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A People's Biodiversity Register (PBR) of Village Sükhai, Zünheboto, Nagaland

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...towards global sustainable development

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TERI Team

Chapter 1. Introduction

India, a megadiverse country with only 2.4% of the world's land area, harbours 7-8% of all recorded species (*MoEF, 2014*). Of the 34 global biodiversity hotspots, four are present in India, represented by the Himalaya, the Western Ghats, the North-east, and the Nicobar Islands (*MoEF, 2014*).). The North-Eastern Region which is a part of Indo-Burma global hotspot has at least 13,500 vascular plant species, of which about 7000 (52%) are endemic. The faunal diversity is equally high, and of the 430 mammals found in the Indo-Burma hotspot, 71 are endemic. Similarly, of the 1277 bird species found in the region, 74 are endemic to the hotspot. Other vertebrate groups show much higher levels of endemism, with 189 of the 519 reptile species and 139 of the 323 amphibian species being endemic to the hotspot. The hotspot also has a remarkable freshwater fish fauna, with 1,262 documented species, accounting for about 10 percent of the world total, including 566 endemics. (*Tordoff et.al., 2012*). The northeast eco-region has 3,624 species of insects and 50 molluscs (*MoEF, 2014*). With all this natural wealth, the north-eastern region also leads in the total forest cover being 172,592 sq km,which is 65.83 percent of its geographical area in comparison to the national forest cover of 21.23 percent. (*FSI, 2013*)

The state of Nagaland harbours a total forest area of 9222 sq km which accounts for 55.62% of the state's geographical area (*Nagaland FD, 2014*). Geo-morphologically, the terrain can be broadly grouped into four topographic units - alluvial plains (150 to 200 meters above m.s.l.), low to moderate linear hills (200 to 500 meters above m.s.l.), moderate hills (500 to 800 meters above m.s.l.) and high hills (800 meters and above). The main rivers that flow through the state are the Dhansiri, Doyang, Dikhu, Tizü and Melak.

Much of Nagaland's natural heritage is being rapidly eroded today. The implementation of the Nagaland Biological Diversity Rules (*NBDR, 2012*) framed in the local context has been an important step that takes into account customary laws and practices governing biodiversity, traditional knowledge and land tenure systems. The NBDR provides greater managerial control to the stakeholder communities to regulate local biodiversity assets and resources (*NBDR, 2012*). The rules respond to a number of emerging concerns, many of them the result of new developments in biotechnology and information technology. The rules safeguard the traditional ecological knowledge of the communities by ensuring proper documentation and by securing rights over associated intellectual property. Recently, with the help of NBDR, the Naga Mircha (*Capsicum chinense*) and the Nagaland Tree Tomato or Tamarillo *(Cyphomandra betacca)* has acquired the Geographical Indication (GI) tag [1]as directed by the Trade Related Aspects of Intellectual Property Rights (TRIPS) agreement.[2]

The Nagaland Biological Diversity Rules also provide for the establishment of Biodiversity Management Committees whose main function is to prepare People's Biodiversity Registers in consultation with local people, and to submit the information to the State Biodiversity Board. These registers,"contain comprehensive information on availability and knowledge

[1] A geographical indication (GI) is a sign used on products that have a specific geographical origin and possess qualities or a reputation that are due to that origin.

[2] The Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) is an international agreement administered by the World Trade Organization (WTO) that sets down minimum standards for many forms of intellectual property (IP) regulation as applied to nationals of other WTO Members.

of local biological resources, their medicinal or other use, or any other traditional knowledge associated with them ″(Gadgil et.al., 2005).

In Nagaland, traditional conservation practices have helped protect biodiversity, and there are records of Community Conservation Areas being declared in the early 1800s, especially in response to forest degradation and loss of wildlife. However, with socio-political changes and development, traditional ecological knowledge is getting rapidly lost. Hence, it is necessary to document and preserve this rich ecological knowledge which can contribute to sustainable natural resource management in Nagaland.

The Energy and Resources Institute (TERI) supported by the Department of Forests, Ecology, Environment and Wildlife of Nagaland have initiated the process of preparing People's Biodiversity Registers (PBRs) for the people of Nagaland. Preparation of these PBRs forms a sub-set of a larger programme to prepare a comprehensive documentation of Nagland's Community Conserved Areas (CCAs). This document is the first published PBR for Nagaland, and documents the biological and cultural resources of the village Sükhai, located in the heart of Nagaland in Zunheboto district. The Sükhai PBR consequently represents the first step in the State's efforts to document its people's cultural connections with biodiversity, and is thus an important element in the implementation of the Nagaland Biological Diversity Rules. The objectives of this study which are in tandem with those specified by the National Biodversity Authority are to develop and maintain an inventory of known biological resources, and to document the traditional knowledge associated with biodiversity in Sükhai. By doing so, we chronicle local communities' knowledge about their biological heritage and also foster a commitment among them to conserve their rich traditions. The history of the Sema Nagas, the tribe inhabiting Sukhai village, and their association with nature are highlighted. We have also documented the demography of the village, the different traditions and customs, art forms and festivals in the chapter on 'Peoplescapes', and have attempted to understand and to document the links of the culture and the economy of the Sema people with their local biodiversity.

There is an urgent need to duplicate this activity in other parts of Nagaland. This PBR will serve as a reference point and template for the forest department to refer to, and to compile information on Indigenous Ecological Knowledge (IEK) in accordance with the PBR guidelines of the National Biodiversity Authority. Consequently, the information compiled through this process of PBR creation would provide significant inputs to an integrated Biodiversity Information System that would act as the knowledge base for the implementation of the Biological Diversity Rules in Nagaland. Thus PBR creation process would be an on-going activity providing regulated access to information, where the database is expected to grow over time.

Apart from compiling information for the People's Biodiversity Register, the TERI team also carried out other activities as part of this exercise. These included assisting the local communities of Sükhai village to survey and demarcate the boundaries of their Community Conserved Area by use of GIS based maps, and in identifying some of the flora and fauna present within the CCA.

Chapter 2. Methodology

The Study Area

To select a suitable pilot village for developing a People's Biodiversity Register (PBR), extensive preliminary surveys were carried out across Nagaland. We finalized upon village Sükhai in the Satakha circle of Zünheboto district. Sükhai lies on the southern side of Zünheboto district bordering Phek district. Sükhai is surrounded by Ghathashi block towards the west, Zünheboto block towards the East, Sekruzu block from Phek district towards South. Sükhai is comprised mostly of the *Sema* tribe.

Sükhai village lying in the heart of Nagaland has 8B/C2 Khasi sub-tropical wet hill forest primarily overlapping with the 9/C2 Assam sub-tropical pine forest, and is representative of the overall common flora and fauna of Nagaland state. It acts as an important green corridor between the biodiversity rich forests of Satoi range and Ghosu bird sanctuary that harbor endangered and threatened species like the Blyth's Tragopan (*Tragopan blythii*), Fishing Cat (*Prionailurus viverrinus*) and Wild Dog (*Cuon alpinus*). Sukahi village has undergone considerable transformation in the landscape, in its landuse and cropping patterns, its use of fishing methods and in its approach to conservation. The village council passed a notification in 2002 that puts a complete ban on hunting and fishing, felling of trees and protects the area's biodiversity.

Approach

Sükhai CCA can be approached by road from Zünheboto which is the district headquarter, or from Satakha town. Distance to Sükhai from Zunheboto and Sataka is 30 km and 18 km respectively. Another approach road to the study site is from Satoi range that passes through the Sükhai community conserved area along the Tizü river.

