Traditional Hunting & Trapping Practices Among The *Nyishi* Tribe Of Arunachal Pradesh And Its Impact On Biodiversity

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Abstract: Indigenous trapping system is attached with the tribes of north east India, particularly to the people of Arunachal Pradesh as part of their life and culture. Apart from agriculture as the primary source, these people depend on animal trapping practices as secondary means of livelihood in day-to-day activities. The present work was carried out in East Kameng district of Arunachal Pradesh. People of this area are fond of hunting and fishing using indigenous traps. Almost all the tribes viz; *Nyishi, Aka, Miji* and *Sulungs* use the traps for catching preys. These practices are believed to be as old as the human races with close affinity. The simple structures with unique mechanisms these traps are used in certain periods of the year. The technique adopted is unique whose mechanism works on the scientific principle utilizing the restored stress force to trap the living organisms especially birds and mammals. The practice of trapping system is environment friendly, as because these can be used as and when required without damaging environment and climate. The trapping practice could be reasonably used for keeping ecological balance when the favourable season or environment arrives for rapid explosion of fauna and flora in the nature.

Key words: Indigenous trapping system, Kameng, Nyishi, Aka, Sulung

Introduction

Arunachal Pradesh lies within the Eastern Himalayan biodiversity hotspot (Myers *et al.,* 2000) and among the 200 globally important ecoregions (Olson & Dinerstein, 1998). The state is inhabited by 26 major tribes and a number of sub tribes. The people have their own identities, heritage, myths and practices. In the last few decades, human population have grown accompanied by rapid changes in lifestyle and economy of the tribal communities (Datta, 2007). The indegenos people living in the vicinity of forests depend on wildlife for food, trade, cultural purposes and income (Robinson & Redford, 1991; Fa *et al.,* 1995). Traditional hunting techniques have been recorded in different geographical regions of the world in accordance with the cultural entities of ethnic groups (McKinney M. L. 2001; Colell M., Fa J. and Mate C. 1994). Each ethnic group has developed their own trapping and hunting techniques of fish, birds and animals, which serve their purpose of day to day requirement of food. Hunting culture is widespread in the state of Arunachal Pradesh and has led to low wildlife abundance (Datta, 2002; Hilaluddin *et al.,* 2005; Mishra *et al*., 2006). Villagers do hunting of all types higher vertebrates however, tend to remember mammals only because of large size and higher consumptive as well as economic value than the number of birds or reptiles (Aiyadurai *et al*., 2010). The trapping system is being practiced by almost all the tribes found in Arunachal Pradesh with different names and techniques for their livelihood and sustainability. The traps are designed in unique pattern and thus, interesting to know the principle and mechanism behind. The people extract bioresources from the forest and rivers in turn they protect and conserve their natural forest through the implementation of customary laws.

The present work was carried out in East Kameng district of Arunachal Pradesh. The district lies between longitude of $92^0$36` E to $93^0$24` E and $26^0$56` N to $27^0$59` N latitudes, with the total area of 5,065 sq.km. Seppa is the district head quarter which is 344 km from Itanagar. It is surrounded by West Kameng in the west, Papumpare in the east, Assam in south, Kurung kumey and China in the north and north east respectively. Kameng is the main river with several tributaries flows through the district to the mighty Brahmaputra in Assam. The climate is largely influenced by the nature of its terrain. During winter particularly in the months of December-February it is cold. However, the forest hill region and urban areas experiences high temperature in the months of May-August. Temperature varies from place to place depending upon the elevation. During monsoon season rainfall is heavy in the valley. The major and minor tribes inhabiting in the district are Nyishi, Akas, Miji and Sulungs (puroiks). The livelihood of approximately 80% population is agriculture i.e. jhum cultivation. Besides agriculture they raise mithun, cow, goat, pigs and hens. Study on hunting and wild meat consumption in Asian tropical forests reported that some of the animals were hunted to obtain their animistic ritual pelts and use as traditional and aphrodisiac medicine in ethnic societies (Bennett E. L. and Robinson J. G. 2000).

Tribes using traps

People of this area are fond of hunting and fishing using indigenous traps. Almost all the tribes viz; Nyishi, Aka, Miji and Sulung use the traps for catching preys. The principle behind for each trap is the application of force in different pattern depending upon the objective of trapping animals. The techniques of making the trap are same but names differ slightly from tribe to tribe and locality to locality. The traps are used for catching animals, birds and fish. The most favourable season for using traps against birds is winter and spring when the fruits and flowers are enough. Traps are generally fixed in that area where forest is shady and dense enough with good vegetation. Traps such as Kama, Gopik, Marang are used for trapping animals like deer, bear, tiger, and many species of birds.

