

Fish diversity and drainage analysis of River Siang, East Siang District of Arunachal Pradesh

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Abstract

The present study on fish faunal diversity of River Siang of Arunachal Pradesh was carried out from 2012 to 2013 in different seasons throughout the year. The present Studies on River Siang reveals the presence of different 90 species of fishes belonging to 8 orders, 24 families and 59 genera. Cypriniformes dominates the whole river; Beloniformes and Tetrodontiformes are found in less numbers. An analysis of the drainage network of a part of Siang River, Arunachal Pradesh, India, is undertaken to reveal the role of drainage water activity of the area. A number of fluvial geomorphic anomalies have been identified in the area. This study revealed that the development of topography and drainage system of the study area have been influenced by active subsurface geological structures.

INTRODUCTION

Fishes are in variable living components of water bodies. These organisms are important food resource and good indicators of the ecological health of the waters they inhabit. However, the rich biodiversity of the freshwater fish of the Indian region has been rapidly dwindling because of increasing degradation of inland water. Out of a total of 2500 species of fish in India, 930 are in freshwaters and belong to 326 genera, 99 families and 20 orders (Talwar and Jhingran 1991). India is one of the 12 mega biodiversity hot spots contributing 60-70% of the world's biological resources. India has about 11.72% of total global fish biodiversity. A great number of fish species have been reported from the North - Easter region.

Study Site

The River Siang, is largest river of Brahmaputra river system, originates from Chema Yungdung Glacier near Kubi at 5150 m in Tibet. In Tibet it is popularly known as Tsang-Po, flows in West-East direction. After traversing a distance of about 1625 km river in Tibet and then it takes a turn in south direction, enters the territory of India near Tuting in the Upper Siang district of Arunachal Pradesh and flows through North-South direction in East Siang district towards Assam and finally it merges with

Lohit and Dibang in Assam and it becomes the mighty River Brahmaputra see in fig I (Das *et al.* 2014).

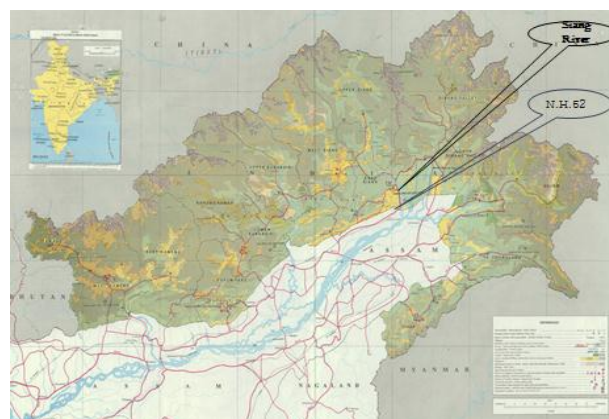


Fig I: Showing the Location of Siang River in Arunachal Pradesh

MATERIALS AND METHODS

General survey of the fish biodiversity was done using standard procedures (Armontrout, 1990). Fish samples were collected from Siang River during June 2012 to December 2013 through experimental fishing; using cast nets, gill nets, drag nets, triangular scoop nets and variety of traps and

also by hooks and lines. Local people were involved in the netting and also in the fish collection.

Fish samples sites were chosen in the survey area based on micro-habitat types, substrate type, water quality, soil quality and the depth of the river. Fish species have been preserved at first in concentrated (100%) formaldehyde in the field. After that the fishes are transferred to into 10% formaldehyde glass container to preservations purpose. In the laboratory the fish species have been identified after standard literature by following Talwar and Jhingran (1991), Jayaram (2010), Kar (2007, 2013) and Vishwanath (2002).The study area covers a major part of East Siang District of Arunachal Pradesh latitudes 28°02'43.16" - 28°10'28.87"N and longitudes 95°13'05.30" - 95°21'39.00" E and altitude 501- 1681 Ft.; which is included in the Survey of India (SoI) topographic map nos. 82 O/11, 82O/12, 82 O/15, 82 O/16, 82P/9, 82P/10, 82P/11, 82P/12, 82P/13, 82P/14, 82P/15, 82P/16, 83M/5 and 83M/9 on 1:50,000 scale. The satellite Images LISS III were collected from the NRSC Hyderabad, India, Bhuvan and also from USGC. The present study is confined to both the plain and hill areas because drainage anomalies in the plains and hills indicate the influence of subsurface structures, which are active in nature (Saha *et al.*, 2006; Sadlers and Tabuchi, 2000; Das *et al.*, 2014).