Investigation Team

The study was led by researchers from TERI who formed teams of local community members to assess various thematic threads of the PBR. One team carried out vegetation sampling and survey of boundaries of the CCA, while the second undertook faunal surveys. The third team interacted with the local people to document traditional knowledge and practices. *Gaon Burrahs*[3] or the elderly people of the village provided insights on Sükhai's rich traditional knowledge, folklore and culture. Additional inputs were provided by the Nagaland forest department. All pertinent possible secondary data such as topographic maps, aerial photographs, satellite imagery, information on the traditional history of the *Semas*[4], landuse and cropping patterns, rainfall and river flow statistics were collected from various sources.

Study Tools and Techniques

The following techniques were adopted for this PBR study:

1. **Interviews:** Information related to history of the village, local institutions and decision making, landscape aspects and biodiversity was collected from *Gaon*

[3] The village heads

[4] Sukhai is a Sema village. See chapter 3

Burrahs and knowledgeable individuals, through personal interviews. Local communities were shown local field guides on various taxa (e.g. birds, mammals, butterflies and reptiles) and asked to list the species found in their village, their local names and uses and their current status. While the books on birds and mammals elicited the most interest, discussion, and responses from the people, they showed less interest in the smaller fauna, particularly butterflies and reptiles. For ascertaining scientific names standard field guides such as, 'A Companion to the Birds of Nagaland', authored by Grewal, Sen, Ramki and Haralu; 'Indian Mammals- A Field Guide' by Vivek Menon; 'Butterflies of the Garo Hills,' and 'Butterflies and Moths of Pakke Tiger Reserve' by Sondhi, Kunte and Captain and Romulus Whitaker's book on 'Snakes of India', were consulted (details in Literature Cited). Houses of hunters were also visited to observe their animal trophies, and these were added to the species lists of the village.

2. **Field visits:** Field visits were carried out with members of the village council and knowledgeable individuals to document the bio-resources of the village, and of the CCA. For faunal surveys, opportunistic documentation was carried out and species observed were recorded. For floristic surveys, we carried out detailed vegetation sampling inside the CCA. At every 250 m along a 2km stretch of the transect, we laid circular, nested plots of 10 m radius for trees, 5 m radius for shrubs and 0.5 m X 0.5 m quadrats for ground cover. In the 10 m circular plots, we recorded the number of trees (> 30 cm GBH), their height, and the species to which they belonged.
3. **Group discussions:** The investigating team conducted several group discussions with *Gaon Burrahs* and knowledgeable individuals. Discussions were mainly held to validate the information gathered at various levels.
4. **Village Council Meetings:** A village council meeting was conducted at the village council hall involving all the stakeholders. The village council members and the village development board members were present at the meeting along with women group members. Village health workers, church members and other officials were also present during the meeting. This meeting helped to understand various issues pertaining to conservation of the community conserved area, and to identify possible solutions to tackle the problems.
5. **Mapping:** Mapping of the village was done by the village people themselves. Different maps were drawn as a part of the exercise, and the best map depicting all the landmarks was selected.

Photo 1 Village Mapping Exercise with woman church members

Photo 2. Survey teams carrying out Floristic and Faunal surveys

Photo 3 Documentation process of wild and domseticated plants during the study

Chapter 3. A Bit of History

Another generation and hardly a memory will remain of the stories and songs which the Aos[5] have handed down from father to son for untold ages… the past is being allowed to die. -J. P Mills (1973)

An introduction to the landscapes of the past

Understanding and documenting the current biodiversity practices of the Sema tribe of Sükhai village needs to be contextualized in terms of their history. Their origin myths, folklore, migration pathways, traditional connections with nature and agricultural practices have over the years shaped their understanding of, and relationships with biodiversity and the natural world. At the same time, the cultural, political, religious and natural landscapes of the Sema community have not remained static but have been influenced by numerous changes happening around them. This has in some instances fragmented their traditional economic, religious and social systems and beliefs. In this chapter, we therefore, provide a brief overview of the Sema tribe-available information on their origins and migration into the current area, their folklore and culture surrounding the natural world and the importance of their forms of agriculture to their lives and livelihoods. We have largely limited this history to ecological issues centering on nature and wildlife, agriculture and hunting given the nature of this biodiversity documentation. Changes in political systems have not been documented here, although we understand that most decisions concerning the land and the life of people are ultimately political in nature.

The picturesque Naga hills consisting of a crinkled landscape of hills and valleys through which streams and rivers meander, have changed over the years. Forests, for example according to records in the colonial period were teeming with wildlife. Grimwood mentioned in 1871 that it took them eight days to get from Kohima to Golaghat[6]. According to her,

We stayed two days at Kohima on our way to Jorehat, and travelled after leaving there through the Namba forest to the next station, called Golaghat. Bears, tigers, leopards, and elephants swarm in the jungle around, but one seldom sees anything more exciting than a harmless deer browsing by the wayside, or a troop of long-tailed monkeys crossing the road. It is all very wild and beautiful, and when we eventually came to the end of our eight days' march through the Namba, and reached cultivated regions once more, we were quite sorry.

Butler (1875) mentions the presence of even rhinoceros and wild buffalo in Nagaland, although rare and, "only to be met with in the Dhansiri valley". The forests were still unexplored and undocumented. Says Masters in 1844, "*I presume it would occupy an experienced Botanist 10 years to explore the whole of the Naga Hills, from the Booreedihing to the Dhunsiri, in a satisfactory manner; none of them having been hitherto visited by any Botanist*"[7].

[5] Replace Ao with Sema and the same would be true.
[6] In Assam
[7] The floristic diversity of Nagaland is still not well documented. There is still no published flora on Nagaland

Despite the still thick jungles during the colonial era, Naga settlements dotted the landscape and appear to have been clearly visible. The landscape was thus bold wild and agrarian in nature. According to Grimwood (1871),

Sometimes you find yourself riding along a narrow path which skirts round the side of a steep hill, while below you is the river, clear and blue and deep, with an occasional rapid disturbing the calm serenity of its flow. The hills around are studded with villages, and peopled by various tribes.

According to Godwin-Austen (1872)

Dense forest covers the slopes, but from their steepness many parts are bare, breaking the usual monotony of the dark-coloured mountain scenery. Where the steep rise in the slope commences, the spurs are at once more level, and are terraced for rice cultivation; not a square yard of available land has been left, and the system of irrigation canals is well laid out.

While some information is available on the Naga tribes from the colonial period (1832-1947), before this there is a vacuum for this part of the world. In this chapter, we piece together some of the ecological history of the Sema tribe mostly from accounts written in the colonial period.

Charting the origin of the Sema Nagas

Photo 4 A group of men and women belonging to the Sema warrior tribe

In 1921, J. H. Hutton wrote a seminal ethnographic work on the Sema Nagas. Prior to this, there was little documented information on the Sema tribes. Interestingly, Elwin mentions that, "*It is curious that the large and important Sema tribe (which numbered 48,000 at the last Census) should have attracted so little attention during the early period*." In Hutton's

work he documents the origin, migration patterns, socio-economics, traditions, biodiversity use and folklore of the Sema Nagas. This remains the most authoritative description of the Sema Nagas. We have drawn upon this remarkable exposition to document the history of the Sema tribe in conjunction with other published literature and discussions held with the people of Sükhai, a Sema village which is one of the ancestral, 'parent' villages for the tribe in the Naga Hills.