Materials and methods

The first hand information on trapping mechanism was collected from the local people of the study area. For record keeping, standard open end questionnaire has been prepared and met with the village people for data collection. The traps both at the trapping place and at stores were photographed/ drawn for proper documentation. The areas from where the information was collected were mainly dominated by Nyishi tribes in the East Kameng District of Arunachal Pradesh. Around 100 numbers of local consultants were contacted for collecting the proper information on the trapping systems.

Results

Traps used for birds and mammals

1. Ada (stone trap)

Ada is tradional trap as shown in Fig. 1A used for trapping birds. The stone trap which is traditionally called as *Ada* is very unique in structure made up of a stone generally flat (medium size preferred). The food materials, fruits, insect larvae are used as bait for attracting the preys. Other parts consist of twig and bamboo slits. These traps are placed in the forest generally shady and dense where diversity is rich enough. The mechanism behind the trap *Ada* is simple and easy to understand where a medium size flat stone is place over a twig (cut) from the ground level. The stone is kept at about 45 degree angle from the ground with the help of twig (*dale*), between the dale and stone a small piece of bamboo acting as balancer. Now a "*pello"* is adjusted with balancer and twisted down ward to support the "*dasso*" (a bamboo piece where fruits and worms are placed. All the sides are blocked with small fence leaving the entrance. The trap is ready, so when any rodents or birds comes the way and try to eat or pull the fruit from the *dasso*, the *dasso* is click away with that the trap is collapse and the prey is caught in the trap. Caught prey is collected by lifting the stone trap.

2. Marang

The traditional "*Marang"* trap for catching birds and mammals is almost similar to that of bow but here one end is thin and other is real trap (Fig.1B). A cane rope is tied at one end stretching to another with a connected (*Marang asso*) adjusting the piece of bamboo *("Blachi").* From the blachi another small

rope is extended and tied with the controlling and balancing part (*"Lachi"*). The triangular structure is called as *rangung* and the rope is *"marang asso"*. It is generally hang on the branches or set up on the ground where there is chances of playing and roaming of animals. The trap is unique in itself, when it is to set up, *marang asso* is pulled towards the *rangung* and the *blachi* is twisted inner side of *rangung* resulting in the bending of marang bamboo and a force is restored giving a proper shape to the rope between the *rangung*. The controlling part is *lachi* pull and fixed at the lower side to balance the small, thin bamboo piece (*dasso*) blocking the entrance point and a good fence is made. Grains are kept in the inner side of trap to attract the preys. When any prey comes that way, try to get pass to eat the grains between the rope and the controlling stick i.e. *dasso,* the prey touches the *dasso*, the *lachi* is released from the place further more releasing the *blachi* resulting the rope to come back with a force and the prey is trapped with no chance of escape. The prey is collected by pulling the rope.

3. Garga (bow trap)

"Garga", a traditional bow trap of Nyishi people is used for live trapping of birds and larger mammals (Fig.1C). The trap looks like a bow, due to its shape similar to bow and which can be bent. It is generally made from bamboo, cane rope and other materials available in the jungle. The trap is used for trapping birds only. The fruits and flowers are used as bait in the trap. It has the capacity to capture one prey at a time, doubling is very rare. Normally two sticks are closely attached (*Gado*) to each other with a long rope passing though and get bind to both ends of the trap. When it is made ready, two *Gados* are made apart giving a V shaped structure. In between the two *Gados* there is a thin piece of stick known as *Kukla* where the fruits and flower are placed. In one of the end the balancing part *(Lechi)* a small piece of bamboo is tied, with the V shaped *Gado* the *Lechi* is fixed over one of the *Gado* with a gentle adjustment with a *Kukla*, the trap is ready. Now the trap is hanged over a branch over a flowering tree or bushes. The fruits and flowers attract the birds from the nearby area and the bird come closer to the trap or sit on the *Gado* and tries to strike or eat the material from the *Kukla*, the *Kukla* is shattered and in doing so the bird is caught in between the two *Gados* coming back into resting position with a great force.

