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Forest Resource Management: The use of Indigenous Knowledge

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Abstract

Indigenous knowledge is human life experience in the distinct natural and social compound, with the unique local and contemporary setting. The Pengaparaja live in harmony with their forest environment and their culture incorporates the spiritual and material, the living and non living into one integral whole. This holistic concept is evident and expressed in their myths traditions. The Pengaparaja have their own taxonomies of flora and fauna. They are familiar with and have a thorough knowledge about growth, maturity, efflorescence and decay about plants that are available in their forests. Particularly the Pengaparaja women are very particular about which type of bamboo shoots should be collected. It is analogous seen in the forest near the sample villages that patches with thick forest cover are left untouched by them. Only the patches with scanty growth and under growth are cleared by them for dangarchas.

Keywords: Indigenous knowledge, sacred groves, sacred trees, myths and religion, traditional, restrictive Practices.

Introduction

Indigenous knowledge is human life-experience in the distinct natural and social compound, within the unique local and contemporary setting. Indigenous means that "something is originating locally and performed by a community or society in a specific place. It emerges as people's perceptions and experience in an environment at a given time in a continuous process of observation and interpretation in relation to the locally acknowledged everyday rationality and transcendental powers"[1]. Indigenous knowledge is found in people's memories and activities and is expressed in the form of stories, songs, folklores, proverbs, dance myths, cultural values, beliefs, rituals, community laws, local language and taxonomy, agricultural practices, equipments, materials, plant species, and animal breeds[2]. The context of local social performance makes sense between people who share a common rural habitat, language and knowledge, be it exoteric (open for all) or esoteric (secret knowledge). In a traditional society the local context is taken as the universal frame in which knowledge matters. Indigenous is not formally taught, but perceived in a particular context at a certain stage of the perceiver's consciousness that grown in the world of local events. Knowledge is to be called indigenous, if it is bound to local experiences and takes its local world. Local knowledge, as we may also call it, is an encompassing whole of what has been revealed to human perception in a particular place or region. The perspective adopted is local, but concerned with the past and present or the dynamics of knowledge in the making[3].

"Traditional knowledge", is often a subset of indigenous knowledge[4], which is like modern science-based is also a system of knowledge, in that it is based on the accumulation over thousands of years of human observation and practice and the working out of interrelationships and cause- effect relations of different process. Such knowledge apparently seems to be more observational than modern knowledge, but spans multidimensional aspects of natural process and is more holistic because it is accumulated through the process of human observations *in Situ*[5]. Tribal have adopted diverse agricultural practices with their time-tested indigenous knowledge and technologies, and have integrated several related world view (spiritual) practices. They possess knowledge about agriculture, pest management, soil fertilization, multiple cropping pattern, food preparation and so forth. They recognize both natural and super natural forces and agencies shaping human destiny and seek to utilize them for their benefits according to their need[6].

Many communities practicing traditional resource use system have developed systematic body of knowledge regarding the natural environment, the functioning of the ecosystem and different habitats and how to manipulate these for human use without damaging the natural process and cycles. This is not to say that all such communities have done so, those which have not succeeded have either been destroyed or have moved to new localities on the exhaustion of the resources. However, the very survival of thousands of communities which are directly depended on the cultivation indicates that they had accumulated knowledge of natural resources. Tribal communities have their own indigenous knowledge for management of forest and forest resources and they are not imaged in reckless productions of forest resources like many other communities. They use to regard forest as their own property and hence never overexploit it to its devastating end. They have their own system of soil and forest conservation because they are vitally concerned with preservation and continuance of forest and simplify the age-old pattern of co-existence between man and nature. In fact, the tribal societies manifestly demonstrate that there are still ways

of living with nature without exploiting and destroying it. The traditional management practices not only helped in conserving the resources and ensuring its sustainable use but also serve as a 'common and safety net' for the communities[7]. Tribal communities have depended on their local environments for survival for a long period of time and therefore have developed a stake in un-serving the same. In the process they have accumulated a detailed empirical and qualitative knowledge base "handed down through generations by cultural transmission, about the relationship of living beings, including humans, with one another and with their environment"[8].