According to Hutton (1921a), the Sema tribe was located to the north-east of the Angami country, and inhabited the valleys of three rivers; the Doyang (known as Tapu by the Semas), the Tizü and the Tita rivers (Now called Tsutha river) as well as the mountain ranges and plateaus that separate their waters. The closest relatives of the Sema Nagas, according to Hutton (1921a), are the Angami tribe and more specifically, the Kezami division of this tribe. The Sema language too is closely related to the Kezami Angamis, though it also resembles that of the Chekrama Angamis, since, according to Hutton (1921a), "a number of villages considered to be Chekrama are actually largely of Sema origin".

While tracing the origins of the Sema Nagas, Hutton (1921a), mentions that the Semas point south as the direction from which they came and,"relate the story of the Kezanenoma stone as well as many other folk-tales common to the Angami and Lotha, particularly the latter." According to the Kezanemoma legend, the ancestors of the Angamis, the Semas and the Lothas were brothers who lived with their parents in the Kezanemoma village in the Kheja area. They would spread paddy on a stone inhabited by a spirit who would make the paddy double by nightfall. Once the brothers had a bitter fight about whose turn it was to spread the paddy on the stone. The parents fearing that bloodshed would result spread eggs on the stone and set it on fire. The stone burst into pieces and the spirit departed. The brothers also departed in different directions giving rise to the three tribes (Hutton, 1921b).

According to another legend, sections of the Rengma, Sema and Lotha Nagas stayed below a township of Tsemenyu, where a stone slab to commemorate their stay still exists (Kumar, 2005). According to yet another story, Kepezoma and Kepepfuma, two divisions of the Angami descended from two brothers who emerged from the earth. The Angamis believe the prints of the hand and feet can be found near the hole where the brothers emerged (Hutton, 1921b). According to Hutton the Angami tribe (1921b), "pointed to Mao and the country beyond as the place of origin."

Hutton (1921a), in the Sema Nagas, however says that the Semas,

do not, however, trace their origin south of Mao, but point to Tukahu (Japvo) as the place from which they sprang. The ancestors of the Semas came from that mountain, and the Sema villages spread, according to one account, from Swema or Semi, a village near Kezabama, which is to this day a Sema community retaining Sema as its domestic language, though it has adopted the Angami dress and is surrounded by Angami villages on all sides.

This version is corroborated by Davis (1891), according to whom,

The Semas say that they had their origin from the small village of Swemi, situated just north of Khizobami and about 30 miles east of Kohima. From Swerni they spread north and north-west until they occupied the country in which they now dwell.

Hutton (1921a), however, goes on to say,

Other versions, ignoring the Swema story, trace the wanderings of the Semas through different villages, some clans having come north through HebuHmi, Cheshahmi, and ChishiUmi, others through Mishilimi (" Terufima ") and Awohomi. The Semas of Lazemi tell

of a great battle with the Angamis near Swema in which the Semas were defeated and retreated westwards until they reached the Zubza river; afterwards they turned northward to settle finally at Lazemi, MishiUmi, and Natsimi (" Cherama ") in the Doyang Valley.

Hutton (1921a), goes on to say, that these stories suggest that, "the Sema tribe occupied the land which is now occupied by the Tengima, Chekrama, and Kezama Angamis and migrated north under the pressure of Angamis coming from the southern side of the Barail range". "Furthermore, all traditions agree in tracing the northward movement of the Semas up through the low hills of the Doyang Valley," from which the Sema tribed moved outwards.

Hutton (1921a), further hypothesizes that although the Semas share several affinities with the Kezami Angamis, the real origin of the Sema tribe was probably the country of the Khoirao tribe in Manipur State, who were sandwiched between the quasi-Agamis of Maram to the west, the Tangkhuls to the north and east and the Kacha Nagas and Kukis to the South (see Fig. 1). Hutton (1921a) mentions that the villages close to Maram were more similar in Angami culture than the villages further north which were more Sema in nature. The Tangkhul village of Chingjaroi is also called Swemi by the Angamis and lies North of Ngari, the northernmost village of the Khoirao tribe and according to Hutton (1921a), was probably, "another stage southwards in the migrations of the Sema tribe". These Khoirao villages also have the same name as Sema clans and give their origin as a place to the West, which according to Hutton (1921a), could be the Bodo tribes. He further draws out the similarity between these Bodo tribes and the Sema-in lycanthropy and tiger clans[8], in the Y shaped posts which the Garo, the Sema and the Kachari use, and in various linguistic similarities. Based on this evidence he concludes that the Semas are a composite tribe containing more Mongolian and Bodo blood from the north or north-west than their Angami neighbours.

The Sema village and culture

Irrespective of the exact origin of the Sema tribe, Hutton (1921a) provides a map of migratory routes that were given to him by the Sema community. This includes the village Kiyeshe, the current village under study. The village Kiyeshe was founded in 1810. According to Hutton (1921a), Sema villages frequently retain the name of the original chief, although village names may change when the old chief is succeeded by his son. This was corroborated in our discussions with the people of Kiyeshe (Sükhai). Traditionally in the Sema community, selection of chiefs is hereditary and the elder sons of the chief often leave to found their own villages while one of the younger sons succeeds the chief on his death in the ancestral village. According to Davis (1891),

These chiefs invariably have three or four wives, and usually large families. It is the custom for the sons as they grow up to start new villages on their own account. We thus find that, as a rule, Sema villages are small as compared with the villages of other Naga tribes.

The advantage of this formation of additional villages is likely to be manifold. First, this prevents in-fighting amongst the sons of the elder, each of whom can found a village named after him. Secondly, land is not divided amongst the sons in the village and so landholdings are not fragmented. And thirdly, because, the sons of the chief often fan out to form their own villages nearby, the 'parent' ancestral villages are often well-protected on all sides due to ties of kinship. This is important for warring tribes like the Sema and appears to be

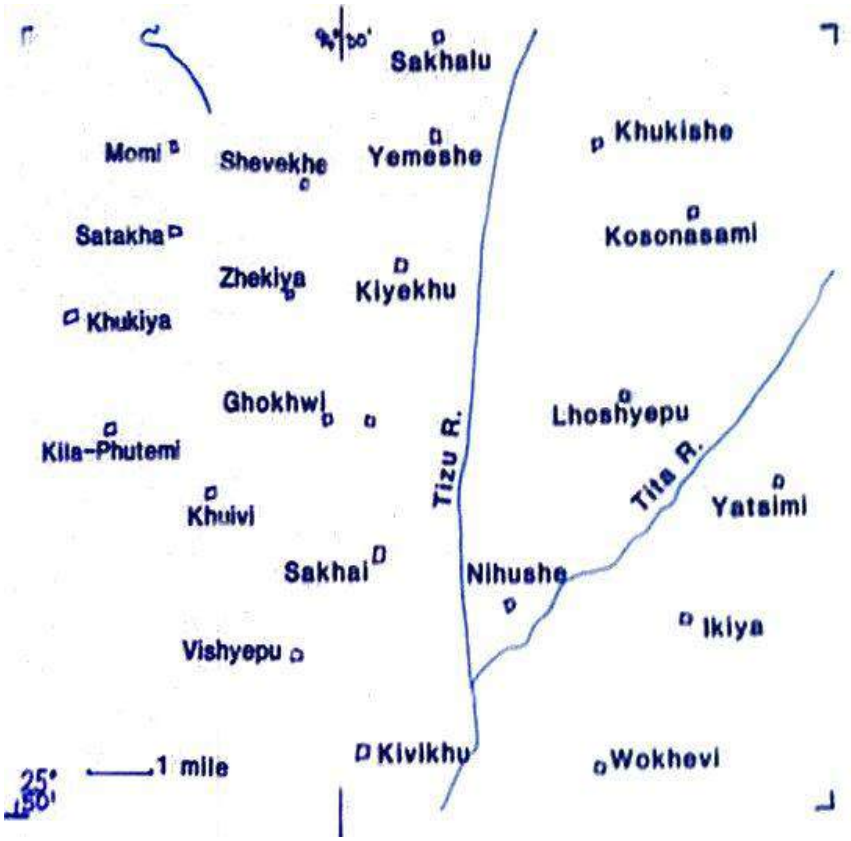
[8] See section later in this chapter which describes lycanthropy

corroborated by the location of these Sema villages atop the summit of a hill or the shoulder of a spur probably to give them a vantage point from which they could get a bird's eye view of the approach of other warring tribes. The entire design of Sema villages appears to reflect their readiness for battle, important for a warrior tribe. For example, the Sema villages tend to be small (not more than 100 houses) and the cultivated fields close so that men could be easily assembled in case of a raid. The villages are also surrounded by jhum fields and low dense jungle in which movement by an enemy is difficult (Hutton, 1921a).

