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**Shweta Singh**  
Guru Gobind Singh  
Indraprastha University,  
Sector-16 C Dwarka,  
New Delhi-110075

**Amit Pandey**  
Guru Gobind Singh  
Indraprastha University,  
Sector-16 C Dwarka,  
New Delhi-110075

## Significance and Commercial Aspects of Ethno-fishing Techniques used by Baiga Tribe to improve their Livelihood in Amarkantak, Madhya Pradesh, India

**Shweta Singh, Amit Pandey**

### Abstract

The paper documents and analyses the ethno-ecology associated with fish harvesting practice of 'Baiga' community inhabiting in Amarkantak and adjoining region of Madhya Pradesh. In 'Amarkantak' the density of *Baiga* population is higher than others. The study indicates that this indigenous technical knowledge for fishing has been developed by local tribes specially women since time immemorial. In this method tribal women used the behavioral pattern and microhabitat type used by the fishes. The study reveals that they used bunch of tall stout tropical grasses for trapping the fishes from the bank of ponds and swampy places. The present information discusses the species specific and habitat specific methods utilized by tribal fisherwomen. The study also revealed that hand netting for catching fishes is done by using an aquatic grass *Sacciolepis interrupta* which is frequently used by *Baiga* women and it's of immense commercial importance to the tribal people to earn their livelihood by selling the nets and for their own use to catch the fishes.

**Keywords:** Fishing Techniques, *Baiga* Tribe, Livelihood, Amarkantak

### 1. Introduction

Tribal inhabitant and rich primitive culture covers much tradition and fish is an integral part of tribal food habit since time immemorial for many regions in India. The livelihood of tribes mainly depends on naturally available foods which can rarely reap in other places. The origin of fish farming in India dates back to 1900 AD, it is started with the fish seed collected from rivers and their subsequent stocking in the shallow impoundments created at the mouth of tidal inlets [1, 50, 51]. Later hooks, harpoons, spears, operation of indigenous nets, traps fishing techniques were developed. Selection of fishing methods and use of gears are influenced by various factors such as topography of water body, nature of fish stock, behavior of fish, characteristics of the raw material from which the gears are fabricated<sup>2,3</sup>. Use of modern fishing devices like synthetic gears, plywood fiber glass motor boat, dynamite, fishing vessels, use of long persistent chemicals for catching fishes have adverse influence on aquatic living organisms including fish [48, 52-54]. Hence biodiversity of the aquatic ecosystem is being destroyed in a drastic manner. But fishing by traditional devices will not give any ill effect to the ecosystem [49].

Amarkantak is located in the state of Madhya Pradesh in India at 22.67°N 81.75°E. It has an average elevation of 1048 meters (3438 ft). It is situated at the meeting point of the Vindhya and the Satpura mountain ranges amongst sylvan surroundings, Amarkantak is a great pilgrim center for the Hindus, and is the source of the rivers Narmada and Sone. While the Narmada flows westwards from Amarkantak, the Sone flows towards the East. Amarkantak is indeed blessed by Nature. Holy ponds, lofty hills, forested surroundings, breathtakingly beautiful waterfalls and an ever-pervading air of serenity make Amarkantak a much sought-after destination for the religious-minded as well as for the nature-lover. River which is the ultimate source of livelihood for many tribal communities inhabiting in and around Amarkantak. Several tribals as *Baiga*, *Gond*, *Kondar*, *Kol*, *Bharia*, etc. are maintaining their lifestyle, culture and traditions since these cultures are influenced by scientific and economic changes, it is therefore, essential to study and conserve them before they become extinct [4]. Among them *Baigas* are the last residual population and one of the most ancient indigenous tribes of Central and Western India and still hold on to their ancient ways [5, 6]. They are still not entirely a part of the mainstream of the country. It seems *Baiga* families have recorded their history from ten to thirty thousand years ago in the rock shelters of Central Narmada Valley region of Hoshangabad and its adjoining districts. Their simplicity, culture, lifestyle, low levels of literacy and close bonding with nature make them a special people. Though no longer associated with the term 'hunting savage' yet they still follow

