kajuli	Gangetic Ailia	<i>Ailia coila</i>	LC
37	Bagridae	Kabashi Tengra	Gangetic Mystus	<i>Mystus cavasius</i>	NT
38	Cobitidae	Gutum	Annaldale Loach	<i>Lepidocephalus annandalei</i>	VU
39	Cyprinidae	Kalo Bata	Reba Carp	<i>Cirrhina reba</i>	NT
40	Sisoridae	Gang Tengra	Gang Tengra	<i>Gagata youssoufi</i>	NT
41	Notopteridae	Foli	Bronze Featherback	<i>Notopterus, notopterus</i>	VU
42	Cyprinidae	Gonia	Ghainna	<i>Labeo gonius</i>	NT
43	Heteropneustidae	Shing	Stinging Catfish	<i>Heteropneustes fossilis</i>	LC
44	Clariidae	Magur	Walking Catfish	<i>Clarias batrachus</i>	LC
45	Gobiidae	Bele, Baila	Fresh Water Goby	Baculis	LC
46	Anguillidae	Indian mottled eel	Banehara, Bamosh	<i>Anguillabengalensis</i>	VU
47	Ambassidae	Himalayan Glassy Perchlet	Kata Chanda	<i>Pseudambasis baculis</i>	NT
48	Ambassidae	Mola punti	Lal Chanda	<i>Parambassis lala</i>	LC
49	Osphronemidae	Dwarf Gourami	Baicha, Lal	<i>Colisa lalius</i>	LC

Table 2: Fish Diversity of Kushiara River on 2021

Annexure 3



Figure 1: Study Area -Kushiara River.



Figure 2: Fishing Activity during the Peak-season within the Study Area.



Figure 3: Fish Species Observed in the Local Market.



Figure 4: Fish Species Observed in the Local Market.

Annexure 4

Focus Group Discussion Participants

Sl.	Name of Participant	Age	Occupation	Phone Number
1	Abdul Jalil	38	Fishing Craft & Gear Maker	8801706996143
2	Imran Ahmed	28	Fisherman	8801742492945
3	Md. Fayez Uddin	60	Fish Trader	8801735521953
4	Chomok Ali	60	Fisherman	8801763502319
5	Asman Mia	65	Fishing Craft & Gear Maker	8801743333541
6	Dulu Mia	52	Fish Trader	8801762455052
7	Md. Janu Mia	46	Fisherman	8801312673804
8	Md. Ziaur Rahman	32	Fisherman	8801759718313

Table 3: Focus Group Discussion Participants.

Annexure 5

Sample Questionnaire

<p>Introductory Note: Good morning/afternoon. We are conducting a socio-economic study to assess the fishing related livelihood under the project titled as "WATER QUALITY PLAYS AN IMPORTANT ROLE IN THE SOCIO-ECONOMIC CONDITION OF THE LOCAL COMMUNITY: A STUDY ON THE KUSHIARA RIVER" Based on the outcome of this study, we will be able to assess the impact of the river water quality on the Fisheries and associated livelihood activities. We only seek your responses and opinions regarding some of the issues. We assure that your personal details will be kept confidential. The interview could take no more than 10-15 minutes. We seek your cooperation in this regard. May we proceed? Thank you</p>			
Enumerator Details		Survey Date (DD/MM/YY)	
Name		Signature	
Section-A [Basic Information]			
A-1	Respondent's Name	Religion (tick the appropriate one)	Buddhism Christian Hindu Muslim Others
Respondent's ID		CL	_FS_SEC_
Mobile No.		01	
Name of Household Head		Wife of/Son of/Others	
Household Structure (tick the appropriate one)		Nuclear Joint/Extended	
Category of the Respondent (tick the appropriate one)		Fisherman Fish Trader Middleman (Hoarder/Aratdar/Wholesaler) Craft and Gear Maker Craft and Gear Trader	

Codes to be followed for Module A-2			
Gender	Marital Status	Educational Status	Last Level of Education
1. Female 2. Male 3. Others	1. Married 2. Single/Unmarried 3. Separated 4. Divorced 5. Widowed 6. Abandoned	1. Currently Studying 2. Not School Going Age Completed 3. Currently not studying/discontinuing	1. Primary/Ebtedaye 2. Secondary/Dakhil 3. Higher Secondary/Aalim 4. Graduation/Degree/Hon Fazil 5. Postgraduation/Master's/Kaamil 6. Vocational Training 7. Never been informal EIs
Primary & Secondary Occupation		Skill Set	Disability

