

# NMHS Progress Report

## (Period from April/2017 to March/2018)

### 1. Project Information

Project ID:	NMHS/2015-16/SG05/05	Sanction Date:	31-03-2016
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Project Title:	<b>Fish Faunal Diversity, Habitat Ecology and their Conservation strategies of the Kameng River system in Arunachal Pradesh</b>
BTG:	Conservation and Sustainable Use of Biodiversity




PI and Affiliation (Institution):	<b>Dr. Dandadhar Sarma Professor, Department of Zoology, Gauhati University, Guwahati, Assam</b>
Name & Address of the Co-PI, if any:	<ol style="list-style-type: none"> <li>1. Prof. W. Viswanath, Professor (HAG) &amp; Dean, School of Life Science, Canchipur-795003, Imphal, Manipur (India).</li> <li>2. Sri Ratul Chandra Bharali, Asstt. Professor Department of Zoology Udalguri College, BTAD, Assam.</li> <li>3. Dr. Sarbojit Thaoosen, Associate Professor Haflong Govt. College, Haflong, Dima Hasao Assam – 788819</li> </ol>




Structured Abstract - detailing the current year progress [Word Limit 250 words]:	<p>Kameng River is one of the major tributary of River Brahmaputra having a drainage basin of about 11,843 sq. Km. A total of <b>12 sampling sites</b> were selected throughout the stretches of the River in Arunachal Pradesh on the basis of <b>topography, altitudinal variation &amp; tributaries</b>. To examine fish faunal diversity of the River, experimental fishing is being carried out twice in a season in all selected sampling site with the help of local villagers. The relative abundance of fish across different sites is also being carried out. Distributional pattern of fish diversity in each sampling sites are also being carried out twice in a season. A total of <b>51 fish species</b> under <b>4 order</b> and <b>11 families</b> has been collected so far. Taxonomic characterization of fish species is in progress. For Physico-chemical parameters of water, following attributes are taken into consideration: Temperature, Turbidity, Conductivity, DO, FCO<sub>2</sub>, pH, Acidity, Alkalinity as CaCO<sub>3</sub>, Hardness as CaCO<sub>3</sub>, Chloride, etc. Analyses of physico chemical parameters of all sampling sites of two annual cycles have been completed so far. The studied physico-chemical parameters were found within the permissible limit. Collection of other information such as invasive/exotic species, anthropological disturbances etc. are in progress. Five training/awareness campaigns have been organized so far. Meeting with the officials and village leader of different panchayat of the vicinity of the River has also been organized to ensure their cooperation in all the activities of the project.</p>
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Project Partner Name	Affiliations	Role & Responsibilities
<b>Prof W. Viswanath</b>	Professor (HAG) & Dean, School of Life Science Canchipur-795003, Imphal, Manipur (India).	Valid taxonomic identification of the collected fish samples
<b>Ratul Chandra Bharali</b>	Asst. Professor	Survey and Field work and also help

	Department of Zoology Udalguri College (Affiliated to Gauhati University BTAD, Assam	in organization meeting with various stakeholders of the study area
<b>Dr. SarbojitThaosen</b>	Associate Professor, Department of Zoology, Haflong Govt. College, Assam	Survey and Field work and also help in organization meeting with various stakeholders of the study area




## 2. Project Site Details

Project site	Morsing	Domkho	Phudung
Ihr state covered	Arunachal Pradesh	Arunachal Pradesh	Arunachal Pradesh
Long. & lat.	27°42'36.3" N 92°12'16.9" E	27°10'30.9" N 92°12'84.5" E	27°13'70" N 92°14'61" E
Site Photograph			

Project site	Dirang	Rama camp -1	Rama camp-2
Ihr state covered	Arunachal Pradesh	Arunachal Pradesh	Arunachal Pradesh
Long. & lat.	27°11'15" N 92°07'14" E	27°23'76" N 92°12'23.6" E	27°23'63.9" N 92°09'46"E
Site Photograph			

Project site	Jamiri	Banna	Bula
Ihr state covered	Arunachal Pradesh	Arunachal Pradesh	Arunachal Pradesh
Long. & lat.	27°11'34.7" N 92°34'15.2" E	27°17'79" N 92°48'69.1"E	27°18'03.9"N 92°57'14"E

Site Photograph			
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Project site	Savivok	Dundri	Pakke (Talong)
Ihr state covered	Arunachal Pradesh	Arunachal Pradesh	Arunachal Pradesh
Long. & lat.	27°23'25.9"N 93°03'30"E	27°25'81.4" N 92°07'33"E	27°33'72"N 92°58'60"E
Site Photograph			

### 3. Project Activities Chart w.r.t. Timeframe [Gantt or PERT]

Project activities	Work undertaken				Output
	Year 2017-2018				
Project Activity 1	Qtr-1	Qtr-2	Qtr-3	Qtr-4	
Project Activity 1	Collection of Secondary data from local stakeholders, fishers and from literature.	Organised awareness/training programme	Organised training and workshops	Organised awareness programme	Increase in the number of sampling site and accessing the river in tough terrains with the help of local people& villagers were also found aware
Project Activity 2	Selection of sampling sites on the basis of altitudes, accessibility and similarity in physical habitat.	Seasonal Assessment of Fish fauna and habitat	Seasonal Assessment of Fish fauna and habitat	Seasonal Assessment of Fish fauna and habitat	51 fish species collected so far and with two unnamed species.