**Correspondence**  
**Shweta Singh**  
Guru Gobind Singh  
Indraprastha University,  
Sector-16 C Dwarka,  
New Delhi-110075

many prehistoric traditions. The biggest concentration of this oldest aboriginal tribe is in the 'Baigachak' area of Amarkantak near Dindori district, is about 50 km. from main Dindori, surrounded by dense forest patches, rivulets and hillocks. The second largest grouping of the *Baigas* lives in Mandla, Balaghjat and Seoni districts of Madhya Pradesh and Bilaspur, Kabirdham and Surguja districts of Chhattisgarh [7]. The smallest geographical grouping of the *Baigas* exists in Sidhi, Rewa, Satna, Shahdol, Mirzapur and Sonebhadra districts of Baghelkhand region, in both MP and Uttar Pradesh (UP). They may have lived in Central India at least for 20,000 years. *Baigas* always believed that they were the chosen few who were hand-crafted by the God Himself and hence were the kings and rulers of the whole earth. They called God the Bhagwan or Bada Dev (big deity). It seems over the years, by the medieval period, *Bewadia* got its name distorted and was called by its derogatory name of *Baigadia* those people who destroy land and forest by burning. By latter medieval times *Baigadia* shed the last three letters and became *Baiga* by which name this community is still addressed and identified [8]. The life of *Baigas* mainly depends on natural available food and economy mainly depends on agricultural (a shifting, slash and burn method of growing crops.), fishing and collection of minor forest produce. The other employment opportunities are unskilled labor and work in forest. These people have assimilated unique knowledge about the nature. This indigenous knowledge is a potential tool in searching for food and medicines. In turn they protect the forests, conserve its diversity, and also enrich fertility with various cultural activities. They also have a special skill that has been passed down every generation.

River Narmada originated from Amarkantak is one of the most important natural sources of water and important ecological diversity in the state of Madhya Pradesh. Rich biodiversity of fishes present in Narmada River, therefore fishing commonly practiced in the river is responsible for the livelihood for a large number of tribal families living in the vicinity of the river. Riverside capture of fisheries in the Narmada region is a very important source of household welfare for many of rural and tribal poor, particularly for providing nutrition (specially the much need protein), income and employment. A huge group of *Baiga* community and members of other tribes depend on fishing in the river and other related activities like fish marketing and trading, craft and gear maintenance etc. for their livelihood. Hundreds of riparian fishermen and women belonging to the tribal communities earn a living by fishing in the river throughout the year. Deficiency of proper equipments or instruments, which are necessary for fish cultures, hinders the socio-economic growth of people belonging to the fishing. Tribal and the fish traders socioeconomic condition is still in an early stage of growth [9].