Davis (1981) has this to say about the Sema tribes' warrior status,

The Semas are the most barbarous and savage tribes with which we have yet come into contact in these hills. But four years ago the custom of head taking was in full swing amongst all the villages to the east of the Doyang river, and the use of money was unknown to almost every village of the tribe.

While the Sema tribal identity is evident, according to Hutton (1921a), it is actually the village which forms the core of Sema society or part of the village which is under the control of a chief (*asah*). This is unlike other tribes such as the Angami where the clan predominates. This strong sense of village probably results from the presence of isolated Sema villages living in dense forests (Hutton, 1921a). The village Sükhai in particular is important since it is the progenitor of eight Sema villagessome of which are also shown in Hutton's (1921a) map of migration. Another map dating back to the colonial period (Fig 1.) also indicates the location of several of these villages.



Source: http://himalaya.socanth.cam.ac.uk/collections/naga/record/r2659.html

Figure 1 Map of Sukhai and surrounding villages from the Colonial period

Nature and the Sema Naga- traditional folklore

Traditionally, the Naga tribes had an intimate relationship with nature based on a foundation of the interconnectedness of God, people and nature. According to an ancient Chakhesang Naga myth[9], the Spirit, the tiger and a human lived together as a family till their mother died and became one with the earth. On her death, the human won a competition to stay in the village while the tiger who lost was asked by the Spirit to live in the jungle and take care of the birds and animals This story suggests that nature (represented by the tiger) and human beings belonged to the same family and lived in close harmony with God (the spirit) called *Alhou* by the Semas, and the Earth (represented by the mother). Because their mother became one with the Earth, the Nagas consider all land to be sacred (Wezah and Casiño, 2010)[10].

Longchar (2007) narrates how a Naga views land

"The land is the Supreme Being's land"

"One cannot become rich by selling land"

"Do not be greedy for the land, if you want to live long"

"Land is life"

"The one who does not have land always cheats others or cannot become a good citizen"

"The land cries in the hands of greedy people"

"The land never lies; do not lie to the land"

"Anyone who takes another's land by giving false witness will not live long"

"The land is like a bird, it flies away soon in the hands of greedy people"

"You can sell other things, but not land"

"You are a stranger without land"

Jhuming or shifting cultivation[11] involves clearing the land and burning the jungle, so people propitiate the spirit with rice, crabs and rice beer to beg for forgiveness for the many animals, plants, birds and reptiles that might be inadvertently harmed (Longchar, 2000). Hence the clearing of forest or the killing of animals was not taken lightly by the Sema tribe given the kinship that exists between humans and all of nature.

Yiepetso Wezah (with Tereso C. Casiño) (2010) in a paper on the theology of nature narrates several other stories told by a Sema Naga elder, Ms. Wekhwezu-u Wezah that underline this connection between the Sema tribe and nature.

A boy and girl fell in love. They liked each other very much. However, as days passed another man began to like the girl but the man knew that she would not be able to separate herself from her boyfriend. Hence, he tried to trick her. One night he dressed like her boyfriend and came to her at night. He called her to come for a walk. They traveled a far distance without her noticing that the man was not her boyfriend, for he did not speak to

[9] According to the Mao Naga version of this tale (Mao, 2009), the mother was married to a cloud and had three sons, the Spirit, a human being and a tiger. The Sema Nagas also have a variation of this tale.
[10] Narrated by Ms. Wekhwezu-u Wezah, who was 70 years old at the time of the interview in a Sumi Village in the Naga Hills, India, November 20, 2010 to Wezah (Wezah and Casiño, 2010)
[11] See next section

her. At daybreak, she came to know that the man was not her boyfriend. So she insisted that she must immediately go back home. But the man told her that he was going to take her as his wife. So she began to run and the man killed her. The blood splashed on the tree and blood became an orchid flower. Her boyfriend found out that someone had taken his girlfriend away by force. He began to search for her. When he became too tired, he took rest under a tree. An orchid petal fell upon him. When he looked up, he found a beautiful orchid flower on a tree. He slept under the tree and in his dream, his girlfriend told him the whole story and how she became an orchid flower. She asked him not to pluck her but preserve her.

This fluid boundary between plants, animals and humans, and the ease with which humans are believed to transmute to other life forms is reflected in the commonly held belief amongst Ao and other Naga tribes that there are people with tiger souls. The Sema tribes are also believers in lycanthropy, where the souls of some individuals is believed to enter the bodies of leopards or tigers during sleep, although they do not physically transform into were-tigers or leopards. This belief possibly stems from the Naga origin myth described above where the tiger and human beings share the same ancestry. Tigers are rarely killed by Nagas and if this happens, they fill the tiger's mouth with water so that if the tiger utters the name of the man who killed him, the heavens would only hear gargling of water. Various rituals and *gennas*[12] are followed if this happens which are described subsequently. After death, however, the soul may transform into a hawk (kestrel) which then flies to the hill of the dead at Wokha or Naruto[13] (Hutton, 1921a).

Some of these stories underline the ecological role that animals play in the ecosystem and their contribution to 'ecosystem services' for human beings. For example, the role of the earthworm in enhancing soil fertility and the way this came about is described in the next folkloric tale

A cultivator began to cultivate his field, and his crops did not grow well. He was extremely worried that he might not have any harvest, and his family may face starvation. An earthworm noticed the sadness of the cultivator. So the earthworm came and asked the man, "What is the matter with you? I could see some problems in your face." The cultivator replied, "I am sad because soil is dry and my crops are not growing well." The earthworm replied, "Well, I could help you if we can agree (make a pact)." The man replied, "I would agree with you if you could help me." The earthworm said, "Do not hate (or despise) me. Do not crush me so that I will make your land fertile, and your crops will grow well." The cultivator replied, "Curse be upon me if I and my children despise you." From that time onward, the earthworm made the soil fertile.

The Sema Nagas understood the ecological value of diverse fauna, even rats considered by many other societies to be a pest species, and realised the need for co-existence with other species even if this meant sharing a portion of their harvests with other creatures.

Humanity had no rice to eat. Their food was not good. The rat noticed that mankind had a poor diet. One day, a man was searching for food. He saw a paddy plant in the middle of the sea. He thought that it could be good for food. However, he could not collect it. At that time, the rat came and told to the man that he could bring the paddy to him to sow and plant. Yet, the rat asked the man, "I will bring it for you, but I should also have my share to

[12] Prohibitions and taboos. A term used and practiced widely amongst Naga tribespeople
[13] Interestingly, Wokha is the site which is visited by about a million Amur falcons on their annual migration to Africa. One wonders if there is an association between the Sema belief and this annual migration of Amur falcons and for how long Wokha has been on the Amur's migration path.

eat whether in the fields or at home from the barn. We should be good friends in the sharing of paddy. The man agreed and the rat brought the paddy from the sea. The man sowed the paddy and it produced a good crop Therefore, rats continued to have their share to eat in the fields and from the barns. It was believed that people should not curse or destroy the rat from eating the paddy.

