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Faunal Diversity of Andaran Fulbari-II Gram Panchayat Area under Tufanganj Subdivision of Coochbehar District of West Bengal, India

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Abstract: ***Biodiversity is our heritage and People's Biodiversity Register (PBR) is a need of the time. In this context we have surveyed Andaran Fulbari-II Gram Panchyat area of Tufanganj sub-division of Cooch Behar district of West Bengal and prepared a preliminary report on the diversity of the domestic animals, fishes, avian fauna of that area. The survey area is located at 26^{0}24'57" North and 89^{0}35'45" East. Our studied area is approximately 167 acre includes agricultural land, peoples' habitat, patches of wetlands etc. The aim of our study is to record the faunal diversity of various ecological niche of this region. To prepare the report on domesticated animals our team visited 141 houses and recorded only 11 species of domesticated animals. 35 species of fishes are recorded which includes 3 exotic varieties. 67 wild avian species are recorded, few are red listed. A diversity index was prepared which reflect comprehensive information on local biological resources. This data will help to prepare a Biodiversity Register of that area in future.***

Keywords: PBR, faunal diversity, Andaranfulbari, Tufanganj.

1. Introduction

Sustainable biological diversity is a dynamic responsibility of the stake holders of the living world in any ecosystem (Kalpavriksh and GRAIN, 2009). One of the important targets of the Biological Diversity (BD) act 2002 under CBD (Convention on Biological Diversity)) of India is to document the biological diversity through PBRs (People's Biodiversity Register) and to respect and protect the knowledge of local communities related to biodiversity (Venkataraman, 2009; Kulkarni, 2012). The objectives of the PBR (Wagh and Khade, 2016) is to record the practices of the local people through which the spiritual adoration, careful selection of the biological diversities which maintains the natural life forms of an area i.e. these conventional practices achieve the delicate balance between the need to use nature's resources and meet the absolute needs of the natural system (Gadgil, 2001). In this context a team composed of Zoology Honours students along with two guide Teacher of Tufanganj Mahavidyalaya have surveyed three localities (locally called 'Para' under a 'Gram' i.e. village) of Andaran Fulbari-II Gram Panchyat area (26^{0}24'57" N & 89^{0}35'45" E) under Tufanganj sub-division of Cooch Behar district of WB, India during 2016 – 2017 academic session and have prepared a preliminary report on the diversity of the domestic animals, fishes and avian fauna of that area. The objective of the study is to identify and prepare checklist of the faunal resources of the area for equitable benefit-sharing accruing from revere of the local inhabitants and to get a step forward to prepare PBR of this area.