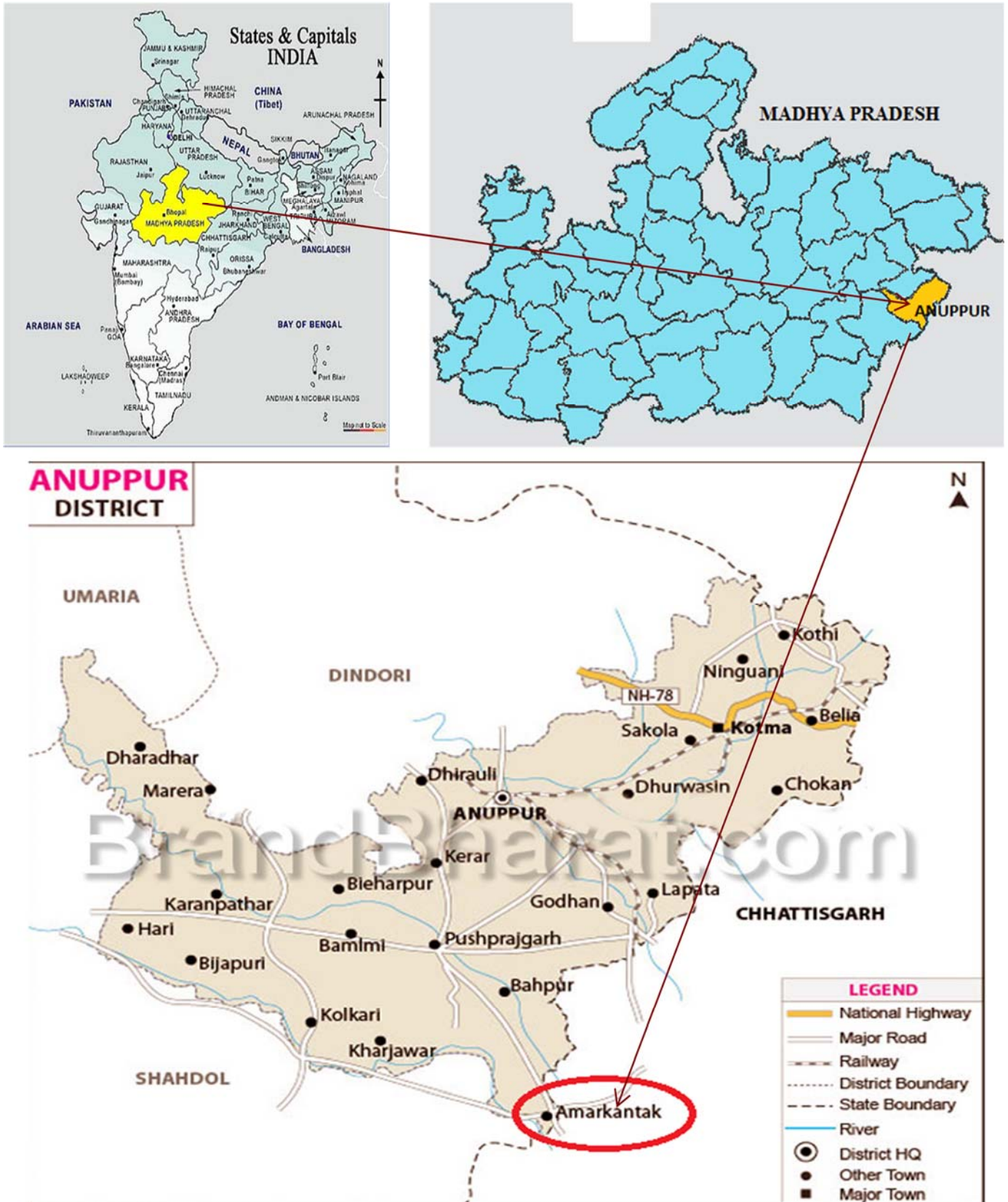
A number of researchers have reported indigenous technical knowledge on fisheries in relation to marine resources conservation and management in India as well as in abroad [10-18]. A few researchers have worked on indigenous fishing techniques of Indian Fisheries of marine and fresh water in different parts the country [19-21]. Indigenous technical knowledge related to inland fisheries on fishing and harvesting was documented by many workers [22-31]. Central India has rich fishing resources, which are the essential part for fishermen of local and tribal people of rural areas. These are providing direct and indirect jobs and provide economic benefits in relation to population. Hence, very few literatures have been found on ethnic fishing techniques and methods [32-

33] and no more literature has been found that are cited the available indigenous crafts and gears in Amarkantak district used in fishing operation.