<ol style="list-style-type: none"> 1. Fishing 2. Fish Trading 3. Fishing Gear & Craft Making/ Trading 4. Farming/Crop Cultivation 5. Livestock Rearing/Trading 6. Foreign Employment 7. Agricultural Labor 8. Wage Labor (Non- agriculture) 9. Construction Worker 10. Business/Trade/Shopkeeper 11. Electrician 12. Mechanic 13. Driving 14. Heavy Machinery Operator 15. Professional 16. Private Job 17. Government Job 18. Traditional Medicine 19. Housewife 20. Teaching 21. Rent Collection 22. No Occupation 	<ol style="list-style-type: none"> 1. Agro-based Training 2. Cattle Rearing 3. Carpenter 4. Driving 5. Plumbing 6. Electrician 7. Welding 8. Masonry 9. Mechanic 10. Cooking 11. Tailoring/Stitching/Sewing 12. Baking 13. Artisan/Handicrafts 14. None 	<ol style="list-style-type: none"> 1. No 2. Eye Sight 3. Mobility 4. Speech 5. Mental Disability 6. Hearing specify
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A-2 Household Members' Detail

Sl.	Name	Gender [use code]	Age	Marital Status [use code]	Educational Status [use code]	Current/last Level of Education [use Code]	Primary Occupation [use code]	Secondary Occupation [use code]	Skill Set/Training [use code]	Disability [use code]
01										
02										
03										
04										
05										
06										
07										
08										
09										
10										

Section-B [Livelihood Information]

B-1 [Applicable for Fisherman Only]

B-1A	Type of Fisherman [use code*]
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B-1B	Fishing as Primary Income Source (tick the appropriate one)	<ul style="list-style-type: none"> • Yes • No
B-1C	Fishing as Secondary Income Source (tick the appropriate one)	<ul style="list-style-type: none"> • Yes • No
B-1D Years engaged in fishing		
B-1E What is the Peak Season for Fishing?		
B-1F What is the Off/Lean Season for Fishing?		
B1-G Seasonal Variation		
Peak Season		Off/Lean Season
Fishing Frequency [use code*]		Fishing Frequency [use code*]
Fishing Intensity [use code*]		Fishing Intensity [use code*]
Available Species		Available Species
Catch (in Kg)		Catch (in Kg)
Income (in BDT)		Income (in BDT)
Historical Variation (one/two year before)		
Peak Season		Off/Lean Season
Fishing Frequency [use code*]		Fishing Frequency [use code*]
Fishing Intensity [use code*]		Fishing Intensity [use code*]
Available Species		Available Species
Catch (in Kg)		Catch (in Kg)
Income (in BDT)		Income (in BDT)
B1-H What is your yearly gross income from fishing?		
B1-I Fishing Related Expenditures		
Name of the Item		Amount (BDT)
B1-J Are you and any other member(s) from your household member of any formal fishermen association (tick the appropriate one)?		<ul style="list-style-type: none"> • Yes • No
B1-K Do you have any outstanding loan (tick the appropriate one)?		<ul style="list-style-type: none"> • Yes • No

If yes in B1-K , then	<ul style="list-style-type: none"> • Bank Debt • NGO Debt • Cooperative Debt • Samity • Family/Friends • Informal Money Lenders
If there is a current loan, please explain the reason?	<ul style="list-style-type: none"> • Illness • Home construction/ improvements • Health and treatment • Marriage/Rituals/Cultural/Festival • Death Ceremonies/Funerals • Acquisition of property (including vehicles) • Economic activity • Migration • Studies • Other, specify
B1-L Do you have any livestock (tick the appropriate one)?	<ul style="list-style-type: none"> • Yes • No

B1-L Details of Livestock				
Type	Quantity	Usage	Product	Total Income
Cow				
Buffalo				
Goat				
Chicken/Poultry				
Duck				
Others (specify)--				
B1-M Do you observe any changes in fishing activities in recent times?				<ul style="list-style-type: none"> • Yes • No
If yes in B1-M , then provide some details				
B1-N Do you observe any impact of the water pollution in your locality (in general)?				
Positive Impacts			Negative Impacts	
B1-O Do you observe any impact of the water pollution in your locality (specific to fishing activities)?				
Positive Impacts			Negative Impacts	