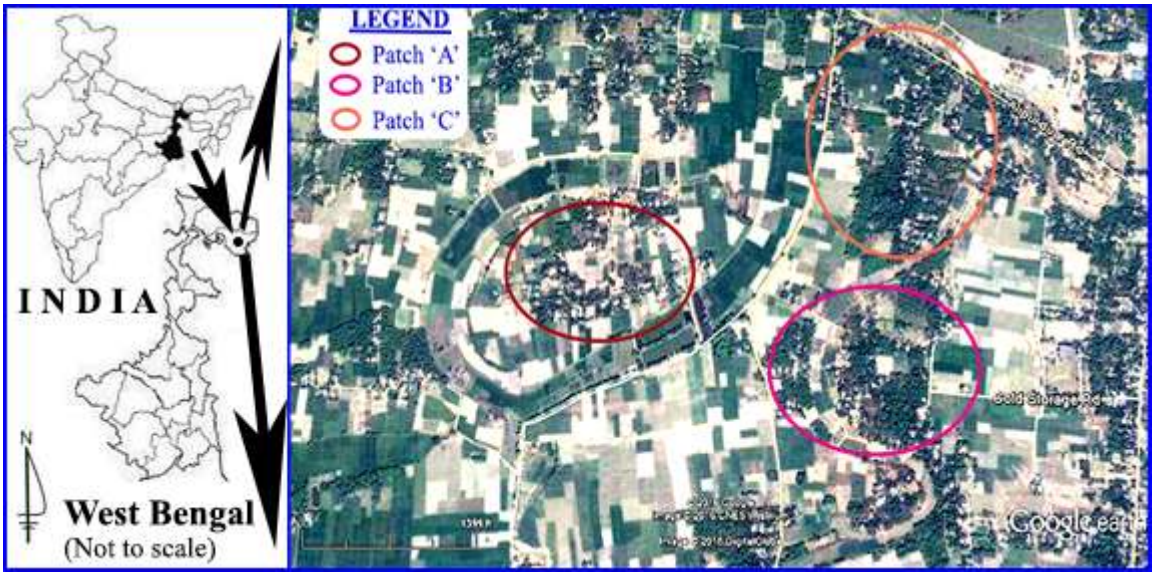

Plate I: Surveyed area of Andaranfulbari-II Gram Panchayat

2. Materials and Methods

To prepare the checklist and documentation of the domesticated animals including poultry birds, surveyors have visited every household of the area and have counted the domesticated fauna of each household. It is important to note that the avian species Pigeon, Hen and Ducks are analyzed under the list of domesticated animals as it is a culture of that area to maintain these birds for their commercial value or aesthetic purpose. To count the wild avifauna of that area, surveyors have used 50 m long by 50 m wide fixed-width transects method as describe by Emlen, 1977. Three observation team have conducted bird survey at the same time in a day during the first 4 hrs after sunrise, during survey they have slowly moved by walking a line bisecting transects and recorded visually or aurally identifying all avifauna foraging, perching or vocalizing within transects. Water birds were counted by point counting method (Bibby *et al.*, 1992) and direct counting methods (Colin *et al.*, 1992). To record the fishes of the wetlands of this area, surveyor have used cast net (Jhapi Jal), trap net (Fanshi jal) and hand lift net (Chip Jal) and engaged local expert fisherman to capture the fishes. Captured fishes were photographed then preserved in formol saline (Bagra and Das, 2010). Captured Ichthyofauna were identified by morphometric and meristic characters in the laboratory by consulting the literature of Talwar and Jhingran (1991), Jayaram (1999). Scientific names were specified as described in Fish Base website and conservation status and trends were specified by surfing IUCN websites. After analyzing all data respective tables were prepared and graphs were plotted for better understanding of the recorded data and diversity indices were estimated. Ms Excel, SPSS and PAST (Hammer *et al.*, 2001) software were used for all these analysis and tabulations.

3. Result and Discussion

3.1 Summary of domesticated animals / fauna along with poultry bird census

The surveyed area was divided into three patches as presented in Plate-I for better understanding of the recorded data. A total of 141 household present in that area was surveyed and out of that 52 household was found not maintaining any type of domesticated fauna. Details of the recorded data are presented in Table-I.

Table I: List of Domestic fauna recorded from Andaranfulbari-II Gram Panchayat area

Studied area:		Patch-A		Patch-B		Patch-C	
No of Household surveyed:		37		28		76	
No of Household not maintain any animals:		8		0		44	
Scientific name of the recorded fauna	Type of fauna recorded	No of Household maintained the fauna	No of domesticated fauna recorded	No of Household maintained the fauna	No of domesticated fauna recorded	No of Household maintained the fauna	No of domesticated fauna recorded
Bos taurus	Cow	27	47	14	27	23	39
	Calf	11	21	8	15	12	16
	Bull	2	5	4	10	5	13
Capra aegagrus hircus	Goat	5	9	9	38	8	16
	Goatling	1	1	1	1	2	4
Ovis aries	Sheep	2	6	7	26	4	7
	Lamb	0	0	4	6	2	4
Canis lupus familiaris	Dog	2	3	3	3	4	5
Bengal cat (hybrid *Canis*)	Cat	3	4	3	7	2	4
Gallus domesticus	Hen	5	22	4	28	3	9
Anas platyrhynchos	Duck	2	6	9	89	2	12
Columba livia	Pigeon	0	0	7	40	0	0
Psittacula krameri	Parrot	1	2	0	0	0	0

From the above table it can be seen that 13 types of domesticated animals have been recorded after completing a thorough survey at every households of four patches of the proposed region. It is evident from the survey that cows are the main domesticated fauna in this region. Majority of the earnings of the families are coming from selling cow milk. No household have been recorded to maintain Buffalo (few records are there from the nearby localities to maintaining buffalo for large amount of milk) though this area have good source of wetlands which is conducible for buffalo maintenance. After interacting with the peoples of this area, it is known that they are unable to buy the buffalo due to poor financial condition and therefore demanding for financial assistance from any level to continue and increase their earning. Due to considerable amount of wetland, a comparative high duck count (107) was recorded than other poultry birds. Local peoples are much interested in sheep & lamb for their meat and raw material of wool fibre, and a total of 39 sheep was recorded from only 13 houses. 40 pigeons are recorded from only 7 houses. Two Parrots were maintained in a household as a traditional family culture as they can mimic few local vocabularies. No household have been recorded to maintain pig/s (but too attractive as commercial for their large amount of meat). A considerable number of hens were found but no hybrid Poultry was recorded from the region.