Significantly, the location of India's predominant tribal population is closely superimposed on the nation's forest tracts. With the greatest economic dependence on forest resources, it is not surprising that perhaps tribal possess the most extensive knowledge of India's forests, as well as the strongest motivation to ensure the continuity of these ecosystems. Barring a few isolated patches, the tribal communities co-exist with other local communities, whose production system exhibits a close linkage with forest biodiversity. These combined local communities (estimated population 200 million) therefore constitute the critical segment of the Indian population whose survival depends on the sustainability of forest biodiversity. There are also strong correlations between the locations of tribal people, forests and India's concentrated poverty areas[9]. Tribal communities that live inside the forest do hunt and cut trees for the fulfillment of their minimum needs, but effective rational, social and cultural norms regulate such activities and ensure adequate protection and regeneration of natural resources. Tribal and other local communities lead a life of frugality and simplicity and take from the forest what is absolutely necessary for their subsistence. This explains the strange nexus of high diversity and high poverty[10]. According to one estimate, indigenous peoples (some 300 million people), manage or control about 19 per cent of the earth's surface and are currently grouped into 4000 to 5000 different cultures[11]. Their system of management is generally tuned to the needs of local people and often social and ecological circumstances. Poole used the term "vernacular conservation" which is based on site-specific traditions and economies[12]. It refers to ways of life and resource utilisation that have evolved in that place and, like vernacular architecture is a direct expression of relationship between communities and their habitat. The settlement pattern of tribal habitats suggests that the size should finite to achieve sustainability [13].

These knowledge systems are handed down through oral tradition as well as through various religious rituals, cultural practices and beliefs in which they are embodied. There is increasing evidence suggesting the adaptation of these system to the changing ecological, social and economic conditions, although it is not really known how new experience and effects of changing conditions become assimilated in the "accepted" body of knowledge. The cultural practices in the Indian sub-continent indicate a number of traditions of restraints on the exploitation of wild plants and animal resources that reflect a detailed knowledge of functioning of the ecosystem and need to preserve biological diversity.

There are empirical ethnographic data outlining the nature of relationship and interactions the tribal have with various elements of creations. An over-acknowledgement of the "gifts" received from the nature finds its expressions in their worship of its various manifestations: plants, animals, hills, rivers and many other objects. In closer analysis of the tribal world-view, it is discovered that objects of nature are not seen as inanimate entities but as persons, as fellow human beings. A substantial part of the tribal lore myth, legends, folk tales, folk songs – reaffirms the concern of a tribal community for its ecosystem and efforts to conserve the resources of its neighbourhood[14]. This concern institutionally finds its expression in "totemism". Durkheim (1915) and Radcliffe Brown (1952) saw social solidarity is established between man and nature. It is a way of bringing the natural world within the social and moral order of man. Totemism is not only a mode of symbolising social groups but also a way of domesticating nature[15]. Totem taboos exist, and are sometimes carried to extremes. Eating, killing or destroying the totemis is regarded as equivalent to killing a human member of the clan. It is further believed that a diminution in the number of the totemic animals, plants or other objects caused by their destruction or killing will endanger a corresponding decrease in the size of the clan.

Another mode of ensuring that forest is preserved is to set apart entire ecosystem as a divine abode which is therefore sacred. This is true not merely for the tribal but for all the forest dwellers as well. Many "devaranyas" (God's groves), and "Nagaranyas" (Serpent's groves) found in the Western Coast of India are examples of this. Among the tribal, Fernandes and Menon[16] find, three ecosystems are protected. The first is a "sarna", a sacred grove in the dense forest, the second is "akhara" and the third is the "aasan", the ancestral burial ground in the forest. The Hill Kharia leave patches of forest where human interference is completely prohibited. Such patches of forest are called "Zaheera", meaning a sacred grove. In the Zaheera "s*argi*" species with other flora are preserved[17].

Besides the sacred groves individual trees are also held in high esteem in tribal societies. Such a sacred tree is also believed to be the abode of malevolent and benevolent spirits. Every Oraon village has "mychitkha" (*ficus riligiosa*) tree locally known as "hagripipa" or "borandapipa". People believe that after the ceremonial offering of the water to these the rain is sure to come[18]. According to the Saora traditions some of their deities dwell on trees. Kutting is one of these Gods who is a lover of trees. He weeps when a Saora cuts down trees. They consider it a taboo to cut some species of trees, viz. mango, mahua, tamarind and some other fruit bearing trees. Bura Deo, the principal deity of the Baiga, is believed to live in the *sargi* trees. Goats, foal, wine and fruits are offered to him[19].