*Codes			
B-1A Fisherman Type	B-1F Fishing Frequency	B-1F Fishing Intensity	B-1J Usage
1. Full Time 2. Part time/Casual 3. Amateur	1. Daily 2. Alternate Day 3. Weekly 4. Monthly	1. Once 2. Twice 3. Thrice 4. More than thrice	1. Self- consumption 2. Sale 3. Both

B-2 [Applicable for Fish Trader Only]		
B-2A	Type of Fish Trader [use code**]	
B-2B	Fish Trading as Primary Income Source (tick the appropriate one)	<ul style="list-style-type: none"> • Yes • No
B-2C	Fish Trading as Secondary Income Source (tick the appropriate one)	<ul style="list-style-type: none"> • Yes • No
B-2D Years engaged in Fish Trading		
B-2E What is the Peak Season for Fish Trading?		
B-2F What is the Off/Lean Season for Fish Trading?		
B-2G Seasonal Variation		
Peak Season	Off/Lean Season	
Trading Frequency [use code**]	Trading Frequency [use code**]	
Available Species	Available Species	
Sell Volume (in Kg)	Sell Volume (in Kg)	
Income (in BDT)	Income (in BDT)	
Historical Variation (one/two years before)		
Peak Season	Off/Lean Season	
Trading Frequency [use code**]	Trading Frequency [use code**]	
Available Species	Available Species	
Sell Volume (in Kg)	Sell Volume (in Kg)	
Income (in BDT)	Income (in BDT)	
B-2H What is your yearly gross income from fish trading?		
B-2I What is your yearly gross expenditure related to fish trading?		

B-2J Are you and any other member(s) from your household member of any formal fish trading association (tick the appropriate one)?		<ul style="list-style-type: none"> • Yes • No
B-2K Do you have any outstanding loan (tick the appropriate one)?	<ul style="list-style-type: none"> • Yes • No 	
If yes in B-2K , then	<ul style="list-style-type: none"> • Bank Debt • NGO Debt • Cooperative Debt • Family/Friends • Informal Money Lenders 	
If there is a current loan, please explain the reason?	<ul style="list-style-type: none"> • Illness • Home construction • Health and treatment 	
	<ul style="list-style-type: none"> • Marriage/Rituals/Cultural/Festival • Death Ceremonies/Funerals • Home improvements • Acquisition of property • Acquisition of vehicle • Economic activity • Family Function • Migration • Studies • Other, specify 	
B-2L Do you observe any changes in fish trading activities in recent times?		<ul style="list-style-type: none"> • Yes • No
If yes in B-2L , then provide some details		
B-2M Do you observe any impact of the river water pollution in your locality (in general)?		
Positive Impacts	Negative Impacts	
B-2N Do you observe any impact of the river water pollution in your locality (specific to fish trading)?		
Positive Impacts	Negative Impacts	

**Codes	
B-2A Fish Trader Type	B-2G Trading Frequency
1. Full Time 2. Part-time/Casual	1. Daily 2. Alternate Day 3. Weekly 4. Monthly

B-3 [Applicable for Fishing Gear & Craft Makers Only]			
B-3A	Type of Fishing Gear & Craft Maker [use code***]		
B-3B	Fishing Gears & Crafts Making as Primary Income Source (tick the appropriate one)		• Yes
B-3C	Fishing Gears & Crafts Making as Secondary Income Source (tick the appropriate one)		• Yes
B-3D Years engaged in Fishing Gears & Crafts Making			
B-3E What is your yearly gross income from fishing gears & crafts making?			
B-3F What is your yearly gross expenditure related to fishing gears & crafts making?			
B-3G Are you and any other member(s) from your household member of any formal fishing gears & crafts making association (tick the appropriate one)?			• Yes • No
B-3H Do you have any outstanding loan (tick the appropriate one)?		• Yes	
		• No	
If yes in B-3H, then		<ul style="list-style-type: none"> • Bank Debt • NGO Debt • Cooperative Debt • Family/Friends • Informal Money Lenders 	
If there is a current loan, please explain the reason?		<ul style="list-style-type: none"> • Illness • Home construction • Health and treatment • Marriage/Rituals/Cultural/Festival • Death Ceremonies/Funerals • Home improvements • Acquisition of property • Acquisition of vehicle • Economic activity • Family Function 	

		<ul style="list-style-type: none"> • Migration
		<ul style="list-style-type: none"> • Studies
		<ul style="list-style-type: none"> • Other, specify
B-3I Do you observe any changes in fishing activities in recent times?		<ul style="list-style-type: none"> • Yes • No
If yes in B-3I , then provide some details		