3.2 Summary of fishery catchment records

From the present study, 35 species of fishes belonging from 7 orders and 15 families have been recorded. With the help

of a checklist different species of fishes with their respective order, family and subfamily have been presented in Table-II.

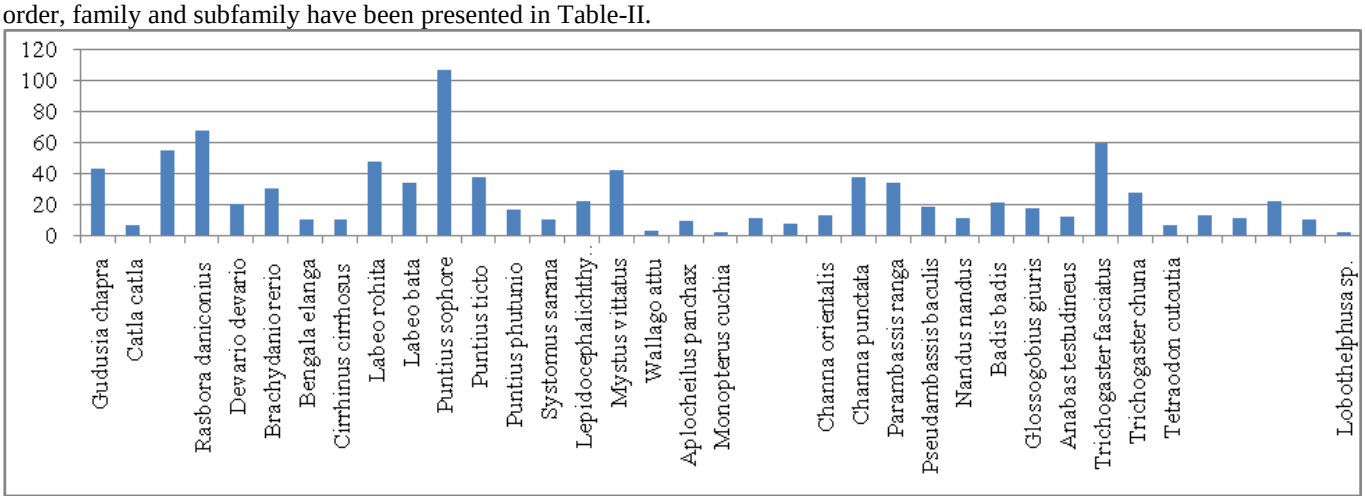

Plate II: Catchment status of the fishes from the wetlands of Andaranfulbari-II Gram Panchayat area

Table II: Ichthyofauna & crustacean catch list from the wetlands of Andaranfulbari-II Gram Panchayat area