According to Wekhwezu-u Wezah as cited in Wezah and Casiño (2010), even today, the people ask rats to protect their crops from grasshoppers and insects so that they have a plentiful harvest.

The Sema people's agricultural calendar was attuned to nature, guided by the movement of the stars or of birds-their migration patterns, breeding seasons and songs. For example, the sowing of paddy was initiated only when the constellation of Orion (*Phogwosiilesipfemi*) is at its zenith or after the *Kasupapo*, a species of cuckoo [14] was heard calling (Hutton 1921a). According to legend,

Photo 5 Kasupapo or Indian Cuckoo at the advent of monsoon

The father of a man named Kasu, having died, appeared to his son in a dream and told him not to sow until he should come and call to him. Everyone else in the village sowed his seed and the seed sprouted and still Kasu heard nothing from his father, and the blades of corn grew up and still he heard nothing, and at last, when the rest of the crops were grown quite high, Kasu said, "My father has forgotten. If I do not sow now it will be too late." So he got ready his seed and started for his field. And as he went down the hill he heard his father calling loud and clear "Kasu pa po! Kasu pa po! "(= "Kasu, his father "), and then he knew that the time had indeed come, and sowed his seed gladly. And of allthat village he was the only one that year who reaped a harvest, for the paddy of the others died in the ear, having

[14] The Indian cuckoo (*Cuculus micropterus*) according to Hutton (1921a). The sowing of paddy appears to correspond with this bird's breeding season which though poorly known is probably April and June (Grimmett et al., 1998).

been sown too soon. From that time forth the Semas have waited to sow paddy until they hear the Kasupapo.

The relation between Semas and birds is quite evident as we were told by the people of Sükhai village, that the Pompadour Green Pigeon (*Treron pompadora*) locally called *Chengu* acts like an alarm clock for the people, waking them in the morning and calling in the evening.

Many of the Sema stories suggest that that wild animals and plants colluded in mutually beneficial ways against human-beings who hunted them. Hutton (1921a) narrates a story of a mutualism[15] between the sambhar and the fish poison vine[16],

The sambhar and the fish wanted to become friends. So the sambhar said to the fish, "my friend, whenever men with dogs come hunting me, I shall come running down the stream. Do splash up the water and obscure my tracks". And the fish said to the sambhar, "my friend, men will strip the bark of the fish-poison vine and bring it to kill me. You too break down that vine with your horns." For this reason even today the Sambhar keeps breaking down the fish-poison vine.

These stories indicate the Sema Nagas' keen observation of nature and of ecological relationships including predation, competition and mutualism. Their observations and understanding of nature were, however, anthropomorphized in the form of folklore. Another story narrated by Hutton[17] explains how some birds came by their particular colouring[18].

When the earthcreepers[19] and the birds went to war, the earth-creepers brought the Python as their leader and the birds brought the Hornbill and the Eagle. The Eagle said to the Great Pied Hornbill (Aghacho)-"you are the largest, go and bring the python". The hornbill said, "the python is bigger than I am, let the Autsa (the Rufous necked hornbill) go". But the Autsa also refused. Then the Eagle said he would go. When the Eagle vanquished the snake, he brought it back and the birds divided the flesh amongst themselves. The crow (Agha) rubbed himself in the gall and became black. The minivet (Chilichepu-Scarlet Minivet), rubbed himself in the blood and turned red. However, the rubythroat (Izhyu) was late and all that was left for him was a bit of blood. He smeared his chin in the blood and that is why he has a ruby throat.

The Naga tribes had several taboos and traditions to regulate hunting of species during certain seasons. For example, hunting of some species during the breeding season such as hornbills was not allowed. Although, we did not come across any such stories from the Sema Nagas, the following tale from a Chakesang village suggests that hunting hornbills during the breeding season was discouraged through such stories[20].

Two young men fell in love with one girl. One day they went in search of a hornbill nest, which is located on top of a tree. They made bamboo steps and climbed up. One man was very deceitful; when his friend climbed to the top, he climbed down. He cut the bamboo

[15] Mutualism in ecology denotes a relationship in which both partners benefit, i.e. two species have a mutually beneficial relationship as long as the benefits outweigh the cost.
[16] We have paraphrased this story.
[17] The Sema Nagas has a number of animal folktales narrated by Hutton (1921a)-we have only reproduced a few here
[18] Only part of the tale has been narrated here and has been paraphrased
[19] Lizards and other reptiles
[20] Meselhitsu-u Khalo, story narrated in Chakesang village, Nagaland, India, December 22, 2010 (as cited in Wezah and Casiño, 2010)

ladder and went home. His friend was left behind on top of the tree. He could not come down. So he began to eat the fruits brought by the mother of a hornbill for her little ones. He wanted to come down. He began to construct wings with the feathers and tails from the young hornbills. The mother of the chicks told him not to cut the feathers of her young ones; she said that she would bring him down to the ground. Then a huge flock of hornbills came, and slowly took him down to the ground. The man was so thankful to the hornbills.

Amongst some Naga tribes, killing of pregnant animals and birds was a taboo that would bring misfortune to the hunter and his family. Fishing and the use of certain poisonous roots and leaves that kill fishes in the rivers or springs during the spawning season were also restricted (Lanusashi Lkr and Martemjen, 2014).

According to Hutton (1921a), however, "*The Sema observes no close seasons for game (except when made to do so), but hunting with dogs on an extensive scale usually stops towards the end of May, because it is apt after that to damage the young corn. Hunting is in full swing again after the harvest is in.*" The Sema Nagas, however had several gennas and taboos for the killing of certain game; or example, whoever killed a tiger had to remain chaste for six days. *While on the first day he could not eat rice, for the remaining six days he could not eat vegetables except chillies nor any meat except pork and had to sleep away from home on a bed of split bamboo to prevent sound sleep, lest the spirit of the slain beast attack him. In some tribes such as the Changs this genna is observed for thirty days* (Hutton 1921a). Various animals were not eaten including several birds for many reasons[21]. In addition, amongst Semas, those who killed a tiger or leopard have to abstain from eating plants called *chiiye, ashebaghiye, tsughukutsiye, or aghiye*.

All these taboos and practices amongst Naga tribe's people encouraged wise-use of plants and animals that helped them maintain viable populations. The underlying principle of sustainable utilization appeared to embody interactions between people and nature in the past. Killing was not taken lightly. In recent years, however, this fragile balance appears to have broken down in many places in part because of changes in religion and culture. Consequently, hunting in Nagaland is now widespread and wise-use practices eschewing hunting during the breeding season are largely non-existent. Nevertheless, as described in a later section, initiatives are being taken across the State, including Sükhai village to promote conservation and a revival, albeit incipient appears to have begun in the State.

That folklore is deeply embedded in the culture and practices of the local Sema Nagas even today, however, was very evident in our interaction with the people of Sükhai village. The Gaon Burrah, for example, narrated a story about a bird, the Silver-eared Mesia (*Leiothrix argentauris*) locally called *Achita*. These stories centering on plants, birds, animals, reptiles and insects characterize daily life for the Sema people.

[21] See chapter on hunting practices and traditions.

Photo 6 Silved-eared Mesia in Sükhai CCA

Farming in the Forest

The Sema tribe depends on jhuming or shifting cultivation as the mainstay of their diet supplemented by hunting. So dependent are the Sema tribes on their land and forests that their folklore, traditions, *gennas*, taboos and indeed entire lives revolve around this traditional practice of jhuming. Hutton (1921) puts it succinctly.