Thus, the tribal combined religious myths, social control mechanism and technology to keep a balance between human needs and environmental imperatives. While using the resource on which they depended, they also preserved it for posterity. with this stand the conservation efforts of the Pengaparaja have been analysed in this chapter. The Pengaparaja live in harmony with their forest environment and their culture incorporates the spiritual and the material, the living and the non-living into one integral whole. Being part of the living nature, the environment is also not exploitable. This holistic concept is evident and expressed in their myth and traditions.

The conservation of many plants and animals in the forest environment is a part of the Pengaparaja culture. The taboos and customs enforce protection and conservation of forests teeming with a wide diversity of species, which are not destroyed. Many songs composed by the Pengaparajas are full of respect of plants and animals.

Realising the significance involved in the topic, the present study is made with the following objectives:

Objective: To identify the prevailing indigenous knowledge system among the Pengaparaja; to examine the role of oral traditions and traditional knowledge system of the Pengaparaja in resource conservation

Significance of the Study: The present study is significant from the view point of resource conservation and indigenous knowledge system among the tribal in Odisha. The Pengaparaja are a primitive tribal group (PTG) of Odisha with many distinguished features. However, we find very limited number of systematic studies on them. They inhabit the densely mountainous forested terrains of Kalahandi district of Odisha. This area were thickly covered with trees before two decades and now it has been degraded to a great extent, affecting the very survival of the Pengaparaja whose life revolves round the forest.

Being a forest dwelling tribe the Pengaparaja practise shifting cultivation as a part of their culture and economy. In this context it is very important to study the changes taking place in the life and economy of the Pengaparaja due to deforestation. The present study tries to address all the above questions from an anthropological perspective.

Methodology

Coverage: The study was conducted in Thuamul Rampur Block of Kalahandi district. Kalahandi occupies the south western portion of Orissa and is situated between 19°3'N and 21°5'N latitude and 82°30'E and 83°74' E longitude. It is bounded in the north by the districts of Bolangir and Nuapara, on the south by the district of Rayagada, on the west by the districts of Nawrangpur and Raipur (Chhatisgarh) and on the east by the districts of Rayagada and Boudh. It extends over an area of 8,364.89 sq.kms. The district headquarters is at Bhawanipatna town which stands almost to the eastern boarder.

The district has two distinct physiographic regions – the plain lands and the hilly tracts. The plain region runs southward upto Bhawanipatna and then eastward through Junagarh and Dharamgarh and then further upto the boundary of the district. The plain cover about 59 per cent of the total area of the district. The hilly tracts are mostly located in the south-western part, most of which are covered with dense forest.

Sampling: A sample of 180 Pengaparaja households from five different villages of Thuamul Rampur Block have been covered for the study. As the Pengaparaja have their concentration in Mahulpatna Panchayat, the sample villages were selected from the same panchayat. All the Pengaparaja households of the sample villages are included in our sample. The head-of-the-household of each family is interviewed with the help of a structured schedule. All the five sample villages are located in the hill range of Eastern Ghat mountain.

The sample villages are selected on the basis of their relative distance from the forest in order to have a comparative analysis of the situation. The villages are selected from two types of locations, one which are very close location to forest and the other, which are at a relative distance from forest.

Indigenous knowledge of the Flora and Fauna

The Pengaparaja have their own taxonomies of flora and fauna. They are familiar with and have a thorough knowledge about growth, maturity, efflorescence and decay of plants that are available in their forests. Their mode of management of plants and other forest resources is based on age-old experiences. So their mode of management is not detrimental for the preservation of plants of food and medicinal value.

The Pengaparaja have adequate knowledge about use of hundreds of plants. They know which plants have nutrient and medicinal value and which plants are good for fuel and for making their tools. They are totally dependent on their indigenous medicines for different diseases.

In our sample village the Pengaparaja could tell us the names of 72 trees (table-1) and 53 herbs (table–2) of medicinal value. The Pengaparaja use different parts of these plants for treatment of different diseases. As told by our respondents these plants are of immense value for them as they do not have any other source of medicine.

It is observed that when the Pengaparajas lost hope on somebody's life then only they take the diseased person to the hospital at Khatiguda for allopathic treatment. Hence their belief and dependence on indigenous medicine is near total, and they treat these plants of medicinal value with reverence.