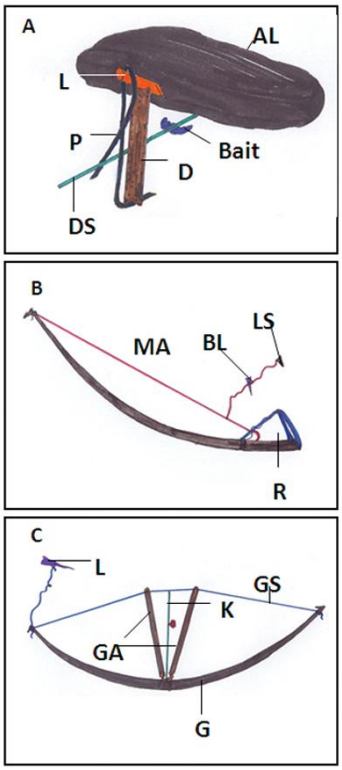

Fig.1. Traps components and their Mechanism. A =Ada, B=Marang C=Garga. AL=Alang, D=Dalle, L=Lachi, P=Pello, DS=Dasso MA=Marang Asso, BL=Blachi, LS=Lachi, R= Rangung, GS=Gado Asso, GA=Gado, K=Kukla, G=gata.

4. Bows and arrows

This is not a trap but used by the hunters to kill birds and animals, locally called as *"ari"* (bow) and *"apok"* (arrows) (Fig 2A). These are generally made from bamboos. After cutting a piece of bamboo shape is given to a bow with broad in the middle and tapering ends. Both the ends are marked and dried for several days in the smoke for strength and flexibility. A rope or bow string made of especially made of wild plant bark is tied at the both ends. The "*apok*" (arrow) are of different types based on the shape of head portion viz. *Marto* (star shaped), *Nyirang* (spear head) and *Pukkhei* (normal pointed arrows). The head of the *Marto* and *Nyirang* are made up of metals such as iron and tin. These arrows are used in hunting for large animals with poisons. During

shooting arrow is released from the string of bows with some force that can make injury. When an arrow is fixed on the bows string in the middle and pulled using both hands one to bow and other to the arrow in string, minimum expected angle formed at the two corners of bow (i.e. between bow and string) is 30° to 40° and the point of holding the arrow should be more than 90° giving a straight direction with best aim towards the target. In doing so the force restored when pulled and when arrow is released the string comes back to its original position and support the arrow to move forward hitting the target. The arrows are kept in clusters in a hollow bamboo covered with animal furs called "*Agge*". When the target is hit arrow pierce the bird or animal body resulting into death.

5. Gopic (Rope Trap)

The *Gopic* is a simple trap constructed with the help of thread or rope and plant twigs (Fig.2B). The trap is mostly set up in those areas of forest which are dense and a lot of playing sites and paths of birds and animals are commonly seen. Here no food material is used for trapping the animal and birds rather their daily paths and route is blocked with the trap. In case of birds grains are used as bait to trap. The mechanism of this trap is that a rope ("*Giyo*") is tied to a strong and long twig of medium size called *Tollo* which can pull with a great force when a prey is caught in the trap. It should be flexible enough and is made bend along with a *Giyo* towards the two strong sticks fixed to the ground for anchor. One of the stick (*Rangpang*) has given a deep cut mark where a piece of bamboo bearing the *Giyo* is to be adjusted. This part with rope is called *Geki*, acts as a balancer for the trap. Now the *Geki* is adjusted in one of the *Rangpang, Tollo* is bend with a resting force and the *Giyo* (thread) cover the path. All the sides are blocked with a fence leaving the entrance and exit point. Any birds or animals coming that way get passes through the gap or in between the *Geki* and *Giyo*. During passing or crossing over any kind, a stress or jerk is given to *Geki*, the *Geki* flicks away from the *Rangpang* and the animal or bird is caught in the rope with a great force from the *Tollo* to come back into its original position and the prey is hang up.

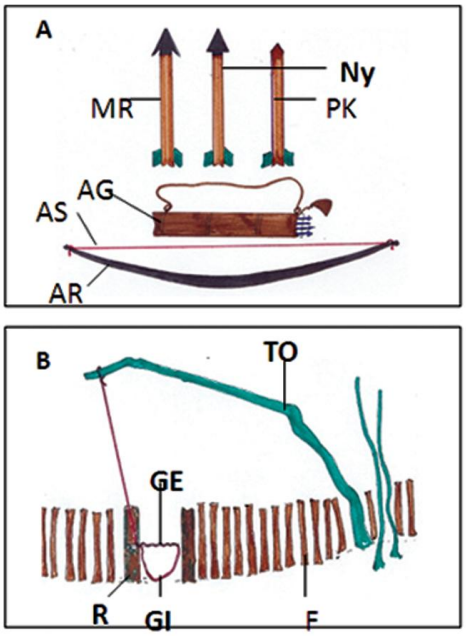

Fig.2. Traps components and their Mechanism. A =Ari & Apok B=Gopic, MR=Marto, PK=Pukeii, AG=Age, AS= Ari Asso, AR= Ari, F=Fence, TO=Tollo, NY=Nyirang, GE=Geki, GI=Giyo, R=Rangpang