Scientific name	*Common / Local name*	*Number recorded (mean data)*	*Economic importance*	*IUCN Status (ver 3.1, 2016)*	*IUCN Trend*
CLASS: PISCES	(2)				
ORDER: CLUPEIFORMES					
FAMILY: CLUPEIDAE					
Gudusia chapra (Hamilton, 1822)	Chapila / Korti / Khoira	43	Fd	LC	D
ORDER: CYPRINIFORMES	*c)*				
FAMILY: CYPRINIDAE					
SUB FAMILY: Cyprininae					
Catla catla (Hamilton, 1822)	Katla / Katal	6	Fd	NA	UK
SUB FAMILY: Danioninae					
Amblypharyngodon microlepis (Bleeker, 1853)	Mourla	55	Fd/Or	LC	UK
Rasbora daniconius (Hamilton, 1822)	Darkina / Dankani	67	Fd/Or	LC	UK
Devario devario (Hamilton, 1822)	Chapling / Chapchata	20	Fd/Or	LC	UK
Brachydanio rerio (Hamilton, 1822)	Anju / Zebra fish	30	Or	NA	UK
Bengala elanga (Hamilton, 1822)	Darkina / Elanga	10	Or	NA	UK
SUB FAMILY: Labeoninae					
Cirrhinus cirrhosus (Bloch, 1795)	Mrigal	10	Fd	VU D2	D
Labeo rohita (Hamilton, 1822)	Ruhi / Rui/ Rohu	47	Fd	LC	UK
Labeo bata (Hamilton, 1822)	Bata	34	Fd	LC	UK
SUB FAMILY: Barbinae					
Puntius sophore (Hamilton, 1822)	Deshi Puthi / Jat Puthi	106	Fd/Or	LC	UK
Puntius ticto (Hamilton, 1822)	Tita-puthi / Tit-puthi	37	Fd/Or	LC	UK
Puntius phutunio (Hamilton, 1822)	Phutuni Puti	16	Or	LC	UK
Systomus sarana (Hamilton, 1822)	Sar-puthi / Saral-puthi	10	Fd	LC	UK
FAMILY: COBITIDAE					
SUB FAMILY: Cobitinae					
Lepidocephalichthys guntea (Hamilton, 1822)	Poia / Poa	22	Fd/Or	LC	UK
ORDER: SILURIFORMES					
FAMILY: BAGRIDAE					
Mystus vittatus (Bloch, 1794)	Tengra	42	Fd/Or	LC	D
FAMILY: SILURIDAE					
Wallago attu (Bloch & Schneider, 1801)	Boal	3	Fd	NT	D
ORDER: CYPRINODONTIFORMES					
FAMILY: APLOCHEILIDAE					
Aplocheilus panchax (Hamilton, 1822)	Te-chokha	9	Or	LC	UK
ORDER: SYNBRANCHIFORMES	(2)				
FAMILY: SYNBRANCHIDAE					
Monopterus cuchia (Hamilton, 1822)	Kuchia	2	Fd	LC	UK
FAMILY: MASTACEMBELIDAE					
Macrognathus aculeatus (Bloch, 1786)	Guchi / Gota	11	Fd/Or	NA	UK
Macrognathus pancalus (Hamilton, 1822)	Pankal / Pakal / Gota	7	Fd/Or	LC	UK
ORDER: PERCIFORMES	(4)				

FAMILY: CHANNIDAE					
Channa orientalis (Bloch & Schneider, 1801)	Chang	13	Fd/Or	NA	UK
Channa punctata (Bloch, 1793)	Sati / Taki (Lata)	37	Fd	LC	UK
FAMILY: AMBASSIDAE					
Parambassis ranga (Hamilton, 1822)	Ranga Chanda	34	Or	LC	ST
Pseudambassis baculis (Hamilton, 1822)	Chanda	18	Or	LC	D
FAMILY: NANDIDAE					
SUB FAMILY: Nandinae					
Nandus nandus (Hamilton, 1822)	Bheda / Meni	11	Fd	LC	UK
SUB FAMILY: Badinae					
Badis badis (Hamilton, 1822)	Napit Mach / Bot Koi	21	Or	LC	UK
FAMILY: GOBIIDAE					
SUB FAMILY: Gobiinae					
Glossogobius giuris (Hamilton, 1822)	Balia / Beley	17	Fd/Or	LC	UK
FAMILY: ANABANTIDAE					
Anabas testudineus (Bloch, 1792)	Koi	12	Fd	DD	UK
FAMILY: OSPHRONEMIDAE					
SUB FAMILY: Luciocephalinae					
Trichogaster fasciatus (Bloch & Schneider, 1801)	Khalisha / Kholsa	59	Fd/Or	NA	UK
Trichogaster chuna (Hamilton, 1822)	Chuna kholsa (Dhutra)	27	Or	LC	UK
ORDER: TETRAODONTIFORMES	(6)				
FAMILY: TETRAODONTIDAE					
Tetraodon cutcutia (Hamilton, 1822)	Tepa / Tayapa	6	Fd/Or	LC	UK
EXOTIC FISHES RECORDED					
ORDER: CYPRINIFORMES	*e)*				
Hypophthalmichthys nobilis	Bighead carp	13	Fd	LC	UK
Hypophthalmichthys molitrix	Silver carp	11	Fd	LC	UK
Barbonymus gonionotus	China Puti	22	Fd	LC	UK
CRUSTACEA RECORDED					
FAMILY**:** PALAEMONIDAE					
Macrobrachium assamense (Tiwari, 1958)	Icha / Chingri	10	Fd	LC	UK
FAMILY**:** Potamidae					
Lobothelphusa sp.	Kankra	2	Fd	LC	UK