RESULTS AND DISCUSSION

The results of the present study pertaining the aspects of fish diversity are given in the below mentioned. The fish nomenclature is based on Fishbase.org. The present Studies on Siang River reveals the presence of different 90 species of fishes belonging to 8 orders, 24 families and 59 genera. Cypriniformes dominates the whole river and found in higher numbers and Beloniformes and Tetradontiformes are found in less number. The existing fish community comprising of terrestrial as

well as aquatic and other organism will face the problems of loss of habitat, feeding sites and breeding grounds as a result of change of vegetation pattern due to change of normal water regime of the river.

The regular flow of water was diminished to a very minimum level which causes the lowering of the ground water level resulting to loss of vegetation due to scarcity of soil water. The drying up of the river will initiate human activities on the river. The existing fish community comprising of terrestrial as well as aquatic and other organism will face the problems of loss of habitat, feeding sites and breeding grounds as a result of change of vegetation pattern due to change of normal water regime of the river.

A number of fluvial geomorphic anomalies have been identified in the drainage basins of Siang River within the East Siang valley in Arunachal Pradesh. The Himalayan belt in the north and the east has been controlling deposition of the stratigraphic formations and development of structural features throughout the Tertiary period till recent time (Halbrook, 1999). Hence some of the observed drainage anomalies and geomorphic features have been influenced by recent tectonic activity within the various geomorphic features and drainage in seismically active areas provided evidence of neotectonic activity in response to movement along faults.

The regional drainage pattern of the area under study is nearly parallel to sub-parallel, whereas a prominent annular pattern is observed in the central part of the area. An attempt is made here to examine how are drainage networks influenced by underlying neotectonically active structures (Roy, 1975).

Table I: Habitat Characteristics of Siang River

Stream Order	Microhabitat Type	Cover Type	Substrate Type	Riparian Land Use	Signs of Erosion	Valley Segment
First Order	Riffle, Cascade,	Under cut bedrock, Overhanging, Depth, Turbulence Cover, Small Woody Debris.	Boulders, Cobbles, Gravels and Fine Sands	Human Habitation, Fishing, Protected Areas as Reserved Forest and Agricultural Use	Visible	Colluvial

In River Siang catchment area the major drainage can be delineated as dendritic, sub-dendritic, sub-parallel, trellis and rectangular pattern. The drainage of the most of the part of the

river catchment area is collected from the available topographic maps. Drainage was controlled by the

The drainage networks by large rectangular and trellis that are orienting the channels along North-East and East-West directions in the central domain. The drainage patterns are as follows:

1. Dendritic Pattern
2. Trellis Pattern
3. Rectangular pattern
4. Sub-Parallel Pattern

The course shifting and braided character of the alluvial river also gives some anastomosing

structure and the lithology of the area.

pattern of channel. In the eastern side Ranaghat and Pasighat shows anastomosing pattern. In the eastern side of the river change its course occupying the other tributaries along with the main river (Talukdar, 2011; Ouchi, 1985). This type of anastomosing is found in intermittent to perennial stream systems with net long-term erosion, in contrast to braided streams which are characterized by net long-term deposition, and which occur within well-defined floodplains.