His[22] life is one perpetual struggle for an existence in which one year's crop is rarely enough to last him in even comparative comfort till the next harvest. Before he has reaped the whole of that harvest he is already at work clearing the new jhums for the following year. If he leaves his fields alone at all it is only to raid, to hunt, to observe a genna, or to go away to work for just long enough to earn the two rupees which he must pay to Government as house tax.

Given the widespread portrayal of jhum cultivation in a negative light as the primary source of forest degradation due to ever decreasing jhum cycles, the following comment by H. H. Godwin-Austen (1982)[23] on the quality of rice obtained from jhum fields in Nagaland is refreshing.

While on the subject of rice, I may mention that the kind grown by the Kukis is remarkably fine and nutritious, no doubt due to their system of joom cultivation, the crop being taken year after year off virgin soil.

[22] The Sema
[23] Cited in Elwin (1969)

Photo 7 Maize being grown after slash and burn of forests

Governance of Sema lands

For the Sema tribal, the forests were his farms and hence from his perspective land and forests were inseparable. The forests formed the mainstay of the economy as well as an integral part of the social and cultural fabric of Sema life. The ownership and governance of forests[24] is largely communal in nature in Nagaland and governed by customary practices which, however, deviate substantially from tribe to tribe. As Verrier Elwin (1969) puts it so succinctly, "*Naga society presented a varied pattern of near-dictatorship and extreme democracy*." The Semas along with the Konyaks and Changs, for example have completely different land ownership patterns from other Naga tribes. While in the Ao tribe the village people play an active role in governance and chieftanship is not hereditary but by a council of elders representing clans and family groups of the village (Jamir), amongst, the Semas, Konyaks and Changs, however, ownership of land vests with the village chief (Akukao). The chief controls the land and hence all power and privileges lie with him. The chief decides who gets a piece of land (forest) to farm based on the needs of each member of the village community. Davis in 1891 has this to say about his hereditary system of chieftanship,

These chiefs have many privileges, i.e. their subjects cut their jhums and cultivate them for them for nothing; they get a portion of every animal killed in the chase, and generally are in a position far superior to that of an ordinary Naga headman.

Some percentage of land is privately owned but which varies from village to village. George and Yhome (2008) give an account of some Sema villages and their land governance practices. In Lumami village for example, while the Chief owns 60% of the land the

[24] We use land and forests interchangeably

remaining is owned by a few individuals depending on the 'khels' who formed the village along with the then Akukao. Consequently, the majority of the people are landless, and the Chief allocates portions of his land to them each year. In this paternalistic system, the people give the chief a part of their produce and call him 'father.' Every year the chief and his council decide the site of cultivation in the forest. In return for his largesse, the chief is entitled to free labour twelve times each year from the village community. There are other examples of Sema villages in which land is entirely owned by individuals (George and Yhome, 2008). The landless villagers in Awotsakilimi for example are again completely dependent on the Akukao who owns most of the land. In Sutemi village too, land ownership is by individuals, mostly the Akukao and those who first settled in the village. These examples suggest the relatively feudal system of land management amongst the Sema tribe and the enormous influence wielded by the chief of a Sema village.

In 1978, the Nagaland Government passed the Nagaland Village and Area Council Act which called for the creation of a Village Council in each village. However, this Act allows the village councils to select their members based on their own customary traditions and practices and thus fosters the continuation of existing governance and management norms. In the case of Sema villages, the village council makes all the decisions on where cultivation is allowed and violators are sanctioned. The village council also has the power to supersede individual property rights and impose restrictions on village members (George and Yhome, 2008), for example in terms of cutting for firewood.

Practice of shifting cultivation in Sema villages

In the Sema practice of shifting cultivation (jhuming), the people clear the land (forest) which is cultivated for two successive seasons after which it is allowed to revert to forest for a number of years. The land was farmed for only two seasons, because as Masters (1844) put it,

After the Naga has cultivated a piece of ground two years, and often one year only, he finds it so full of weeds, especially of the compositae and labiatae[25] families, that it is not worth his while to sow it again and he clears fresh jungle accordingly.

The exact cycle depends on the amount of land available. Increasingly, jhuming cycles are shortening as populations increase and forest land is scarce. Amongst Sema tribals, fifteen to twenty years was considered to be ideal, though seven to nine years is considered to be the shortest time in which the land is fit for cultivation (Hutton 1921a, discussions with village people). In particular land near the village tends to be left for the shortest time, since it is the easiest to cultivate (Hutton 1921a). Shortening jhum cycles are not a new practice, however. Almost 100 years ago, Hutton (1921a) has this to say about the length of the cycle.

In the Tizü valley, however, and in parts of Kileki valley where the population has much outgrown the supply of suitable jhuming land, jhums may often be found cleared after only five years' rest, and in some villages even after three, while loads of earth have to be sometimes actually carried and dumped down in the rocky parts of the field to make sowing possible at all.

Unlike other tribes, the Sema tribes do not burn and then clear the land. Instead, they first fell much of the forest and then burn (Hutton, 1921a). This practice also probably provides them with ample wood for firewood, construction and for sale. Hutton (1921a) provides a

[25] Asteraceae

detailed list of crops planted in the jhum cycle; however the major ones are rice, Job's tears (*Coix lacryma-jobi*) and millet along with many other secondary crops.

The jhum cycle starts in November when the clearing of old jhums is carried out by the women for resowing. Simultaneously, the men clear new land for the new jhum. Seeds are not broadcast but are inserted into little hollows created with a digging hoe (*akupu*) by the men and then scraped over with a hoe of bamboo or bamboo and iron {*akuivo*) by the women. Harvesting is done from September to November depending on the climate. Stripping of the grain is done by hand. The people of Sükhai told Hutton (1921a) that this painful method of stripping by hand, not practiced amongst other tribes is because, "*long ago, when the Semas reaped with daos, a man slashed open his stomach and so died."*

Although jhuming continues to be the main method of farming in Nagaland, some recent evidence suggests a decline in jhuming patterns as people shift to other avenues of employment. In the case of Sükhai, many of the village people do not have the time to jhum in distant areas of the forest. Some of the village people, for example use cars to reach farm sites, but more distant areas are permanently abandoned back to forest. Population size of the village is dwindling as people move out; hence smaller jhumed areas are probably sufficient for meeting people's agricultural needs.

Photo 8 Fresh jhum on the right and previous jhum on the left from village Nihoshe

Interestingly this reduction in area under cultivation is contrary to what Davis predicted in 1891, although he predicted a shift from jhuming to rice cultivation. According to him, "*the Semas, are to all appearance a rapidly increasing tribe. They have, within the last 30 or 40 years, occupied the whole of the Tizü valley and a portion of the Tita valley, and have ousted the Aos from the sites on which now stand the Sema villages of Lopphemi and Limitsimi. They are now getting considerably pressed for land, and as they can extend no further to the north, south, or west, and not much further to east, it appears to be merely a question of time before they are obliged to adopt the terraced system of rice cultivation. This system, together with the Angami dress, has already been adopted by the seven or eight Sema villages situated near the Eastern Angami villages of Zogazumi and Pholami*."

One of the reasons for selection of the site of the proposed Sükhai Community Conservation Area is its distance from the main village[26]. People from Sükhai hardly venture into this area. While carrying out vegetation sampling in this area, we noticed patches of jhum cultivation that had been abandoned for more than nine years[27]. Such old jhum areas that have reverted to forest form ideal areas to regenerate and conserve.