Note: Economic importance: Fd=Food fish; Or=Ornamental fish.
Status & Trend: LC=Least Concern; NT= Near Threatened; EN=Endangered; NA= Not assessed; VU=Vulnerable; DD= Data Deficient; D=Decreasing; UK=Unknown; ST=Stable

From the Table-II, it is evident that the major number of fish species in this area belongs to the order cypriniformes (17), followed by perciformes (10), synbranchiformes (3), siluriformes (2), clupeiformes (1), cyprinodontiformes (1), tetraodontiformes (1). Again from the view point of catch abundance, cypriniformes (516) ranks first, followed by perciformes (249), siluriformes (45), clupeiformes (1), synbranchiformes (20), cyprinodontiformes (9), tetraodontiformes (6). Altogether 14 fishes recorded are used exclusively for food, 8 are solely ornamental while other 13 fishes serve both the purpose. Majority of the fishes recorded during our study are either 'Least Concern' (LC) or 'Not Assessed' (NA) category according to their IUCN red list, while one Vulnerable (D2) e.g. *Cirrhinus cirrhosus* and one 'Near Threatened' e.g. *Wallago attu* fishes have also been recorded. The variation in catch abundance may be due to differential fish catching practices from the wetlands of this region. It is interesting to note that some valuable ornamental fishes like *Puntius phutunio*, *Bengala elanga* are recorded less in number in the present study but they are categorized as LC and NA respectively in IUCN Red List. Further study and sustainable protective measures should be taken to maintain those fish populations. Besides fishes two species of crustacean (*Macrobrachium assamense*, *Lobothelphusa sp*) have been recorded.

3.3 Summary of wild avifauna census

After a thorough observation on three different patches of Andaranfulbari-II gram panchayat area, a total of 67 species of different birds under 55 genus belonging to 14 order and 31 family including 7 subfamily have been recorded (Table-III). Most of the birds recorded from the area are local to this region although a few migratory are also recorded.

Table III: Avifauna Census Record of Andaranfulbari-II Gram Panchayat Area

Scientific name	*Common name*	*Habitat preference*	*No. recorded*	*Migratory status*
ORDER: PELECANIFORMES				
FAMILY:PHALACROCORACIDAE				
Phalacrocorax carbo	Large Cormorant	OW	2	RM
Phalacrocorax niger	Little Cormorant	OW	3	R
ORDER: CICONIIFORMES				
FAMILY: ARDEIDAE				
Ardeola grayii	Pond Heron or Paddybird	WE	19	R