Table-1
Showing the List of Trees with Medicinal Values Available in the Sample Areas

Sl. No	Local Name	Botanical Name
1	*Amba*	*Mangifera indica*
2	*Amda*	*Spondias pinnata*
3	*Ainla*	*Emblica officinalis*
4	*Arjun*	*Terminalia arjuna*
5	*Ashoka*	*Saraca asoca*
6	*Babul*	*Acacia nilotica*
7	*Bahada*	*Terminalia belirica*
8	*Bara*	*Ficus bengalensis*
9	*Barakuli*	*Ziziphus mauritiana*
10	*Baruna*	*Crateva religiosa*
11	*Behenta (Kaitho)*	*Limonia acidissima*
12	*Bel*	*Aegle marmelos*
13	*Benta*	*Naringi crenulate*
14	*Bhalia*	*Semicarpus anacardium*
15	*Bheru*	*Chloroxylon swietiana*
16	*Bija (Piasal)*	*Pterocarpus marsupium*
17	*Chadheigudi*	*Vitexpedun cularis*
18	*Chakunda*	*Cassia siamea*
19	*Champa*	*Michelia champaca*
20	*Chandan*	*Santalum album*
21	*Char*	*Buchanania lanzan*
22	*Chhatian (Rupen)*	*Alstonia scholaris*
23	*Dhalasiris (Tentra)*	*Albizia procera*
24	*Dhala singa*	*Canthium dicoccum*
25	*Dhoben*	*Dalbergia paniculata*
26	*Dimiri (Dumer)*	*Ficus racemosa*
27	*Gambhari*	*Gmelina arborea*
28	*Garkhari*	*Acacia feruginea*
29	*Ghora lanjia (Kala Siris)*	*Albizia chinensis*
30	*Ganga seuli*	*Nyctanthes arbortristis*
31	*Giridhini (Genduli)*	*Streculia urens*
32	*Giringa*	*Pterospermum xylorarpum*
33	*Gohira*	*Acacia leucophloea*
34	*Haland (Haldu kurum)*	*Haldinia cordifolia*
35	*Harida*	*Terminalia chebula*
36	*Jamu*	*Syzygium cumini*
37	*Kadamba*	*Anthocephalus chinensis*
38	*Kenkat*	*Garuga pinnata*
39	*Kamala gundi*	*Mallotus phillippensis*
40	*Karla*	*Cleistanthus collinus*
41	*Mankar kendu*	*Diospyros malabarica*
42	*Karanj*	*Pongamia pinnata*
43	*Kendu*	*Diospyro melanoxylon*
44	*Khair*	*Acacia catechu*
45	*Tangini*	*Xylia xylocarpa*
46	*Kumbhi*	*Careya arborea*
47	*Kurei*	*Holarrhena pubesceus*
48	*San kurudu*	*Gardenia gummifera*
49	*Kusum*	*Schleichera oleosa*
50	*Mahanim*	*Ailanthus excelsa*
51	*Mahul*	*Madhuca indica*
52	*Ritha*	*Sapindus emarginatus*
53	*Mundi*	*Mitragyna parvifolia*
54	*Neem*	*Azadirachta indica*
55	*Palas*	*Butea monosperma*
56	*Paldhua*	*Erythrina variegate*
57	*Pita kusum*	*Aphanamixis polystachya*
58	*Phasi*	*Anogeissus acuminata*
59	*Pipal*	*Ficus religiosa*
60	*Rai*	*Dillenia pentagyna*
61	*Rajmohi*	*Lannea coromandelica*
62	*Rohini*	*Soymida febrifuga*
63	*Sahada*	*Stereblus asper*
64	*Sajana*	*Moringa oleifera*
65	*Sargi (sal)*	*Shorea robusta*
66	*San gamari*	*Callicarpa maccrophylla*
67	*Sinha*	*Lagerstgroemia parviflora*
68	*Siris*	*Albizia lebbeck*
69	*Sissoo*	*Dalbergia latifolia*
70	*Sunari*	*Cassia fistula*
71	*Tentuli*	*Tamarindus indica*
72	*Thelko*	*Tamilandia oliginosa*