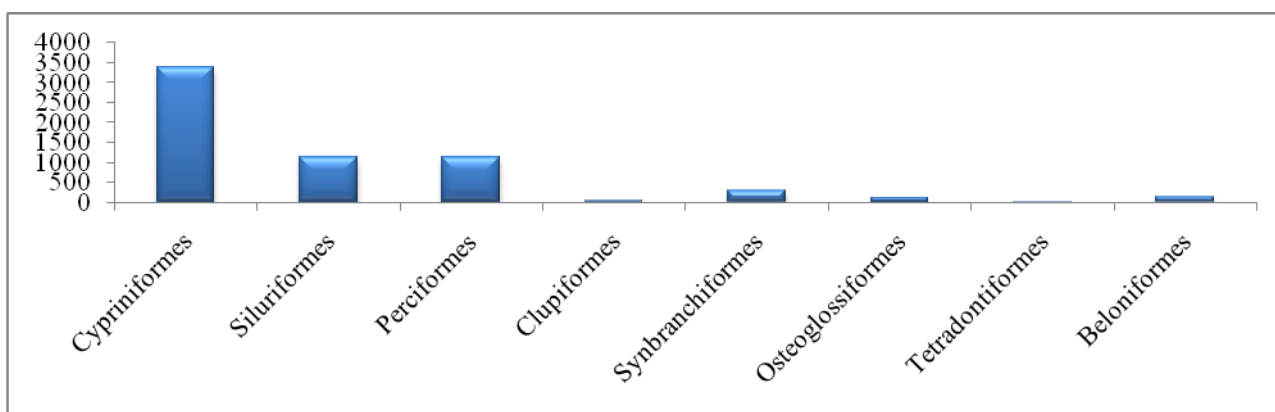


Fig I: Number of Fishes Recorded in River Siang in Order

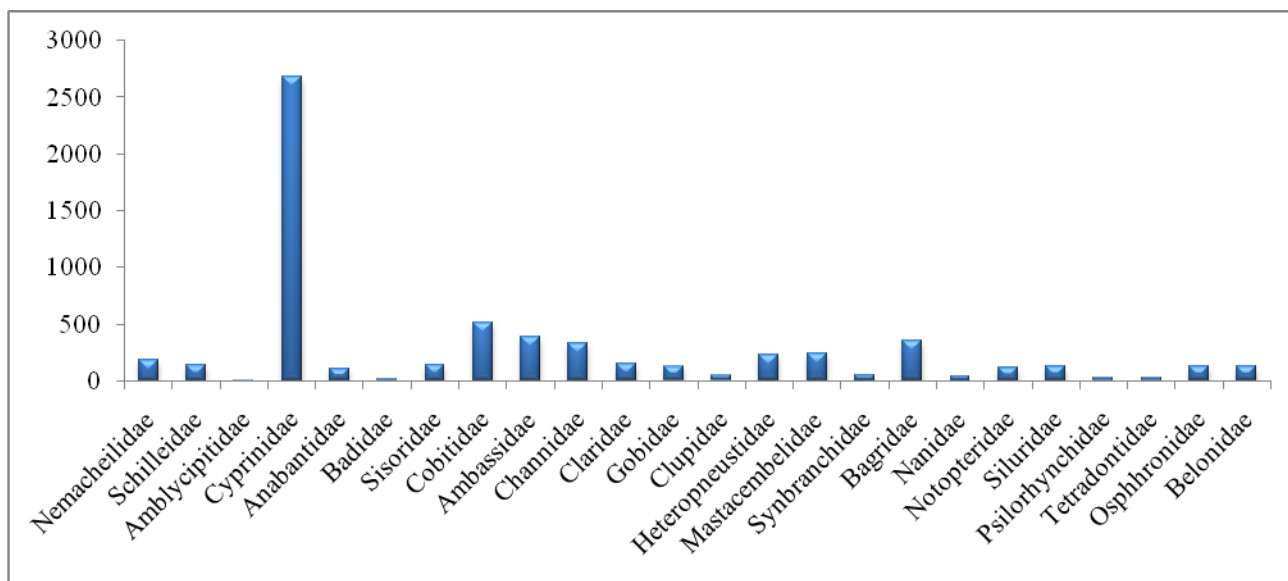


Fig II: Number of Fishes Recorded in River Siang in Family

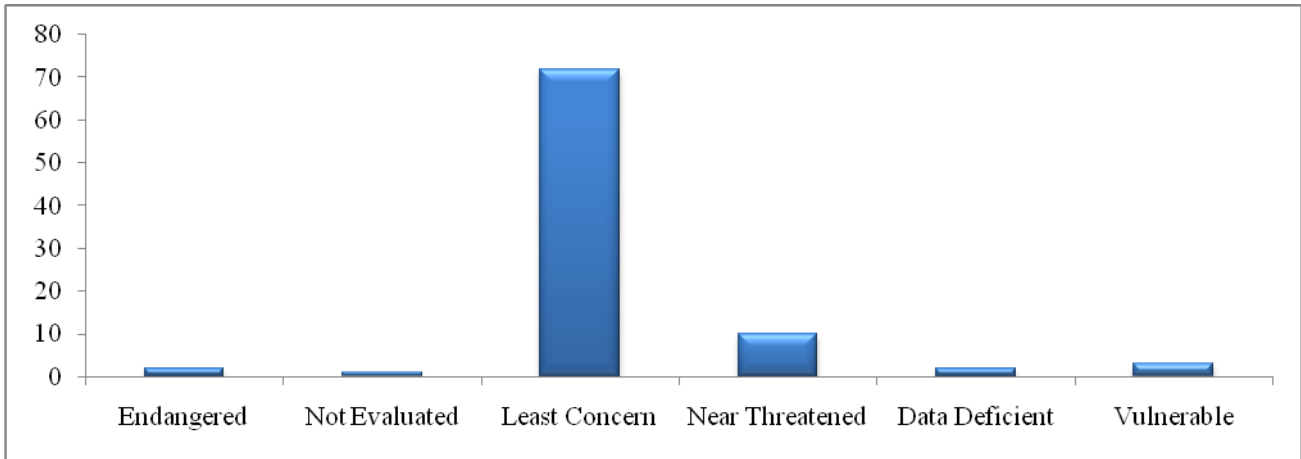


Fig III: Conservation Status of Fishes Recorded in Siang River

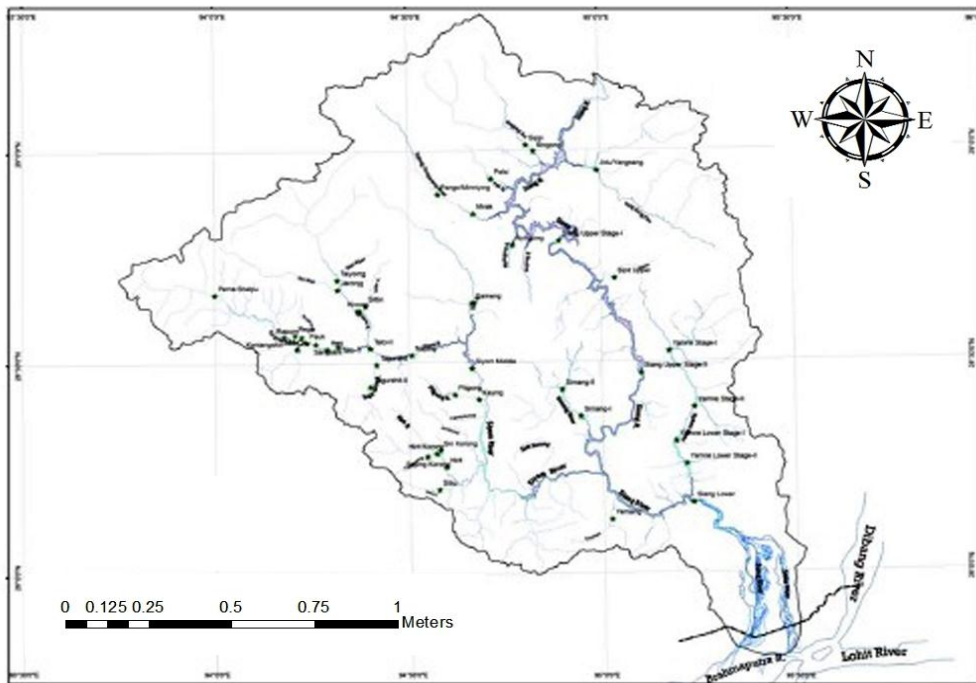