Egretta garzetta	Little Egret	WE	9	R
Bubulcus ibis	Cattle Egret	WE	37	R
Ixobrychus cinnamomeus	Chestnut Bittern	WE	1	RM
FAMILY: CICONIIDAE				
Anastomus oscitans	Openbill Stork	WE	1	RM
ORDER: ANSERIFORMES				
FAMILY: ANATIDAE				
Dendrocygna javanica	Lesser Whistling Teal or Tree Duck	OW	6	RM
ORDER: FALCONIFORMES				
FAMILY: ACCIPITRIDAE				
Milvus migrans	Pariah Kite	TR	7	R
Pandion haliaetus	Osprey	WE	1	RM
Accipiter badius	Shikra	TR	1	R
FAMILY: FALCONIDAE				
Falco naumanni	Lesser Kestrel	TR	1	R
ORDER: GRUIFORMES				
FAMILY: RALLIDAE				
Amaurornis phoenicurus	Whitebreasted Waterhen	WE	5	R
ORDER: CHARADRIIFORMES				
FAMILY: CHARADRIIDAE				
Vanellus cinereus	Greyheaded Lapwing	WE	4	M
Vanellus indicus	Red-wattled Lapwing	WE	2	M
Charadrius dubius	Little Ringed Plover	WE	2	M
Actitis hypoleucos	Common Sandpiper	WE	21	RM
Tringa glareola	Spotted / Wood Sandpiper	WE	4	M
ORDER: COLUMBIFORMES				
FAMILY: COLUMBIDAE				
Treron phoenicoptera	Yellow-footed Green Pigeon	TR	3	R
Streptopelia decaocto	Indian Ringed Dove	TR	4	R
Streptopelia chinensis	Spotted Dove	TR	37	R
ORDER: PSITTACIFORMES				
FAMILY: PSITTACIDAE				
Psittacula krameri	Roseringed Parakeet	TR	9	R
FAMILY: CUCULIDAE				
Hierococcyx varius	Common Hawk-cuckoo / Brainfever	TR	7	R
Centropus bengalensis	Crow-Pheasant / Coucal	TR	2	R
ORDER: STRIGIFORMES				
FAMILY: STRIGIDAE				
Athene brama	Spotted Owlet	TR	2	R
ORDER: CAPRIMULGIFORMES				
FAMILY: CAPRIMULGIDAE				
Caprimulgus asiaticus	Common Indian Nightjar	TR	1	R
ORDER: APODIFORMES				
FAMILY: APODIDAE				
Apus affinis	House Swift	TR	4	R
ORDER: CORACIIFORMES				
FAMILY: ALCEDINIDAE				
Alcedo atthis	Small Blue Kingfisher	WE	5	RM
Halcyon smyrnensis	Whitebreasted Kingfisher	WE	7	R
Ceryle rudis	Pied Kingfisher	WE	1	R
FAMILY: MEROPIDAE				
Merops orientalis	Small Green Bee-eater	TR	4	R
FAMILY: CORACIIDAE				
Coracias benghalensis	Indian Roller	TR	3	R
FAMILY: UPUPIDAE				
Upupa epops	Hoopoe	TR	2	RM
ORDER: PICIFORMES				
FAMILY: CAPITONIDAE				
Megalaima lineate	Lineated Barbet	TR	1	R
Megalaima asiatica	Bluethroated Barbet	TR	3	R
FAMILY: PICIDAE				
Dinopium benghalensis	Lesser Goldenbacked Woodpecker	TR	2	R
Dendrocopos macei	Fulvousbreasted Pied Woodpecker	TR	1	RM
ORDER: PASSERIFORMES				
FAMILY: LANIIDAE				
Lanius schach schach	Rufousbacked Shrike	TR	2	R
Lanius cristatus	Brown Shrike	TR	3	R

FAMILY: ORIOLIDAE				
Oriolus xanthornus	Blackheaded Oriole	TR	8	R
FAMILY: DICRURIDAE				
Dicrurus macrocercus	Black Drongo / King Crow	TR	12	R
FAMILY: STURNIDAE				
Sturnus malabaricus	Greyheaded Myna	TR	7	R
Sturnus contra	Pied Myna	TR	24	R
Acridotheres tristis	Common Myna	TR	18	R
Acridotheres ginginianus	Bank Myna	TR	2	R
Acridotheres fuscus	Jungle Myna	TR	10	R
FAMILY: CORVIDAE				
Dendrocitta vagabunda	Indian Tree Pie	TR	1	R
Corvus splendens	House Crow	TR	15	R
Corvus macrorhynchos	Jungle Crow	TR	2	R
FAMILY: IRENIDAE				
Aegithina tiphia	Common Iora	TR	4	R
FAMILY: PYCNONOTIDAE				
Pycnonotus jocosus	Redwhiskered Bulbul	TR	3	R
Pycnonotus cafer	Redvented Bulbul	TR	18	R
FAMILY: MUSCICAPIDAE				
SUB FAMILY: Timaliinae				
Turdoides striatus	Jungle Babbler	TR	48	R
Garrulax ruficollis	Rufousnecked Laughing Thrush	TR	3	R
SUB FAMILY: Muscicapinae				
Culicicapa ceylonensis	Greyheaded Flycatcher	TR	11	RM
Rhipidura albicollis	Whitethroated Fantail Flycatcher	TR	6	R
SUB FAMILY: Sylviinae				
Orthotomus sutorius	Tailor Bird	TR	12	R
Phylloscopus collybita	Brown Leaf Warbler / Chiffchaff	TR	2	M
SUB FAMILY: Turdinae				
Copsychus saularis	Magpie Robin or Dhyal	TR	19	R
FAMILY: PARIDAE				
Parus major	Great Tit	TR	2	R
FAMILY: MOTACILLIDAE				
Motacilla alba personata	Pied or White Wagtail Sub sp.	WE	2	RM
Motacilla alba dukhunensis	Pied or White Wagtail Sub sp.	WE	1	RM
Anthus trivialis	Indian Tree Pipit	WE	3	RM
Anthus rufulus	Paddyfield Pipit	WE	2	RM
FAMILY: PLOCEIDAE				
SUB FAMILY: Passerinae				
Passer domesticus	House Sparrow	TR	12	R
SUB FAMILY: Ploceinae			0	
Ploceus philippinus	Baya	TR	14	R
SUB FAMILY: Estrildinae				
Lonchura punctulata	Spotted Munia	TR	13	R