Table-2
Showing Herbs with Medicinal Values Available in the Sample Areas

Sl. No	Local Name	Botanical Name
1	*Poksunga*	*Ageratum conyzoides*
2	*Ramduni*	*Ammannla baccifera*
3	*Bhuin neem*	*Andrographis paniculata*
4	*Dengibifull*	*Argemone mexicana*
5	*Pangiri*	*Aristolochia indica*
6	*Pal gunda*	*Curcuma angustifolia*
7	*Ban haldi*	*Curcuma aromaticca*
8	*Jhinka*	*Chlorophytum arundinaceum*
9	*Gaigobra*	*Costus speciosus*
10	*Ban methi*	*Crotolaria epunctata*
11	*Brahmibuti*	*Centella asiatica*
12	*Saloporni*	*Desmodium gangeticum*
13	*Tutamuli*	*Elephantopus scaber*
14	*Ban tulsi*	*Hyptis suaveolens*
15	*Paninoi*	*Merremia umbellate*
16	*Rasana*	*Lapidagathis fasciculate*
17	*Lajkuli*	*Mimosa pudica*
18	*Bana kadali*	*Musa ornate*
19	*Bansi gopal*	*Peucedanum nagpurenrse*
20	*Cher pipala*	*Piper longum*
21	*Ankaranti*	*Solanum virginianum*
22	*Jal Jali*	*Stachytarpheta jamaicensis*
23	*Murga*	*Sansevieria roxburghiana*
24	*Bhumipoksunga*	*Tridax procumbens*
25	*Bana ada*	*Zingiber purpureum*
26	*Arakha*	*Calotropis gigantean*
27	*Assadhu*	*Capparis hrevispina*
28	*Assam lata (Gandhuri)*	*Eupatorium odoratm*
29	*Baikhujri*	*Tragia involucrate*
30	*Banicha*	*Flacourtia indica*
31	*Bankhajuri*	*Phoenix acaulis*
32	*Bansarga (Basak)*	*Justicia adhatoda*
33	*Begunia*	*Vitex negundo*
34	*Bhejri (Tutguna)*	*Solanum nigrum*
35	*Budel*	*Spatholoburghii*
36	*Chakundi*	*Cosia obtusi folia*
37	*Dhatuk (Dhatuki)*	*Woodfordia fruticosa*
38	*Gangai*	*Melastoma malabathricum*
39	*Gangasiuli (Singada har)*	*Nyctanthes arbortristis*
40	*Genguthi*	*Clerodendrom infortunatum*
41	*Iswara jata*	*Pogastemon benghasensis*
42	*Jajanga*	*Phylanthus reticularis*
43	*Kantakoli*	*Ziziphus oenoplia*
44	*Kurei*	*Holarrhena pubescens*
45	*Muraphal (Muri muri)*	*Helicteres isora*
46	*Nagurdi*	*Atalantia monophylla*
47	*Patal garuda*	*Rauvolfia serpentine*
48	*Poksungha*	*Pogostemon bengalensis*
49	*Potuaa*	*Catunaregam nutans*
50	*Rani danturi*	*Desmodiremo triangulare*
51	*Satabari*	*Asparagus racemosus*
52	*Tulsi*	*Ocimum sanctum*
53	*Urguna*	*Cycas circinalis*

On asking the names of tree and other plants with food value, respondents in our sample villages gave us the names of 25 trees, which provide food in the form of fruits, seeds and flowers. These trees are available in plenty in the forests of the Pengaparaja and are highly valuable to them in view of the frequent use of the food obtained from these trees. In addition to these trees, there are also many more other trees, which provide food in the terms of fruits and edible leave which the Pengaparaja preserve. The Pengaparaja also told the names of 13 climbers, the roots of which are good sources of food for them and some of them are used as raw materials.

The Pengaparaja are very much conscious about the preservation of these plants of food and medicinal value. Whenever they cut wood or timber they are cautious about the selection of trees. They spare plants with medicinal value and food value and cut other trees. In case of necessity arising in the community, they cut part of these trees with proper ritual observance like in consultation with the *disari* and performance of sacrifice of fowls by the *jani*. But in case of the necessity of

an individual household, such trees are rarely cut. When a Pengaparaja clears up a *nel dangar*, he spares such trees of food and medicinal value even if they are found in the middle of the *dangar*.

Rational Use

The conservation efforts of the Pengaparaja are very much reflected through their rational approach adopted while collecting the produces from the forest. The Pengaparaja, particularly women, are very careful about the varieties of wood that should be collected for fuel; roots that should be used for consumption, bamboo that should be used as building materials.