Project Activity 3	Proper identification and validation of the species and analysing the collected data	Proper identification and validation of the species and analysing the collected data	Proper identification and validation of the species and analysing the collected data	Proper identification and validation of the species and analysing the collected data	1 species of <i>Schistura</i> is communicated for publication and work on another species is in progress.
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#### 4. Financial and Resource Information

*Note:* A separate bank account is expected to be opened for NMHS Project as per the provision of Direct Beneficiary Account (DBA) as laid out by the Govt. of India and also facilitate the audit of accounts. The interest earned out of the NMHS project funds should be reported clearly in the utilization certificate.





<b>Total Grant:</b>	<b>1080400.00</b>	<b>Grant Received Date:</b>	
<b>Project Partner(s)</b>	<b>Affiliations/ Institution</b>	<b>Budget Allocated to</b>	<b>Work Done</b>
Prof. W. Viswanath	School of Life Science Manipur University, Manipur	As per Gauhati University entitled PI is authorise to disburse requisite amount to CO-necessary during the period Investigation.	Identification & validation of species collected so far
Mr. Ratul Chandra Bharali	Department of Zoology Udalguri College, BTAD, Assam	-do-	Field Survey, Collection, identification of fish
Dr. Sarbojit Thaosan	Haflong Govt. College Haflong, Dima Hasao Assam – 788819	-do-	-do-

#### Project Staff Information:

Sl. No.	Name	Qualification	Designation	Fellowship/ Wages paid	Remarks
1.	Sri Abhinit Dey	M.Sc. in Zoology	JPF	16000+20%HRA	

#### 5. Equipment and Asset Information

Sl No	Equipment Name (Qty)	Details (Make/Model)	Cost	Date of Installation	Photograph of Equipment	Lowest Quotation, IF NOT
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						<b>PURCHASED</b>
1	Digital water & soil analyzing kit	Systronics Model- 371	85,000	3/10/16		Does not arise
2	Digital movie cum still camera	Canon XA10 Camcorder	75,000	5/10/16		Does not arise
3	Electro-fishing device	Safari Surveyor	2,99,900	12/01/17		Does not arise
4	Rubber Boat	ITIWIT-3	40,000	5/10/16		Does not arise

## 6. Expenditure Statement and Utilization Certificate

Please update the annual Expenditure Statement and Utilization Certificate (UC) periodically.

### Expenditure Information:

Sl. No	Financial Position/Budget Head	Amount carried forward	Funds Sanctioned	Expenditure	Balance
I	Salaries/Manpower cost	1,15,200	2,30,400	2,30,400	1,15,200
ii	Travel	NIL	1,50,000	1,50,000	NIL
iii	Expendables & Consumables	NIL	1,00,000	1,00,000	NIL
iv	Contingencies	NIL	50,000	50,000	NIL
V	Activities & Other Project cost	NIL	25,000	25,000	NIL
Vi	Institutional Charges	NIL	NIL	NIL	NIL
Vii	Equipments	NIL	NIL	NIL	NIL
	Total	1,15,200	5,55,400	5,55,400	1,15,200

Period	Expenditure Statement	Utilization Certificate (UC)
Annual	Submitted	Submitted

## 7. Project Beneficiary Groups

Beneficiary Groups [Capacity Building]	Target	Achieved
No. of Beneficiaries with income generation:	Does not arise	Nil
No. of stakeholders trained, particularly women:	Does not arise	Nil
No. of capacity building Workshops/ trainings:	05	Training/awareness programmes has been organised till date since the inception of the project for the local people to make them aware for the value & ethics of the available fish fauna and to make them efficient in breeding & culture of the indigenous species independently without exploiting natural stock of the River.
No. of Awareness & outreach programmes:	02	Assurance of cooperation of fishery official of the state & local villagers during project activities.
No. of Research/ Manpower developed:	01	Training is in progress

## 8. Project Progress Summary (as applicable to the project)

Description	Total (Numeric)	Description
IHR States Covered	1	Arunachal Pradesh
Project Site/ Field Stations Developed	(attach photos)	Sampling site photographs & GIS map already attached in project site details
No. of Patents filed (Description):	Does not arise	Nil
Article/ Review/ Research Paper/ Publication:	1 & 1 (communicated)	LWR of three fishes collected from the Kameng River
New Methods/ Modellings Developed (description in 250 words):	Not yet	Nil