Reviving conservation in Nagaland- the modern rationale

As described earlier, community ownership and management of land is the norm amongst most tribes in Nagaland and forest lands are communally owned. Of the recorded forest areas as much as 8,628 sq. km falls under Unclassed Forests or 93.5% of the recorded area (FSI, 2013) which are owned and managed by individuals, clans, village and district councils and other traditional communities. These traditional and customary rights of people in the North East are protected through the sixth schedule of the Indian Constitution, under which in many States, Autonomous District Councils have been constituted where tribal councils have legislative, administrative and financial powers over 40 subjects including forests (Chatterjee *et al.*). In Nagaland, customary rights are protected under Article 371 A of the constitution (see Box 1), and while no autonomous councils exist each village has a village council (Jamir, Undated). Hence customary land ownership and management practices characterize forest management in the North East including Nagaland.

Box 1 Article 371 A of the Indian Constitution

Article 371 A: Special provision with respect to the State of Nagaland

Notwithstanding anything in this Constitution, no Act of Parliament in respect of:

- Religious or social practices of Nagas
- Naga customary law and procedure
- Administration of civil and criminal justice involving decisions according to Naga customary law, and
- Ownership and transfer of land and its resources,

... shall apply to the State of Nagaland unless the Legislative Assembly of Nagaland by a resolution so decides.

As mentioned earlier each tribe including the Sema tribes had their own conservation ethic and taboos and practices that encouraged the wise-use of nature. Changes in culture, religion and exposure to the outside world have over the years led to an erosion of many of these practices. The influx of guns, has further transformed low-intensity hunting using indigenous traps and snares. The culturally important hornbill has all but disappeared from much of the State and hunting is now rampant and indiscriminate. Nevertheless, the state continues to support significant floristic and faunal diversity, and there is little doubt that In Nagaland, these traditional conservation practices along with low levels of population and development have helped to protect biodiversity. Moreover, there appears to be a revival of interest in protecting communally-managed areas for conservation across the State some of which date back to the late 1800s. For example, there are records of Community Conservation Areas (CCAs) being declared in the early 1800s, especially in response to forest degradation and loss of wildlife. In 1842, the tropical evergreen forests of Yingnyu shang

[26] By road, the nearest point to the proposed CCA from Sukhai village is 10 km
[27] More details on vegetation sampling are available in Chapter 5

were declared a Community Conservation Area by the Yongphang village in Longleng district. Today, there are reported to be 765 Community Conservation Areas in the five eastern districts of Nagaland, Mon, Longleng, Tuensange, Kiphere and Phek. In Tuensang district alone, as many as 104 of these areas have been declared along with self-imposed bans on hunting imposed by village councils

ICCAs, i.e. Indigenous or Community Conserved Areas are areas that are governed by local communities, tribes or indigenous people that lead to conservation of cultural traditions and biodiversity. CCAs may represent the continuation of traditional conservation practices or ones where ancient practices have been revived, modified or even newly created to protect nature and address threats to natural ecosystems and cultural values through changing socio-cultural, economic, developmental imperatives and mores and unsustainable resource extraction practices-e.g. hunting and poaching or shifting cultivation practices on a reduced fallow cycle. Both exogenous and endogenous factors may exert an influence on cultural and resource conservation practices and work alone or in tandem to strengthen or weaken these CCAs.

Motivations for the creation of these CCAs vary. In 1983, in a Chakhesang tribal settlement called Lozaphuhu, the local student's union (LSU), conserved a 5 sq. km of forest in order to protect water sources. Later in 1990, they added an additional patch of forest below the main village, as a wildlife reserve, with a total ban on hunting and resource use (Pathak and Kothari, 2005) the Chakhesang Public Organisation (CPO) consisting of 80 villages in Phek district imposed seasonal hunting bans and protected the forests against forest fires. The recent ban on the hunting of Amur falcons when they make their annual stop at Doyang same in Wokha district during their migration from Mongolia to South Africa is a fine example of efforts by various individuals, organizations and the forest department along with local communities to stop the slaughter of these birds. In the case of Khonoma, in 1993, 300 Blyth's tragopans were killed which led to some individuals in the village vowing to impose hunting bans (Pathak and Kothari), particularly since the forests were already reeling from timber harvests. In 1998, the Khonoma village council decided to notify about 20 sq km as the Khonoma Nature Conservation and Tragopan Sanctuary (KNCTS). Hunting was banned in the village and resource used stopped in the core of the sanctuary. Recently, however due to increasing human-animal conflicts, the ban on hunting has been partially lifted. Sendenyu, is an example of a CCA created by a few members of the village who were government officials and although hunters were concerned about dwindling wildlife in their area (Pathak and Kothari). While the Khonoma and Sendenyu examples are well known, many relatively undocumented examples of community conservation exist. In Thetsumi village for example, the people have kept aside 7 sq. km of area including 800 ha of formerly jhumed areas as a Mithun forest for the breeding of mithuns (Banerjee, 2014).

In the case of Zünheboto district, community conservation activities have been in existence for almost two decades. The people of Chishlimi village in 1995 banned hunting in a designated forest area and stopped the use of explosives to catch fish in the Tapu river to help fish populations recover. Villagers continue to hunt in areas outside the reserve. However, if the animal enters the reserve then it cannot be hunted. In addition, hunting through ambush has been banned in the entire village. The Ghosu Bird Sanctuary in Ghukiye (Gukhui) of Zünheboto was also one of the first community protected areas to be declared. According to Pathak and Kothari (2005), "Ghukiye and five neighbouring villages are also regulating fishing in their river, by banning use of explosives, chemicals and electricity. Another 11 villages under Satoi area in Zünheboto have converged to conserve roughly 50 sq km of forest area, while 14 villages have come together to create the Nanga

Greener Zone. Sükhai village of Zünheboto which lies close to various biodiversity rich areas including Ghosu Bird Sanctuary and the Satoi range, have also declared a Community Conserved Area and are in the process of declaring an additional area for conservation.[28] In the case of Sükhai village, a number of reasons are behind the community's decision to conserve the area. The decreasing need for jhum land has been mentioned earlier. In addition, the local people want this area to become an important center of ecotourism and hope that this CCA will in the long run help generate local livelihoods from ecotourism including bird and wildlife watching.

As described above the modern rationale for conservation in Nagaland are many, and can be driven by resource scarcities, declining wildlife populations, the need to generate alternative livelihoods for example through the rearing of Mithun or ecotourism. Irrespective of the exact motivations, conservation of biodiversity is reviving in the State of Nagaland.

[28] See Chapter 6 for additional details.

Chapter 4. Peoplescape

Introduction

The 'P' i.e. 'People' in the PBR indicates that the PBR activity is people-centric. As a first step to the development of a PBR, it is important to document the people of the locality, their relationships with biodiversity, and variations in the nature of this interaction. This chapter attempts to provide an account of Sükhai village, with respect to Sükhai's natural resource, its people and interactions between the two. The findings represent the perceptions of the people themselves, and their responses and viewpoints to the questions asked by the TERI team.

It is the local communities who over hundreds of years have shaped this region's biodiversity, changing and altering it based on their use of the land, and in accordance with their belief systems. In turn, it is this rich and varied biodiversity that has imbued every aspect of the perceptions, cultural and economic practices of the Sema community, and their well being. Therefore, this chapter attempts to capture the present day practices of the Sema people of Sukhai village but in light of their past history, traditions and beliefs and their use of, and relationship to, nature.

Methodology

To capture the essence of the 'P' of a PBR, participatory techniques such as transect walks, resource mapping, and social mapping were adopted. Participatory approaches are based on an assumption that people have an intuitive picture and knowledge of their surroundings, and hence involve a series of group discussions. Corresponding to each technique adopted by the survey team, formats for documentation, namely, village profiles, resources mapping and social mapping were developed and applied (refer to Annexure 1 to 3 for details). The following paragraphs provide details of methods adopted for data collection.