Usually women go to collect fuelwood, who never cut a standing tree for fuelwood. They collect dry and fallen branches of trees for fuelwood. As the Pengaparaja practice *dangarchas*, they obtain major part of their fuelwood from this clearing operation, which enable them to preserve other trees. The Pengaparaja collect bamboos for construction and repair of their houses and making fence. It is reported that while collecting bamboo they select matured and dry ones for cutting leaving behind the immatured ones. They select bamboos of at least two years old for cutting. By doing so they ensure availability and proper utilization. Such rational approach of selection never allows the resources to be destroyed.

The Pengaparaja collect timber from the forest for construction of their houses. The construction of house is an affair not taking place every year in the life of a Pengaparaja. So they collect timber once or twice in their life for construction of new houses. The repair needs collection of few bamboos and few wooden poles once in two/three years. So for this requirement they never fell trees, but some branches only. Further, they select older trees from which branches are cut and never touch the younger ones.

Another important role played by the Pengaparaja women in conserving the resources is through the rational practice while gathering food during the rainy season. In the rainy season the Pengaparajas totally run on scarcity and solely it becomes the business of women to manage the food. The Pengaparaja women collect a number of food like bamboo shoots, roots, tubers and mushrooms during this period. While collecting bamboo shoots the women invariably spare the healthy one and pluck the weak one. If there are a number of healthy shoots around one stump, they leave one of the two and pluck up the other. They believe that if there will be too many shoots at one place, their growth will be stunted. Likewise, while collecting the roots and tubers also they adopt such rationality. The Pengaparaja women collect only the roots which grow in a particular direction. It is reported that they prefer most to collect roots which are north-facing. Further, after digging the earth they collect a portion of the root and leave the remaining portion for regeneration. Then they cover the hole with earth. The Pengaparaja collect roots and tubers only during the months of Saraban and Bhodo only due to non-availability of other food items to the required extent. The Pengaparaja collect fresh plants for their medicinal use. By this they put limit to their needs as they do not store for future which in turn ensure availability of such plants. Also they are very much cautious that their collections never destroy the life of the tree.

It is an obvious scene in the forest near the sample villages that patches with thick forest cover are never touched by the Pengaparaja for *dangarchas*. The patches with scanty growths and undergrowths are only cleared by them for *dangarchas*. In order to maintain the soil cover and fertility, the Pengaparaja use to put *ghatu* on the dangarland. They raise stone walls of 1 to 2 feet height around their dangarland, locally known as *ghatu*, in order to prevent the running up of soil and maintain soil cover. By this, sustainability is ensured which in turn prevents destruction of additional forest cover by the Pengaparaja.

Sacred Groves

Sacred groves are small patches of native vegetation type traditionally protected by the local communities. This type of small patches of forest protected traditionally is also found in the forests of Pengaparaja. The Pengaparaja consider these patches as the abode of deities, which are known as Asanthan. It is reported by some respondents that the Patdevta reside in the Asanthan. Some of the Asanthans in the forested area near the sample villages are Ghaipat and Chelipat. The Pengaparaja attach high religious value to the Patdevta who lives in these Asanthan. Whenever they go to forest for collection of various produces, it is the Patdevta who protects them from wild animals. Also their crops in the *dangar* are saved by the Patdevta. It is believed that if the Patdevta is unhappy then it will bring all sort of misfortune to them.

The Asanthan of the Pengaparaja spreads over a few acres of forest land. In that patch, large number of old trees like *sargi. bija, kusum, kadam, siso, kendu, mango* and such others are found. Some concial stones are found at the bottom of the trunk of one huge *sargi* tree. Annual sacrifice and sacrifices on some specific occasions are made near those conical stones under the tree.

The Pengaparaja never enter into forest of the Asanthan for the purpose of collecting any of its produce. They have the fear that the Patdevta will become unhappy if they disturb his abode. However, male adults only go to collect some dried and fallen wood from Asanthan on some occasions. Women never enter into the Asanthan. Thus the Pengaparaja preserve forest patch (like Asanthan) by attaching high religious value through traditional practices.

Sacred Trees

The traditional Pengaparaja society recognise individual species of tree as objects of worship, based on accumulated empirical knowledge and their identified value for one reason or the other.

Thus, besides the sacred groves, individual trees are held in high esteem in the Pengaparaja society. Such sacred trees are also believed to be the abode of malevolent or benevolent spirits. Periodical offerings are given to them; sometimes some trees possessing the evil spirits are avoided. *Pipal* and *bar* are two important sacred trees among the Pengaparaja society. They believe that these trees are the abode of some of their ancestral spirits and deities. These trees are considered by the Pengaparaja as immortal and imperishable due to their long life. Wood of these trees are never used as fuel by the Pengaparaja nor they cut any branch of these trees. Doing so, they believe that; will bring all sorts of misfortunes. *Bar* and *pipal* as huge trees, provide cool shade to the Pengaparaja near the village and also inside the forest. These trees have also got great medicinal values for the Pengaparaja.