Some workers have focused on fishermen's occupation in the description of socio-economic and socio-culture aspects [34-35]. Ahmed (1960) described some variables like education demonstration and economic uplift programs under the head economics of fishing industry [36]. At present fishermen do not get their actual price due to lack of transportation and malpractice in the marketing system. But the study on this aspect is very scanty and fragmentary. A few workers worked on the transportation and marketing system [37-38]. In many cases these are formed of illiterates/semi literate, indigent fishermen and women who lack the knowledge of latest fishery technology and proper attitude to fishery development [39]. In the absence of proper techniques and skills they cannot lead towards their development. The *Baigas*, lower class tribes, is one of the traditional fishing communities of India. They live in the vicinity of Narmada River and earn their subsistence by catching fish. They are socially, economically and educationally disadvantaged and lack their own financial resources. The gradually declining riverine fish production in recent years has added to their adversities. So, that the present study was concentrated to evaluate and document the innovative fishing technique used by the *Baiga* tribe of Amarkantak region to improve the livelihood.

## 2. Materials and Methods

Field visit was made in June to September 2014 and data were collected from the bank side of Narmada river, water check dam Khudia Dam, Durga dhara, Mendri Sarai fall, Sinhwal Sagar Lake at Amarkantak and adjoining area *i.e.* Johilla at Jaleshwar, Son at Sonemuda where local people practice different methods of ethno-fisheries. These water bodies are situated in and around the Amarkantak. Information on indigenous fishing methods were collected through intensive field survey, interaction and interviews with local fishermen and women of *Baiga* community as well as other community members of the Amarkantak and adjoining areas of Dindori and Anuppur districts. A total of 85 fishermen and women who are practicing traditional fishing methods were interviewed for the study. During the interview, questions were asked to get information emphasizing on the following aspects- (1) Main source of livelihood and income (2) Tools they used frequently for fishing (3) How much time they spend for fishing (4) Type of fishing techniques (5) Type of fish species commonly found. The information collected is compared with the available existing information in the literature. For some methods information has been gathered from literature with few variations. This slight variation is needed to suit the available materials, topography, and fish behavior, nature of rivers and style of living. But for some methods, there has been no documented record in the literature. Focus group discussion and personal interview with the indigenous fish farmers were one of the tools which were effectively used in this study. The present paper mentions significance of two main plants *Sacciolepis* and *Bamboo* in ethno-fisheries by *Baiga* tribe, which are popularly used in traditional fishing technologies. The methodology of ethno-fishing techniques along with the botanical name, family, folk names, phenology, part/parts used and ecological status of both the plants is also discussed. Herbarium specimens were identified at Central National Herbarium (CNH) Kolkata and Herbarium specimen has been submitted at GGSIP University, New Delhi for further reference.



Location Map of Amarkantak and adjoining area



(a) Fisher Women collecting aquatic grass *Sacciolepis interrupta* ; (b) Preparing grass nets (c) Fisher women releasing fishes from the grass net (d) Collecting fishes (e) Collected fishes (f) Interaction with tribal and fisher women (g) Small fresh water Prawn *Macrobrachium rosenbergii* De Man; (h) Fisher man making Bamboo *Bisar*

### 3. Results

*Baiga* tribe is rich in Ethno-fisheries Techniques (EFT) derive their protein diet requirement directly from the wild sources. In both the ethno-fisheries techniques plants have been found to be widely used as gears and traps. These techniques found are eco-friendly and sustainable. For the surveyed data, it was observed that about 80%-90% of *Baiga* people use Grass (*Hathilid*) mattresses and *Bisar* in the Amarkantak and adjoining areas. The hand netting is done by using an aquatic grass *Sacciolepis interrupta* which is mostly used by *Baiga* women and it's of immense commercial importance to the tribal people to earn their livelihood by selling the nets and for their own use to catch the fishes. Living in a hostile environment *Baiga* Tribe uses innovative techniques to catch fishes. They use two techniques:

(1) ***Bisar***: It is made up of the bamboo splints weave with the help of nylon threads in form of mat. The bamboo splints are diverged straightway to the bottom. The gear has an opening on the top and gradually widen to the open broader at the bottom. No neck or convolution. Small indigenous fishes in pond and stagnant water are caught. It is used in shallow ponds, lakes and flowing water. The base of the ***Bisar*** dug into the mud of shallow water logged area and picked the trapped fish from enclosed water area through the opening on the top.