	Habitat Preference:		**Migratory Status:**
OW	*= Open Water*	*R*	= Resident
WE	*= Water edges/Bank*	*M*	= Migratory
TR	*= Terrestrial*	*RM*	= Resident-migratory / Local-migratory

Altogether 48 species recorded are of resident type, which deploy the area as a means of achieving their primary needs such as, food and shelter. Besides the resident type, 19 species have been recorded to have migratory activity. From among the migratory birds 4 species are solely migratory type and the rest are under the resident migratory or local migratory category which is also included as vertical migrant species due to change of season (Das *et al*., 2013). It is very interesting to note that 21 species of water birds inhabits in the area, among, which 3 species are exclusively use open water for their foraging and the rest 18 species take a share on the edges or the banks of the water bodies. Some of the birds are more abundant in the area (locally called 'Para') while others relatively have a less count. The diversity indices of the recorded data were analyzed in separate headings. Pond Heron, Cattle Egret, Spotted Dove, Pied Myna, Jungle Babbler, Red vented Bulbul Magpie Robin are available in large number. The reasons behind their abundance might be due to the presence of several aquatic bodies, orchards, bushes, cultivated lands containing different crops, ample of fruit trees and moreover amiable environmental condition.

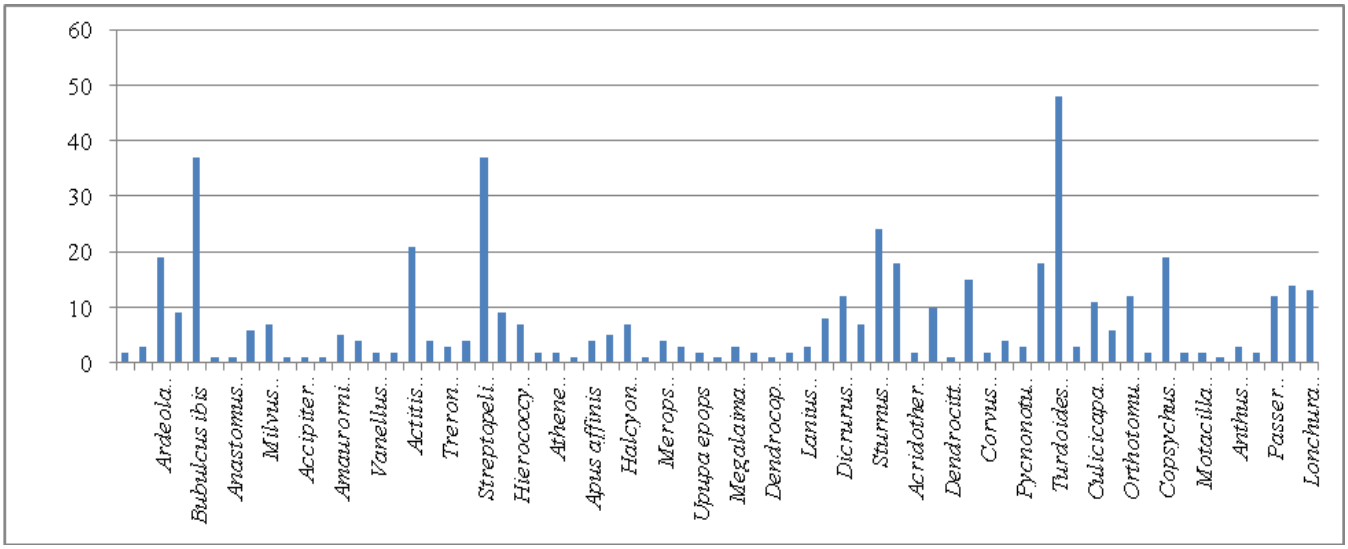

Plate III: Bar diagram of recorded avifauna-census from Andaranfulbari-II Gram Panchayat area