No. of Trainings(No. of Beneficiaries):	5	Attached in annexure
Workshop:		Attached in annexure
Demonstration Models (Site):	Does not arise	Nil
Livelihood Options:	Not yet	Nil
Training Manuals:	Does not arise	Nil
Processing Units:	Does not arise	Nil
Species Collection:	51 species	51 species under 11 families and 4 orders has been collected so far.
Species identified:	51 species	2 species of <i>Schistura</i> in our collection is unnamed and necessary actions have been taken for the documentation and validation of the species
Database/ Images/ GIS Maps:	1 map	GIS map of the Kameng River basin , Arunachal Pradesh has been prepared and attached herewith

*Note:* Photos/ maps should be attached in high quality in compatible formats viz., JPEG, .JPG, .PNG, .SHP, etc. along with asuitable figure legend/ caption.

Target Deliverables	2 <sup>nd</sup> year Achievements
<ul style="list-style-type: none"> <li>Selection of sampling sites on the basis of altitudes, accessibility and similarity in physical habitat</li> </ul>	12 sampling sites have been selected in first year to determine Fish Faunal Diversity, Habitat ecology of the River.
<ul style="list-style-type: none"> <li>Seasonal Assessment of Fish fauna</li> </ul>	51 fish species have been collected in first & 2 <sup>nd</sup> year so far, out of which one species has sent for recognition as new species and another under process
<ul style="list-style-type: none"> <li>Seasonal estimation of Physico-chemical parameters of the river</li> </ul>	All the studied Physico-chemical parameters were estimated within permissible limit.

<ul style="list-style-type: none"> <li>Study of relative abundance of existing fish species and CPUE</li> </ul>	<p>Relative abundance of <b>Cyprinidae</b> was estimated highest in all the sampling sites. <b>Sisorids</b> were the second most dominating family in the Kameng River followed by <b>Balitoridae, Chamnidae, Psilorhynchidae</b> and <b>Amblycipitidae</b>.</p>
<ul style="list-style-type: none"> <li>Organising Training and awareness programme</li> </ul>	<p>5 training programmes has been organised till date since the inception of the project for the local people to make them efficient in breeding the indigenous species independently.</p> <p>2 awareness programmes has been organized to educate the local people about their role in the conservation process of the fishes as well as the river.</p>

### 9. Project Linkages (with nearby Institutions/ State Agencies)

Sl. No.	Institute/ Organization	Type of Linkages	Brief Description
1	Department of Fisheries, Arunachal Pradesh	Permission and helps to locate sampling site, awareness campaign etc.	Necessary permission has already achieved for collection of sample from the River.
2	School of Life Science Manipur University, Manipur	Co-investigator	Taxonomic identification of the collected fish samples
3.	Department of Zoology Udalguri College. BTAD, Assam	Co-investigator	Survey and Field work and also help in organization meeting with various stakeholders of the study area
4.	Department of Zoology, Haflong Govt. College, Assam	Co-investigator	-Do-

### 10. Additional (publication, recommendations, etc.)

Time Period	Publications (Research Papers, Information Material, Policy drafts, Patents, etc.)
2017-2018	LWR of three fishes collected from the Kameng River (soft copy has already submitted)



## 11. Project Concluding Remark

Kindly update the following Progress Parameters for the Reporting Period:

<b>Project Objectives</b>	<b>Project Output against each objective</b>	<b>Progress made against Monitoring Indicators (specified in Sanction Letter)</b>	<b>Remarks</b>
<p>To examine the fish fauna, their diversity patterns in the distribution of different fish biodiversity components (seasonal plus altitudinal variation, taxonomic richness, endemism, taxonomic singularity and rarity) of Kameng River and its tributaries in Arunachal Pradesh from upstream to downstream.</p>	<p>51 species have been collected so far from 12 selected sampling site of the River. Studies on Relative abundance &amp; diversity pattern of the fish fauna of the River is in progress.</p>	<p>Preparation of checklist of fish faunal diversity of the River is in progress.</p>	<p>Survey &amp; sampling is in progress.</p>
<p>To analyze the state of habitat ecology, species diversity and possible influence on native fish fauna by exotic fish.</p>	<p>Estimation of certain physicochemical parameters of the water has been estimated for two annual cycles so far to determine habitat ecology of the River. Collection of other information such as invasive species, anthropological disturbances etc are in progress.</p>	<p>Complete database on habitat ecology of the fishes of the rivers and impact of invasive species and climate change etc. are in progress.</p>	<p>Survey &amp; estimation is in progress</p>