(2) **Grass (*Hathilid*) mattresses** - This ethno fishing technique is very common among the tribal people live around the lake as well as being a cultural symbol of the ethnic *Baiga* people. The people of *Baiga* tribe construct mattresses of grass *Sacciolepis interrupta* or other tall aquatic monocots for trapping and scooping up fishes near the surface of the water. They have been used these grasses since antiquity. They are also called scoop nets or mattresses. This ethno-fishing technique mostly used by *Baiga* women and it's of immense commercial importance to the tribal people to earn their livelihood by selling the fishes and for their own use to catch the fishes.

Interview with tribal people revealed many common fish species found in the region which was documented in the local names but has been translated in scientific names following many research articles. The natural fish fauna of the area consists of namely *Macrobrachium rosenbergii*, *Parapsilorhynchus tentaculatus*, *Garra mullya*, *Puntius ticto*, *Puntius sophore*, *Catla catla*, *Labeo rohita*, *Cirrhinus mrigala*, *Labeo calbasu*, *Notopterus notopterus*, *Osteobram cotio*, *Puntius sarana*, *Clarius batrachus* (Endangered), *Hypothalmichthys nobilis*, *Mastacembelus armatus*, *Channa marulius* and exotic carps like *Cprinus carpio* (common carp), *Ctenopharygodon idella* (grass carp), and *Hypothalmichthys molitrix* (silver carp) have become common here [40-47]. The total amount of fishes caught per net was found to be 1-2 kgs, subsequently such traps have been arranged at different localities depending on geographical conditions of the water body i.e. whether it is river, bund, lake, depth of the available water body.

### 4. Conclusion

Amarkantak area possess a lots number of water bodies like Narmada river, water check dam Khudia Dam, Durga dhara, Mendri Sarai fall, Sinhwal Sagar Lake at Amarkantak, Johilla at Jaleshwar, Son at Sonemuda with numerous indigenous as well as exotic fish species (and in terms of commercial fisheries it is one of the important water bodies of Madhya Pradesh as well as India. These water bodies have lots of problem regarding fish harvesting. Tribes especially *Baigas*

posses a wealth of knowledge related to traditional fishing techniques. Their techniques are specialized accordingly to size and structure of water body, season and species of fishes intended to be harvested. Traditional fishing techniques and instruments are mostly used in Amarkantak as well as its adjoining areas. Proper training of modern fishing methods should be provided to the tribal community by the Government for commercial yield of fish production. Traditional fishing techniques varies considerably in detail from region to region, but an analysis of the range of techniques employed show that the techniques and tools used depend on the type of habitat being exploited. The present study also reveals that though *Baiga* people of this area are familiar with the knowledge of habit, habitat and reproductive behavior of fishes found in this area though they catch fewer amounts of fish yet it is sufficient for them which is a proof of their sustainable practice of resources. Study further reveals that *Baiga* in this area are quite conscience to protect their biological resources and practices sustainable fishery. It has also been observed that all selected water bodies are perennial in nature and in the entire water body fishing rights rest with the *Janapad Panchayat* and *Nagar Nigam* gives them on lease to local tribes, who in turn partially culture fish and release of fish seed is a common practice [33]. According to the existing policy of M.P. Govt. only the registered co-operative society are empowered for fish catching and marketing of fish from the water bodies. Fishing craft and gears adopted by fish farmers of Amarkantak were simple. Simple tools are used by local fishermen and women for commercial catches of fish. The craft and gears were mostly old-fashioned, indigenous. The present work is a sincere effort towards developing a good understanding of traditional fishing techniques used by *Baiga* tribes of Amarkantak region which is not documented till the date.

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