Table 4: Diversity indices of the recorded fauna from Andaranfulbari-II Gram Panchayat Area

	Fish	Birds	Domestic fauna
Taxa_S	37	67	9
Individuals	900	503	545
Dominance_D	0.04799	0.03735	0.2063
Shannon_H	3.283	3.663	1.796
Simpson_1-D	0.952	0.9626	0.7937
Evenness_e^H/S	0.7201	0.582	0.6696
Menhinick	1.233	2.987	0.3855
Margalef	5.292	10.61	1.27
Equitability_J	0.9091	0.8713	0.8174
Fisher_alpha	7.772	20.75	1.531
Berger-Parker	0.1178	0.09543	0.3541

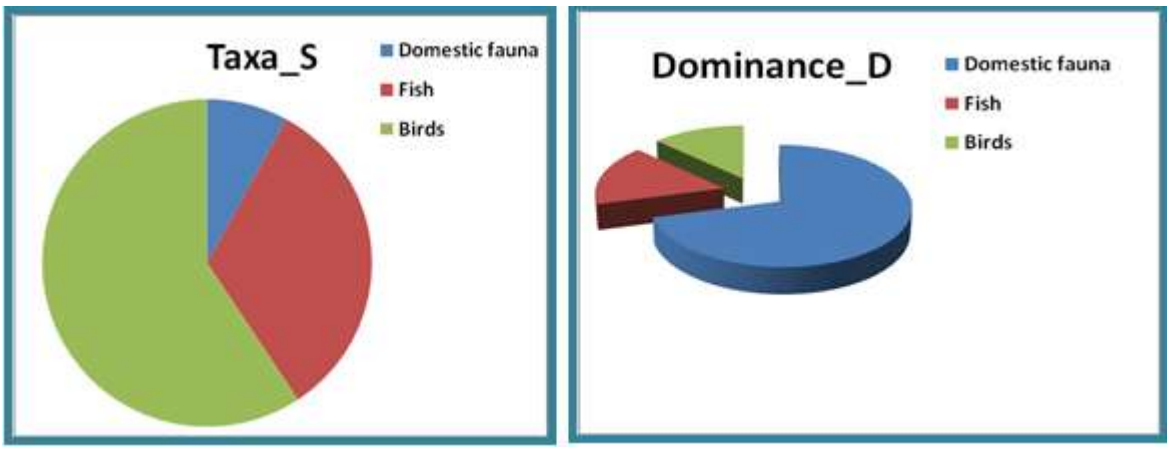

Plate IV: Pie presentation of recorded fauna from Andaranfulbari-II Gram Panchayat area

A diversity index can be regarded as a mathematical evaluation of species diversity in a community. It provides the understanding about community composition. It also takes the relative abundances of different species into account. Within a community, diversity indices supply significant information about rarity and commonness of species. In this regard the Shannon and Simpson diversity index is commonly used to characterize species diversity in a community. Table-IV shows all the possible diversity indices of recorded fauna from this particular region, indicating a stable community structure.

4. Conclusion

Due to the presence of large area of wetlands, fish faunal diversity is very high in this region. This diverse ichthyofaunal population may be one of the reasons for the large avifaunal diversity. In relation with the residence of peoples with lower economic background, the domesticated animal count is also considerably high. With the increased dependence on agriculture and industrialization, the emphasis on biodiversity has decreased. Indeed, the biodiversity, in wild and domesticated forms, is the source for most of humanity, food, medicine, clothing and housing, much of the cultural diversity and most of the intellectual and spiritual inspiration. It is, without doubt, the very basis

of life. Further that, a quarter of the earth's total biological diversity amounting to 1.7 million species, which might be useful to mankind in one way or other, would be in serious risk of existence over the next 2-3 decades. On realization that the erosion of biodiversity may threaten the very existence of life has awakened man to take steps to conserve it.

5. Acknowledgement

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