6. Tachar charna (Sticky trap)

The simplest trap so far known and practice, made up of bamboo sticks and the local gum (*Tachar*). The tachar is obtained from the barks, roots and stem of a particular tree known as "*Sangkang Sangne*". The particulates of the barks are collected and cut in to small pieces rolled and massacred continuously for hours till it becomes sticky enough. The sticky paste is fried along with synthetic rubber for strong stickiness till it turns black in colour, and the final paste is applied on the bamboo piece for several days. During the appropriate season especially the winter and the spring when the fruits and flower are plenty, the trap is set up on the branches with flowers and fruits, even bushes in a circular pattern. Fruit and the flower loving birds approaches near the trap to eat or suck the nectar touches the sticky sticks and bird is caught in the sticky gums in their feathers makes them unavailable to fly away and within a few minutes bird get fall down. Through this trap one can collect many numbers at a time in living condition with minimum injuries.

7. Rabda

The trap has some similarity with the "Ada" (stone trap), only the difference is that in case of *"Ada"* flat stones are used and in *"Rabda"* it is made up of flat bamboo, sticks compiled together tightly with cane ropes in a square or rectangle shape. Over that a thick layer of soil, small stones are kept for more weight and other parts same as *Ada*. The *Dalle* used in a *Rabda* is thicker and stronger. From the surface ground a thin and flexible wild rope is kept beneath *Dalle*, then parallel to *Dalle* stretched upwards and around the *lachi* for balancing the *Rabda*. It comes down again in the opposite side *(Dachi)* to adjust with *dasso* where worms are kept above the ground for convenience. Any birds and rodents interested to get the materials come and to eat or pull which makes *"Dasso"* shattered thereby releasing the "*Dachi*" and "Lachi" with quick collapse. The prey is caught inside the trap. Collection is done by lifting the trap. It has the potential to trap one at a time.

8. Kama (Spear trap)

It is very ingenious device and works like automatic weapon and complex in structures. An spear bamboo piece made from a bamboo species called *"Tallam"* (local name) is placed on the string made of cane or wild creeper to the "*Sangdang"* (point of fixing). Three-four strong woods dip in to the ground for strong support, these are called *"Makos"* tightly tied to each other. Another strong and flexible twig is tied to the *"Makos"* in one end and spear at other end. This part is *"Madang"*. Another loose string (*Lachi*) is connected to the *Lachi Dalle*, which is balanced and adjusted to ground string (*Garbic*) where the animal is likely to come and cross the way. The animal (Deer, Bear and Tiger) approaching the trap and pass through the way touching the ground string (*Garbic*) and giving slight jerk or pulls often happens when a loose string rope is kicked or trampled by the foot of animal. The spear (*Kama*) is fixed at a high place or a mechanism by the direction of *Kama* towards the loose end of the string. The string and spear (K*ama–Nankio*) is devised that the slightest jerk or pull to other end will release the spear from the *Sangdo* (supporter) along the long stick with a greater force and the animal is hit in a flash, some were in the body and kill the animal. The trap miss the target very rarely, one prey at a time is the capacity. The trap is generally set up in the deep forest away from village where the animal frequently visits. The weapon is strong and sharp; it can hurt and kill the large animals such as tigers.

9. Takro

The trap is applied when an animal is to be killed without the hunter being present or observed by the animals. A deep and a hollow pit or wells dug in place or area which is known to be visited by jungle animals or to which wild animal can be driven. The pit is planted with sharp pointed spears made from bamboo pieces, in the inner side of pit and the surface roofing is done with fine bamboo clips is covered with grass and dry leaves to look like the rest of the place matching the ground. An animal wandering in the jungle or driven by the hunters to the way where the trap is set ready and animal passing the site is easily given way and the animal falls in to the pit in no time. The depth of pit is so high that the animal can not jump out and the animal is trapped. Some time fodders are kept in the middle of the prepared pit to attract the animals and when it comes to eat the fodder it slips and falls into the pit. The size of the pit varies according to the size of animal to be trapped and killed. This trap is dangerous because it can kill humans if happens to step over it. To avoid any such accidents it is the responsibility of a hunter to announce in the village and make the location of the trap distinct using some symbols which can be identified by common people.