Bel is one such tree, which is also worshiped by the Pengaparaja. During the funeral ceremony, the Pengaparaja put one branch of *bel* tree on the root to ward off the evil spirit. The wood of *bel* tree is never used for fuel by the Pengaparaja. The Pengaparaja use many parts of the *bel* tree as medicine. The ripen or unripen *bel* is used in the treatment of diarrhoea and dysentery. The ripen *bel* is a tasteful food for the Pengaparaja. The juice of the fresh leaves of bel mixed with honey is used by the Pengaparaja for treatment of fever and common cold.

There are many other trees which form part of the socio-cultural traditions. Among these mango is one of the most important and useful trees. Ripen mangoes provide a good quality of food for the Pengaparaja. They also use it as food during lean season. The Pengaparaja use mango leaves in many festivals and rituals. The place of mango trees in Pengaparaja culture is best observed from a commonly shared oral tradition, one of the deities of the Pengaparaja was originally woman, who was living with her brothers. One day she was busy in threshing *mandia* with bare body, while her brother had been to jungle for collecting bamboos. On their return they saw their sister naked and became furious. They cut off both her breasts and thrown those away. Those got struck up in a mango tree, where from milk started flowing. The sister stayed near that mango tree, doing penances. Finally she became a goddess. Therefore the Pengaparaja take the mango trees with high reverence. *Mahul* and *mand* (product of *mahul*) play very important role in the Pengaparaja culture. The *mahul* tree also occupies a sacred place in this community. As reported by our respondents, the Pengaparaja never fell a *mahul* tree for any purpose. *Sargi* tree is also considered as sacred by the Pengaparaja and its leaves and woods are used in various rituals. The most important is Bali Khamb, which is erected near the village shrines (gudhighar), is made of *sargi* wood. Bali is one of the deities of the Pengaparaja. A *jatra* in honour of Bali takes place every third year spreading over nine days. Therefore *sargi* is also treated as a sacred tree by the Pengaparaja.

While felling trees, the Pengaparaja invariably spare the sacred trees. Similarly while clearing patches for *dangarchas* the Pengaparaja leave such sacred trees, if find within or in between the *dangar*s.

Myths and Religion: The Pengaparaja worship forests, hills, water-resources with the believe that these are controlled by the presiding deities of the concerned places. They believe that unless they satisfy these spirits they will cause hazards and terror in their day-to-day life. The Pengaparaja worship deities like Bhima, Dharni, Patdevta, Dangardei and many other to whom they relate with forest and their well-being. Their deity Bhima is propitiated in the abode trees like *kendu, kusum, sargi, kadam, mahul*, etc. The Bhima is represented by big stump of *sargi* tree who finds its abode among such trees near the foot hill from where the dangar lands start.

A little away from these abode one finds the stone representing the Dharni under the *sargi* tree, near the *dangar*. The Pengaparaja believe that these deities live in the abode of forest as they love it. The Pengaparaja protiate and make sacrifice like *buka (*goat*), kukura* (cock) to these deities in the rituals of *dangarchas*. It is believed that if their deities are not satisfied, then the Pengaparaja will be attacked by tiger. As their deities love the forest, the Pengaparaja also treat the forest (the abode to their deities) with high reverence.

Other deities propitiated by the Pengaparaja are Dangardei and Neelai who also find their abode in the forest near the foot hill from where the *dangar* land starts. Dangardei and Neelai are regarded as brother and sister. The Patdevta lives in deep forest who is propitiated on occasions like Pus Parab and Chait Parab. Thus the Pengaparaja relate the forest with their deities and try to preserve it through religious sanction.

Traditional and Restrictive Practices: The Pengaparaja follow a number of traditions, which reflect the ethos of their conservation efforts. Their traditions include a number of festivals, ritual and restrictive practices. The Pengaparaja celebrate various festivals with a great deal of joy. Therefore, every month some big or small festivals are observed. In such occasions, they propitiate one or the other deity. In most of their festivals importance of forest is clearly reflected, as it is the abode of their deities.