Formulation of possible management strategy for the mitigation & conservation of existing fish diversity.	Only be possible to formulate after achieving clear picture of the Fish fauna, habitat ecology of the River.	Effort is in progress	Nil
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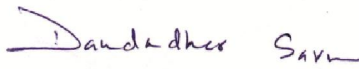
Methodology (in brief):	<p><b>Collection of fishes</b> is being done through fishing using gill net and electro fishing device at least 2 times in a season in each selected sampling site</p> <p><b>Identification</b> of Fishes is being followed after Jayaram 1981, 1999; Talwar and Jhingran 1991, Vishwanath (2014).</p> <p>The <b>habitat categorization</b> method is being followed as per Bain and Stevenson (1999).</p> <p>The <b>relative abundance (RA)</b> (percentage of catch) of fish across different sites is being carried out as  <math display="block">\text{Number of samples of particular species} \times 100 / \text{Total number of samples.}</math></p> <p>The <b>catch per unit effort (CPUE)</b> of gill net is being calculated for each sampling sites following Biswas (1993).</p> <p>All the <b>physico-chemical parameters</b> are being analysed using method of APHA (2005).</p> <p>The <b>diversity index of fish</b> is being calculated as per standard method (Shannon and Wiener 1963).</p> <p><b>Awareness</b> meetings will be organized using Participatory Rapid Appraisal (PRA) tool such as Focus Group Discussion (FGD).</p> <p>Leaflet, banner and signed board in local language will be handed throughout the area to create mass awareness</p>
Major Research Achievements:	Not so far
Brief Conclusion - the current year progress – during the	<ul style="list-style-type: none"> <li>A total of 12 sampling sites were selected throughout the stretches of the River in Arunachal Pradesh on the basis of topography, altitudinal</li> </ul>

reporting period (point-wise):	<p>variation &amp; tributaries.</p> <ul style="list-style-type: none"> <li>• A total of 51 fish species under 4 order and 11 families has been collected so far. Two species are still remaining unidentified.</li> <li>• Analysis of physico chemical parameters of water of all sampling sites of two annual cycles have been completed so far.</li> <li>• Collection of other information such as invasive species, anthropological disturbances etc. are in progress.</li> </ul>
Progress Achieved (%):	About 65%
Remaining work to be done:	Survey and sampling for all components in accordance with approved objectives have been completed for two annual cycles. Hence all the components of the objectives need to repeat in 3 <sup>rd</sup> year again to achieve commendable results.

Submitted to:

Submitted by:

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Project PI (Signature)  
Institution (Seal)  
Dated (25/10/2017)

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Please fill the NMHS Progress Report pro forma as applicable with respect to time and other requirements and return *via* post/ e-mail. In case of any query, please contact at: [nmhspmu2016@gmail.com](mailto:nmhspmu2016@gmail.com)

## **Annexure.1:**

### **Detail Outcome:**

#### **Outcomes:**

A total of 51 species under 11 families were recorded. Family Cyprinidae was found to be the most abundant, contributing 22 species, followed by Sisoridae with 11 species; Nemacheilidae with 5 species; Psilorhynchidae with 3 species; Cobitidae, Amblycipitidae and Balitoridae with 2 species each; Bagridae, Mastacembelidae, Pillaiidae and channidae with 1 species each. According to IUCN 14 species are not yet accessed and 1 species is categorised as endangered (Table 2).

The Shannon–Weiner diversity index of five different sampling indicated a strong relationship with overall species richness, showed considerable variation and ranged from 1.06 to 2.96 (Table 4). The higher fish diversity was recorded from Savivok (K11) (Table 4). The CPUE was maximum at Jamiri (K8) having a value of 1.98 Kg/hr and the lowest value recorded was 0.42 Kg/hr and 0.50 kg/hr from Phudung (K3) and Rana Camp (K5) respectively (Table 4).

Among habitat attributes, Free CO<sub>2</sub>, Dissolved O<sub>2</sub>, and conductivity, were varying considerably from one site to another. pH was normal at upper stretch, slightly alkaline in site K5 while become acidic in the downstream (K6, K7, K8, K9, K10 and K11). Overall, water depths were averaging 0.83 m with a range from 0.29 to 2.5m. Depth was high in middle and lower stretch while moderate at lower region of upper stretch (K5 and K6) and lower in extreme upper stretch (K1 and K7). Water velocity varied from slow (0.27 m s<sup>-1</sup>) in upstream and lower stream to swift (0.57 m s<sup>-1</sup>) with a fairly high average of 1.6 m s<sup>-1</sup> in middle stretch.