Traps used for fish and aquatic insects

There are many traps, which are used for trapping fishes from the available source in the nature. The shape and size varies from to trap to trap and the mechanism is simple to understand. The mostly used traps are as follows:

1. Ader

"*Ader*" a trap used for catching fish. The trap generally made of both bamboo and cane; cylindrical in shape with broad opening, circular anterior and a narrow tapering posterior end. Both ends have opening. It is constructed from a bamboo cutted in to fine and long pieces and celled in to thin and flat pieces. These bamboo ropes are piled and wrapped one above the other with fine craft art leaving small spaces in between allowing the water to flow out of the trap, under water when

placed. The "*Ader*" is used for trapping fishes especially in the monsoon when rainfall is high and fish migration starts to lay their eggs in the rivers, paddy fields, small streams and drains. The trap set is kept in water for over night without disturbances and frequent visit in the early morning. The fishes caught in the trap are collected by untying the posterior opening.

2. Langpam

The typical trap "*Langpam*" as shown in Fig.3A, is made of collection of stones in a clump piled in a circular fashion one above other. The clump of stones is arranged in the spot beneath the water level. That is constructed in both current as well as shallow water especially shady area. The stones are piled in such technique that a hollow space is created inside the clump of the stones for breeding and accumulation of fishes. In one end of the clump an entrance is made and the space between the stones are blocked with leaves and bushes. The trap is kept undisturbed for two to three weeks. As the time passes and fishes get accumulated inside the trap (*Lumpum*) firstly it is covered with fishing nets properly. Then the entrance point is blocked with another trap (*Ader*). Now the stones are removed very slowly from another end, in that way stones are completely removed without disturbance. The disturbed and feared fishes gets into the trap (*Ader*) for protection and safety, rest are caught in the net. The *ader* is lifted and fishes are collected.

3. Shakum

The model of the trap (*Shakum*) is shown in Fig 3B. It is like that of cone with broad opening mouth and tapering down wards blunt end generally made from bamboo. Method of preparation is simple by cutting, pealing in to thin slices and then wrapped with bamboo ropes around the pieces in circular manner maintaining a gap till the base is fully covered with ropes. The gap is big enough for the water to flow out of the trap. Mostly the trap is set up in the rivers, streams and drains for trapping small fishes in the medium depth and less current. Stones are piled and arranged to make water flow in the direction of trap is setup. The trap is set in the river or stream, and left for whole night to let the fish enter inside. In the big rivers with stronger current the traps made bigger in size and stones are piled in basket and arrange in lines with logs and sticks tied for stronger support. Fisherman invigilates time to time for collection in the early morning and night.

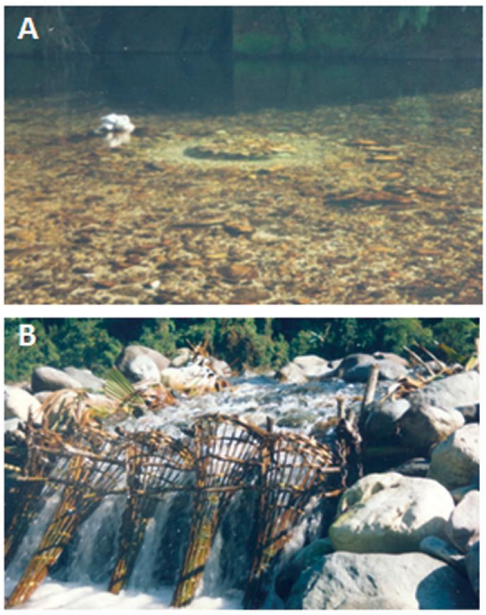

Fig.3 Photographs of Fish Traps. A. Langpam, B. Shakum

4. Sepe (Dam like trap)

The most rarely practiced trap for catching fishes is *"Sepe"* which is of dam structure. The shape is large enough that it covers the whole area traversing opposite bank of the river. It is difficult to construct since it requires more materials, labour and time. The trap is constructed over the river where water current is enough. Materials used are bamboos, logs, cane ropes, stones and bushes. Firstly, stones are collected in bulk and piled in big bamboo baskets. Several such baskets with stones are made called as *"Langwas"*. This *Langwas* are arranged in a queue in the water giving a V shape with keeping equal distance 2 to 3 m apart covering the whole river from each corner. Then 6 to 8 rows of bamboos and logs are very tightly tied over the each and every *Langwas*. Behind this row another supporter row is made by blocking the water passage with the help of leaves, bushes and stones, to divert flowing water in a single direction. This component of the trap is known as "*Patam*". For more support another row of medium sized bamboos and logs are tied along the *Patam* called *Sere* (first floor). The second floor of "*Sere*" is constructed 1m above the water surface towards the last part that is 3rd floor which is also known as catching chamber. Now thin and long bamboos are arranged in the waters in a sequential manner for smooth flow of water towards the 3rd floor. The carpet of