Fig IV: Drainage Basin Map of River Siang from the upstream to downstream of the river.

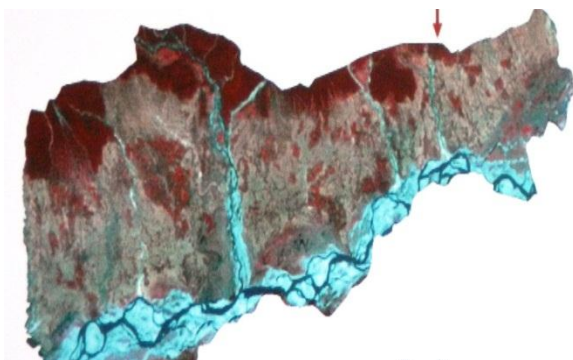


Fig V: Drainage Basin of Siang River in Satellite Image

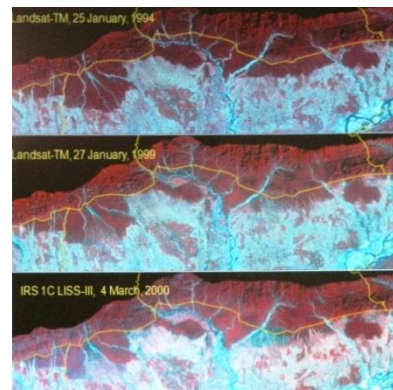


Fig VI: Drainage System in Different Year

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