Sl.No	Species	IUCN Status, 2018	Economic value
	<b>Order - Cypriniformes</b>		
	<b>1. FAMILY: CYPRINIDAE</b>		
1	<i>Bangana dero</i> (Hamilton, 1822)	LC	F,O
2	<i>Barilius arunachalensis</i> Nath, Dey& Anil Kumar 2010	NA	F, O
3	<i>Barilius bendelisis</i> (Hamilton, 1807)	LC	F, O
4	<i>Devario aequipinnatus</i> (McClelland, 1839)	LC	F, O
5	<i>Garra annandalei</i> Hora, 1921	LC	F,O
6	<i>Garra kalpangi</i> (Hamilton)	LC	F,O
7	<i>Garra gotyla</i> (Gray, 1830)	LC	F,O
8	<i>Garra lissorhynchus</i> (McClelland, 1842)	LC	F, O
9	<i>Garra birostris</i> Nebeshwar&Vishwanath, 2013	NA	O
10	<i>Garra quadratirostris</i> Nebeshwar&Vishwanath, 2013	NA	O
11	<i>Garra arupi</i> Nebeshwar, Vishwanath& Das, 2009	NA	F, O
12	<i>Garra parastenorhynchus</i> Thoni, Gurung&Mayden 2016	NA	F, O
13	<i>Tariqilabeo latius</i> (Hamilton, 1822)	NA	F,O
14	<i>Labeo dyocheilus</i> (McClelland, 1839)	LC	F,O
15	<i>Opsarius barna</i> (Hamilton 1822).	LC	F, O
16	<i>Opsarius tileo</i> (Hamilton 1822)	NA	F, O
17	<i>Tor putitora</i> (Hamilton, 1822)	EN	F, G, O
18	<i>Tor tor</i> (Hamilton, 1822)	NT	F, G, O
19	<i>Neolissochilus hexagonolepis</i> (McClelland, 1839)	NT	F, G, O
20	<i>Schizothorax richardsonii</i> (Gray, 1832)	VU	F, G
21	<i>Danio dangila</i> (Hamilton 1822)	LC	O
22	<i>Barilius vagra</i> (Hamilton 1822)	LC	O
	<b>2. FAMILY: PSILORHYNCHIDAE</b>		
23	<i>Psilorhynchus homaloptera</i> (Hora &Mukherji)	LC	F, O
24	<i>Psilorhynchus balitora</i> (Hamilton, 1822)	LC	F, O
25	<i>Psilorhynchus sucatio</i> (Hamilton 1822)	LC	O
	<b>3. FAMILY: COBITIDAE</b>		
26	<i>Botia dario</i> (Hamilton, 1822)	LC	F, O
27	<i>Botia almorhae</i> Gray 1831	LC	F, O
	<b>4. FAMILY: BALITORIDAE</b>		
28	<i>Aborichthys elongatus</i> Hora, 1921	LC	F, O
29	<i>Balitora brucei</i> Gray 1830	NT	O
	<b>5. FAMILY: NEMACHEILIDAE</b>		
30	<i>Schistura scaturigina</i> (McClelland 1839)	LC	O
31	<i>Schistura multifasciata</i> (Day 1878)	LC	O
32	<i>Schistura sp.</i>	-	O
33	<i>Paracanthocobitis botia</i> (Hamilton 1822)	NA	F, O
34	<i>Paracanthocobitis Mackenziei</i> (Chaudhuri 1910)	NA	F, O
	<b>Order- Siluriformes</b>		
	<b>6. FAMILY: SISORIDAE</b>		
35	<i>Bagarius bagarius</i> (Hamilton, 1822)	NT	F, O
36	<i>Glyptothorax striatus</i> (McClelland 1842)	NT	O

37	<i>Glyptothorax cavia</i> (Hamilton 1822)	LC	O
38	<i>Glyptothorax indicus</i> Talwar 1991	LC	O
39	<i>Glyptothorax radiolus</i> Ng & Lalramliana, 2012	NA	O
40	<i>Glyptothorax telchitta</i> (Hamilton 1822)	LC	O
41	<i>Glyptothorax botius</i> (Hamilton 1822)	NA	O
42	<i>Pseudecheneis sulcatus</i> (McClelland, 1842)	NA	F, O
43	<i>Pseudecheneis sirenica</i> Vishwanath&Darshan, 2007	NA	F, O
44	<i>Creteuchiloglanis kamengensis</i> (Jayaram, 1966)	NA	O
45	<i>Parachiloglanis hodgarti</i> (Hora, 1923)	LC	O
	<b>7. FAMILY: BAGRIDAE</b>		
46	<i>Batasio merianensis</i> (Choudhuri)	NA	O
	<b>8. FAMILY: AMBLYCIPITIDAE</b>		
47	<i>Amblyceps apangi</i> Nath&Dey, 1989	LC	O
48	<i>Amblyceps arunachalensis</i> Nath&Dey 1989	NE	O
	<b>Order- Synbranchiformes</b>		
	<b>9. FAMILY: MASTACEMBELIDAE</b>		
49	<i>Mastacembelus armatus</i> (Lacepede, 1800)	LC	F, O
	<b>10. FAMILY: PILLAIIDAE</b>		
50	<i>Pillaiaindica</i> Yazdani, 1972	EN	O
	<b>Order- Perciformes</b>		
	<b>11. FAMILY: CHANNIDAE</b>		
51	<i>Channa melanostigma</i> (Geetakumari&Vishwanath, 2011)	NA	F, O