bamboos tied with cane ropes very close to one another helps the water to escape and fishes can not escape from the catching chamber. The current of water is most powerful in first floor of the trap (*Sepe*) and the 2nd floor water current is reduced up to some extent. The water current along with the fishes are dragged towards the subsequent flows till catching chamber is reached. The capacity is very high in this trap; following heavy rain very often fisher man can collect 20 to 30kg of fishes in a day.

Discussion

Hunting practice in Arunachal Pradesh is as old as the human history of this region of eastern Himalaya. Eastern Himalaya is known for its different climatic conditions, e.g. rain forest, temperate, ever green and alpine nestling innumerable diverse wild life of different categories. Particular tribal groups inhabit in specific area of the state. The erstwhile Kameng district is famous for mighty Kameng river giving the shelter to the *Nyishi* group of tribal community of Arunachal Pradesh. *Nyishi* people are known as one of the expert hunter groups in Arunachal Pradesh especially for wild animals. This hunting is done mainly for food, medicinal purpose and cultural requirement as well as religious beliefs. Use of wild life and their products are observed to be very common among the various ethnic groups of India including Arunachal Pradesh (Pal, 1993; Borang, 1996; Solanki *et al.,* 2005) . The Nyishi people catch wild animals including fishes, reptiles, birds and mammals using various traps which are made up of locally available materials in indigenous technique. It has been observed that these traps can be used for various propose in regulated manner either for killing the animals or to catch the later alive. Killing of animals for food can not be ignored for the sake of societal nutritional requirement as well as maintaining ecological balance in wild condition. In such situation abundant wild life could be considered as the source of food for those communities living away of modern amenities. However, at such situation hunting and trapping system should not by threat to the wild life in their natural habitat. In many parts of the world, trapping and hunting of wild life by ethnic group of people become a threat for survivality of wild life (Bodmer, 1994; Bowen-Jones & Pendry, 1999; Bennet, 2002)

The indigenous trapping practice could have impact on the conservation of Biodiversity. Extensive and unregulated use of the traps could be the threat to the wild life in their habitat. On the other hand these traps are very useful for the human and ecological balance where by trapping excess numbers in a population could be eliminated. The traps are used in a particular period of the year when the food materials are available in plenty in the environment. Among the Nyishi people the traps are set usually during the monsoon, winter and the spring season with plenty of flowers and fruits. However, this indigenous trapping practices should not be misunderstood with discreet killing of organisms rather, traps the preys with least injuries and can be released in the forest as and when required. It has been observed that there is system of giving punishment to the guilty person for indiscriminate killing of wild life among certain tribes of Arunachal Pradesh. Extensive use of certain traps could be a solution of pest control especially for rodents in agricultural field during season of bamboo flowering and other mammals.

Fish trapping mechanism prevailed among the Nyishi tribe has been considered as most relevant and environment friendly method of fishing in Arunachal Pradesh. Arunachal Pradesh has large numbers of streams and rivers with numbers of aquatic fauna including fishes. The first hand information revealed that among certain tribes of the state people use the fish poisoning system in rivers and streams for fishing purpose. Wild plants (e.g *Spilanthes sp., Zanthoxyllum sp.*) are being used for poisoning of fishes resulting in indiscriminate killing of aquatic organism in variably of eggs, juveniles and adults. Use of trapping system mentioned above, fishing could be a selective one leaving other aquatic organism free in the environment.

The indigenous trapping practices are the realistic art and technique which is the out come of the innovative and creativity acts of indigenous people in these areas which do depend upon it as a secondary measure and means for the collection of fish, birds and animals from the nearby forest sources. These techniques are still persisting in the form "indigenous knowledge systems" in the oral literature but not in written documents, which further needs proper documentation and exposure in the outer world. In recent years the trapping practices are loosing its momentum with

the change in the human mental set up, understanding of biodiversity conservation, urbanization and modernization. However, the trapping practices are also directly or indirectly involved in conservation of biodiversity and maintaining the ecological balance.

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