Pus Parab, Chait Parab and Bali Parab or Bali Jatra are some major festivals of the Pengaparaja. They celebrate Pus Parab at the end of the month of *Pus*. This is a festival of rejoice. They start harvesting during this time or from this day and therefore they look cheerful. With the first harvest of the *dangarchas*, they propitiate their deities in the forest. The propitiation takes place by sacrificing *taki* (a female sheep who has not given birth), therefore it is also called Taki Parab. Usually after this festival the Pengaparaja start entering to the forest for collection of different produces. Chait Parab is another important festival of the Pengaparaja, which is celebrated in the month of *Chait*. In this festival the *jani* and *disari* propitiate near the Jankarthaan and fry *semi manji* (country gram) by sacrificing *kukra* (cock*).*

On the very next day all the villagers go to forest and bring mango and leaves of *aam* and sacrifice *kukra* in their respective houses. They also decorate their houses with *Aam* leaves. So the Chait Parab marks the beginning of eating *aam* in the society. After due propitiation and sacrifice in the Jankarthaan during the Chait Parab, the *hakka* (annual hunting) begins. After the ritual observance of eating of mango, the Pengaparaja go on *hakka* for three days. They bring to their village whatever they hunt during the *hakka* and distribute equally among themselves

Another ritual is observed by the Pengaparaja after the Chait Parav. It is performed just before clearing up of forest for the *dangarchas*. In that ritual they propitiate to Dharni and Dangardei near the foothill in the forest by sacrificing *kukra*. They also propitiate other deities of the forest and offer sacrifice during various stages of cultivation leading to harvest. Connected to this harvest is the celebration of their Bali Jatra or Bali Parab, which lasts for long days. Every third year the Pengaparaja celebrate Bali Jatra in order to satisfy the deities of the forests. Their expectation behind the celebration of Bali Jatra is to have a bumper harvest of *dangar* crop. If the deities in the forest are satisfied, they are likely to have a bumper. The Pengaparaja also observe some restrictive practices traditionally. Most common among them is that, in the month of *Pus* they never go to the forest for collection of any produce. It is only after the propitiation during the Pus Parab they begin to go to forest. They believe that the Patdevta in the forest does not want to feel disturbed during this month. So they do not cut even a branch of a tree nor collect any other produce in the month of *Pus*.

In the Pengaparaja society there are guidelines related to the time of the day when a plant should be collected. Usually the practice among them is that the plants are not collected after sunset and at mid-day. For medicinal purposes they collect plants only on certain days of the year, e.g. on a fullmoon day or on a new moon day. The Pengaparaja never fell a tree which is an abode to some birds. Whenever they go to fell some trees, they observe the tree from its nook and corner in order to be sure that there is no nest in the tree. If a nest is found, then they leave that tree. Another conscientious approach that the Pengaparaja adopt during their annual hunting is that they never hunt a pregnant animal. Whenever they see a pregnant animal they leave her and chase some other animals. Thus the belief system and ritual practices help the Pengaparaja to conserve their resources. Those also encourage them to go for sustainable extractions.

Conclusion

Through the indigenous knowledge, the Pengaparaja have created a strong mechanism of the conservation of their natural resources. Their traditional practices have been built in such a way that in every stage the forest is considered in a religious sense. Further their rational approach in resource utilisation substantiates the conservation effort. From all these it is evident that they are prudent user of resources. It is observed that the conservation of many plants and animals in the forest environment is a part of the Pengaparaja culture. They have knowledge about uses of different plants. Respondents in our sample villages could tell us the names of as many as 25 trees which provide them with food in the form of fruits, seeds and flowers. They could also tell the names of 13 climbers, the roots of which are good sources of food for them. The Pengaparaja are very much conscious about the preservation of these plants. Their conservation efforts are also reflected through the rational approach they adopt while collecting the produces. Collection of wood from dead plants and fallen branches, collection of matured and dry bamboo, collection of north facing roots by women and while collecting bamboo shoots, sparing the healthy ones by women are some of the examples of the rational practice of the Pengaparaja. They also protect patches of forests traditionally which they consider as *aasanthan* (sacred groves). They believe that these patches of forests are the abode of their deities. Besides, they also protect particular species to which they held in high esteem. Such trees, as believed by them, are the abode of malevolent and benevolent spirits. In addition, the Pengaparaja worship forests, hills, water resources with the idea that these are controlled by the presiding deities of the concerned places.

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