**Table 1: Fish faunal diversity of Kameng River with their IUCN status and economic importance.**

**F: Food; O: Ornamental; G: Game**

FAMILY	K1	K2	K3	K4	K5	K6	K7	K8	K9	K10	K11	K12
Balitoridae	5.3	0.0	0.0	0.0	14.3	0.0	0.0	10.0	9.1	6.7	15.0	3.2
Cyprinidae	31.6	40.0	75.0	83.3	42.9	20.0	30.8	45.0	75.8	93.3	30.0	38.7
Sisoridae	15.8	20.0	25.0	16.7	21.4	10.0	15.4	20.0	6.1	0.0	17.5	3.2
Channidae	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	2.5	0.0
Psilorhynchidae	5.3	30.0	0.0	0.0	0.0	10.0	38.5	15.0	0.0	0.0	2.5	19.4
Amblycipitidae	0.0	10.0	0.0	0.0	0.0	0.0	0.0	5.0	6.1	0.0	5.0	6.5
Nemachilidae	10.5	0.0	0.0	66.7	7.1	0.0	0.0	0.0	0.0	6.7	20.0	9.7
Bagridae	15.8	0.0	0.0	33.3	0.0	10.0	0.0	5.0	3.0	0.0	5.0	6.5
Pallaiidae	0.0	0.0	0.0	16.7	14.3	20.0	15.4	0.0	0.0	0.0	0.0	6.5
Mastacembelidae	0.0	0.0	0.0	33.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cobitidae	15.8	0.0	0.0	16.7	0.0	30.0	0.0	0.0	0.0	13.3	2.5	6.5

**Table 2: Relative Abundance (%) of fishes (familywise) in each of the sampling sites.**

**2 species of *Schistura* in our collection is unnamed and necessary actions have been taken for the documentation and validation of the species.**



**Photo.1: Unnamed *Schistura* sp. 1**



**Photo.2: Unnamed *Schistura* sp. 2**



Plate 1: Fishes of Kameng River



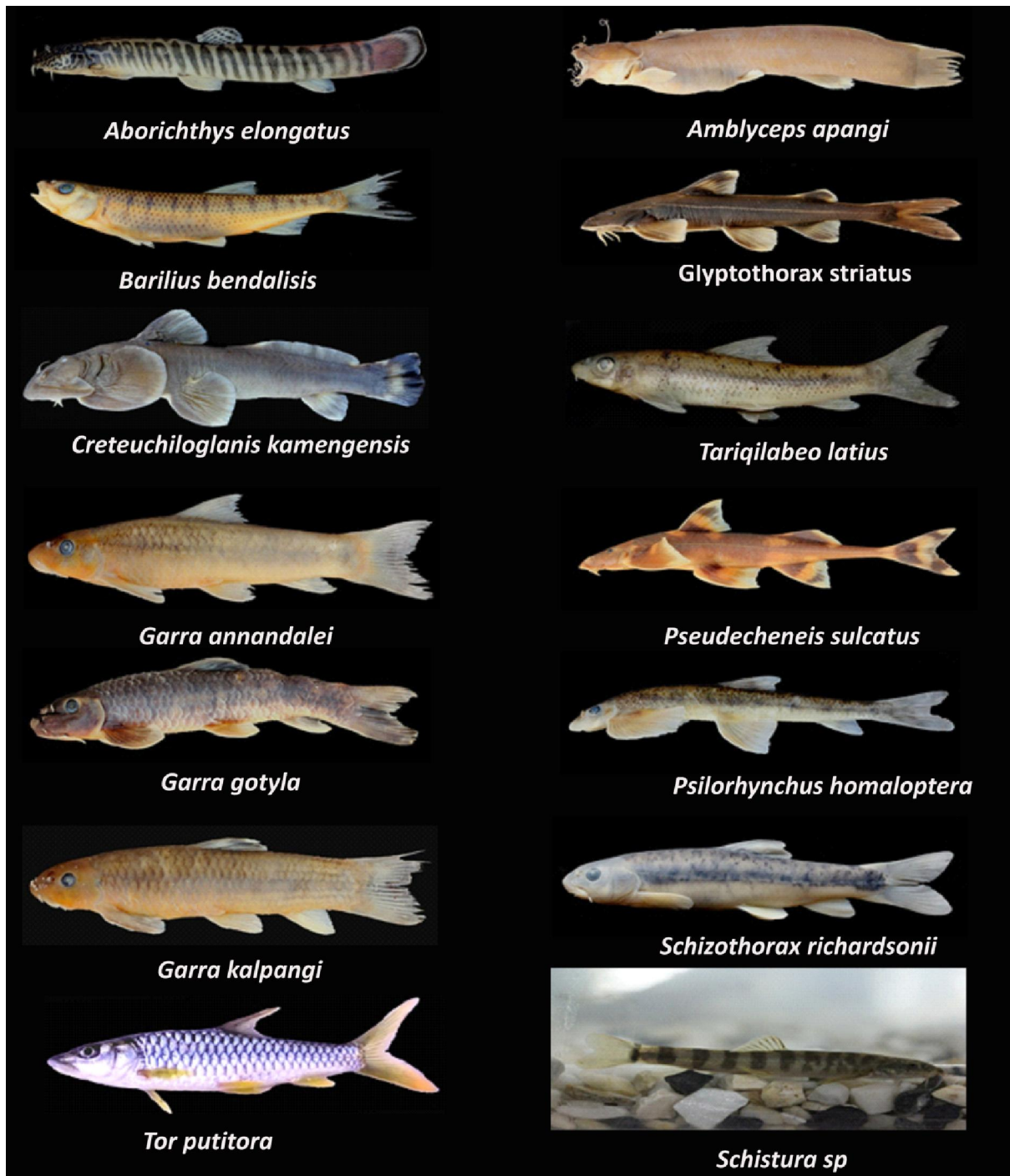
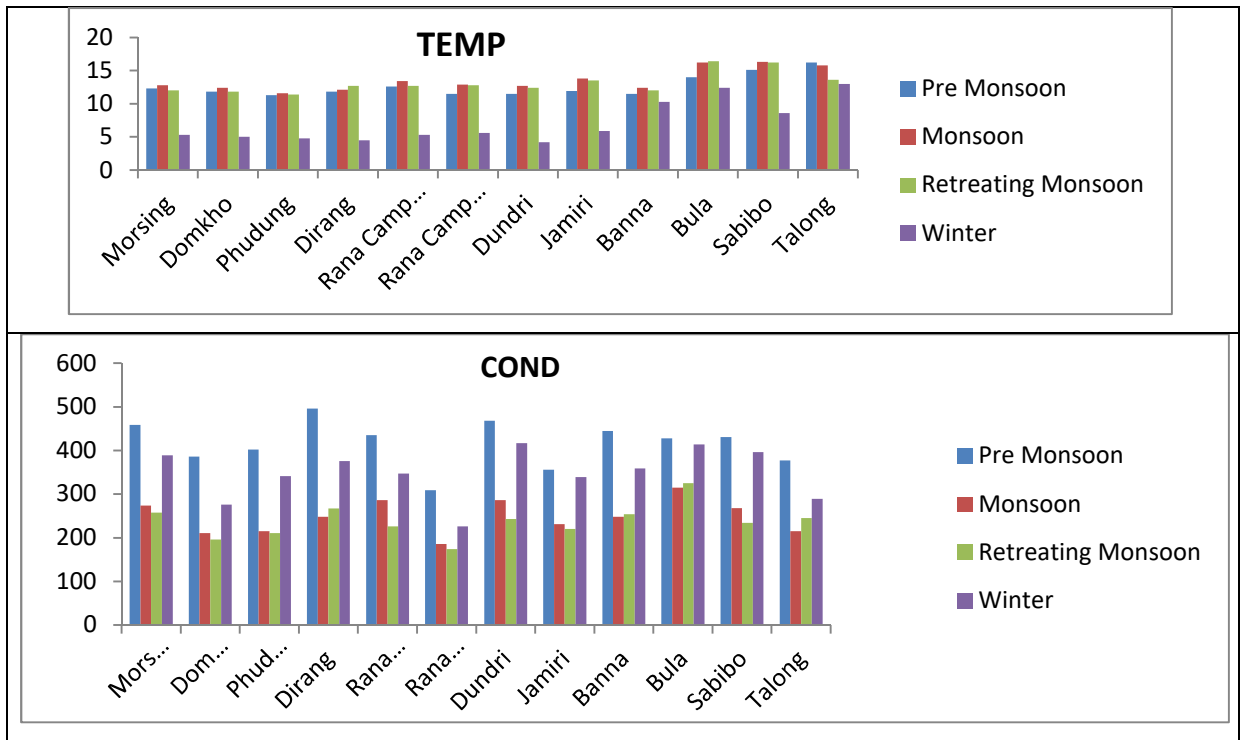
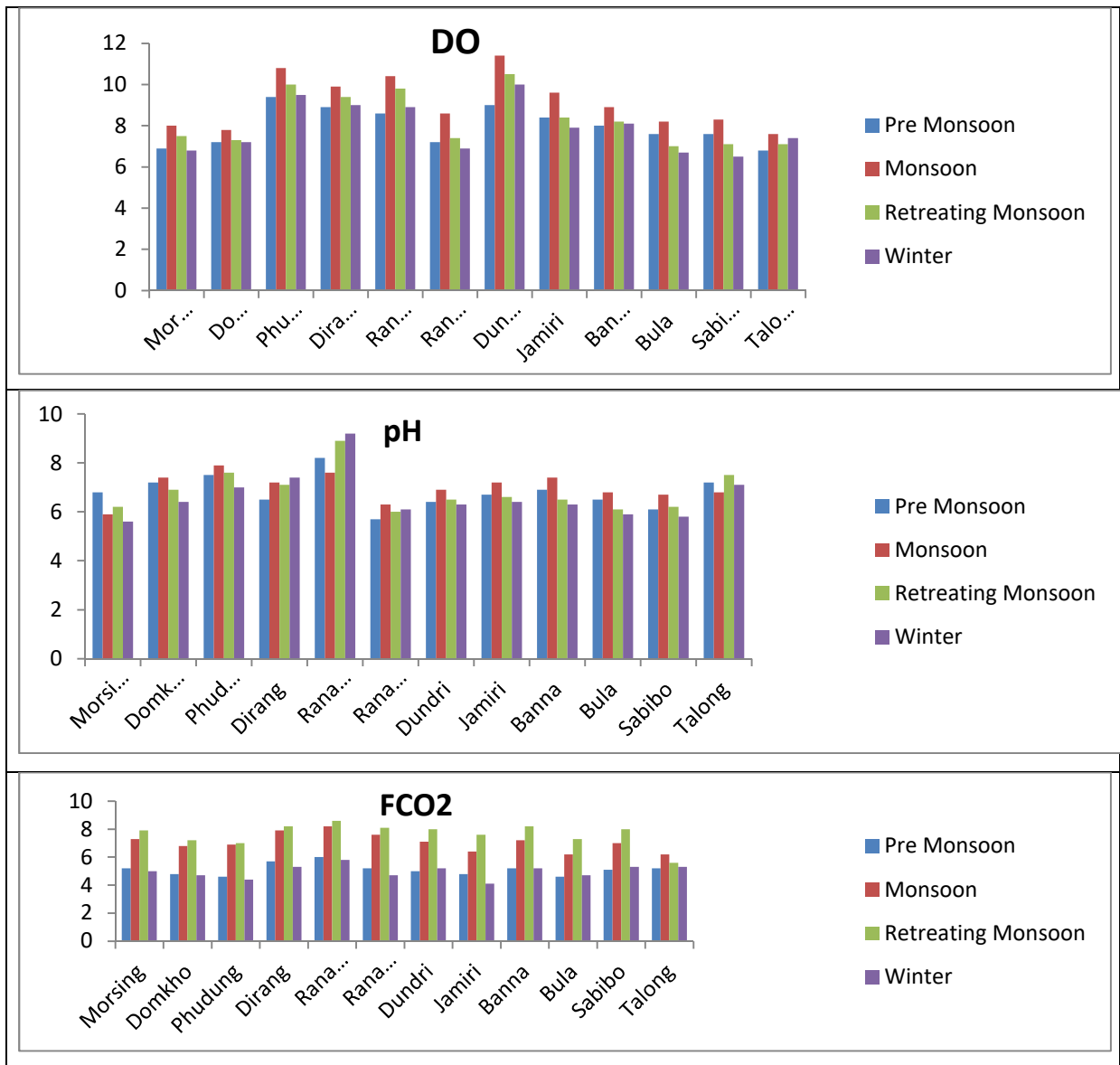


Plate.2: Some Fishes of Kameng River

Sites	Diversity Index	CPUE (Kg/hr)
K1	1.67	1.23
K2	1.72	0.98
K3	1.20	0.42
K4	1.06	0.65
K5	1.46	0.5
K6	1.34	1.42
K7	1.14	0.84
K8	2.76	1.98
K9	1.54	1.76
K10	1.86	1.20
K11	2.96	0.86
K12	2.38	1.12

**Table 3: Shannon weiner diversity index along with the catch per unit effort in each of the sampling sites.**





**Fig. 1: Seasonal variation of Physico-chemical parameters in the sampling sites**

**Trainings & Actions:** 5 training programmes has been organised till date since the inception of the project for the local people to make them efficient in breeding the indigenous species independently.



**Photo: Photograph of training programme**

**Awareness & Education:** 2 awareness programmes has been organized to educate the local people about their role in the conservation process of the fishes as well as the river.



**Photo: Photograph of an awareness programme**