Transect Walk

Materials - pen and paper

Objective – To learn more details about the village – location and boundary of the village, important roads, location of main village, location of jhum land, clans residing within the village, primary occupation, etc.

Method - A transect walk is conducted by walking systematically along a defined path (transect) across the village together with the local people observing, asking, listening and looking (Refer to Appendix 1 for the village profile format).

Resource Mapping

Materials - Large sheet of paper, pencils and colour markers.

Objective –To learn about villagers' perceptions of natural resources found in the village and how they are used.

Steps

1. Participants were asked to draw boundaries, demarcating important roads in, and around, the village.

2. Participants were then asked to draw important landmarks within the village, such as the church, tourist guest house, jhum land and sources of water.
3. After the participants finished drawing the resource map, they were asked to describe the map.
4. Discussion on important resources such as jhum land and forests, sources of water, education and health facilities, were initiated with the participants. The discussion was recorded in the format provided in appendix 2.

Social Mapping

Materials - Large sheet of paper, pencils and colour markers.

Objective – To understand the social composition of Sükhai

Steps

1. Firstly, participants were asked to draw a map of the village, showing boundaries and important landmarks such as Khels, churches, ponds etc.
2. The participants were then asked to draw all the households within the village on the map.
3. Participants were asked to list details of each household – clan they belong to, number of households, gender composition, age composition, and number of migrant members. (Refer to appendix 3 for social mapping format)

Findings

Location of Sükhai village

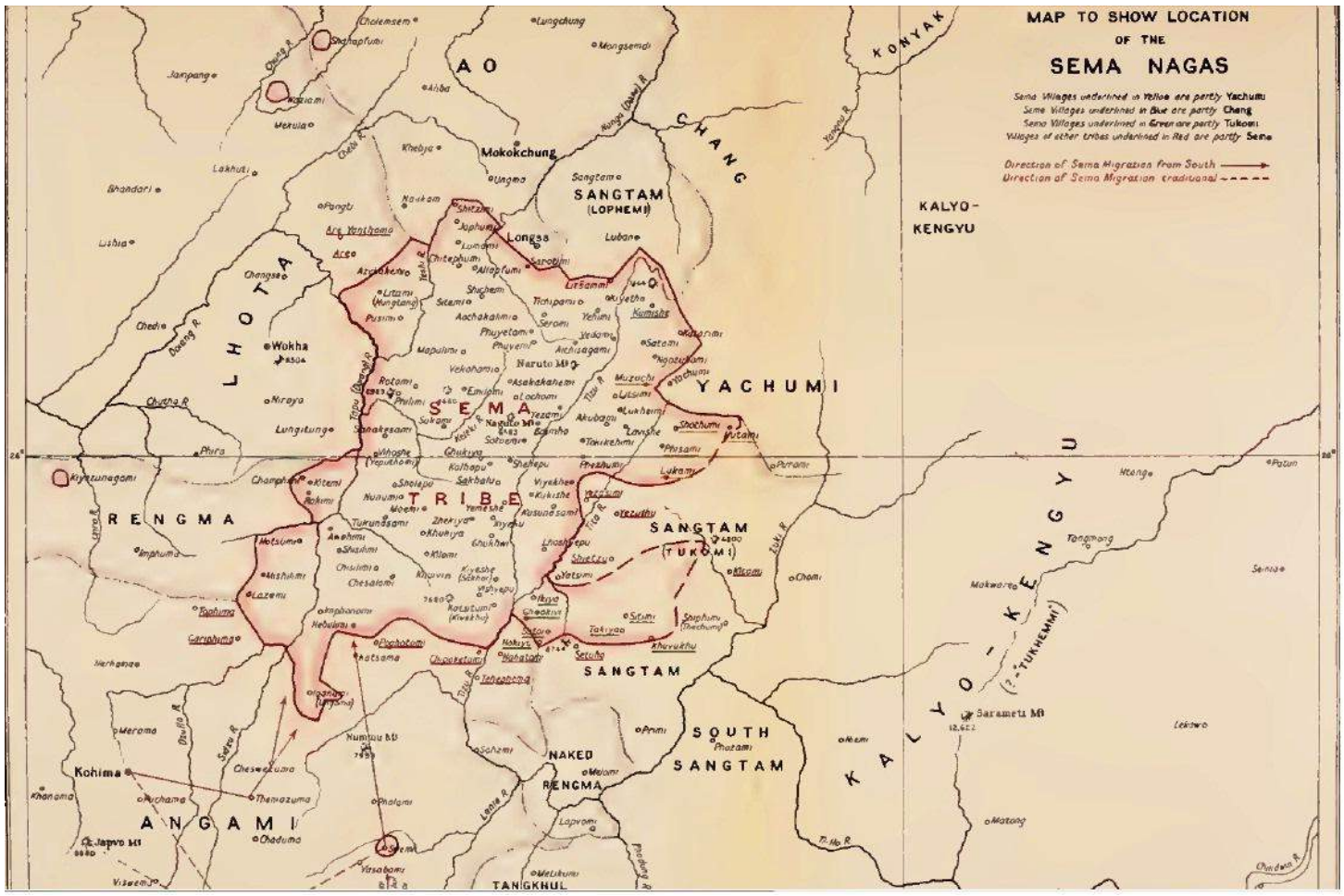
Sükhai a part of Satoi Range is considered to be a paradise for ornithologists and bird-watchers with many interesting species like the Blyth's Tragopan, Kalij Pheasant and Peacock Pheasant that are still seen in this range. On the political map of Nagaland, Sükhai village is located in Satakha Block of Zunheboto district, Nagaland, 20 Kms from Satakha, Block Headquarter along the Satakha-Satoi Highway and approximately 120 kms from Kohima, the Nagaland state capital.

The history of Sükhai

Huton (1921) in 'The Sema Nagas' identifies Semas as a migrant tribe. This was corroborated by the village council head according to whom the Sema had migrated from the Chin State of Myanmar (see Fig 2). The original name of the village was Kiyeshe (the founder of the village), though the village is commonly known as Sükhai (the great grand son of Kiyeshe). Sükhai is recognized as the parent village of eight of the neighboring villages, including, *Xuivi, Kiyekhu, Vishepu, Kivikhu, Ghukhuyi, Nihoshe, Khukiye,* and *Zhekiye* (Refer to Figure 3).

Source: https://en.wikipedia.org/wiki/File:Burma_Chin_locator_map.png

Figure 2. Map indicating the Chin region of Myanmar



Source: Hutton, 1921

Figure 3. Map showing the location and migration of Sema nagas

The layout of Sükhai village

Household settlements in Sükhai are located on the Sataka-Satoi highway, which passes through the village (Figure 4). The village is bestowed with a natural river and two streams, flowing in and around the village; The *Tizü* River lies in the east, the *Yayi* stream in the west, while the *Loyi* stream horizontally cuts through Sükhai.

Jhum land within Sükhai extends from the north-west to the south-east of the village and is divided into 14 Jhuming areas[29]. Recognizing the need for conservation a resolution was passed by Sükhai Village Council in 2002 to protect "Azhoqha and Yayi" area (located in the far south of the village) earlier covered under Jhum cultivation, so as to safeguard the natural resources including living and non-living resources. The land adjoining *Tizü* River is agricultural land (locally referred as Pani Kheti) for cultivation of paddy. An exercise was undertaken to draw the various landmarks and position of village Sükhai by the local people (Figure 5).

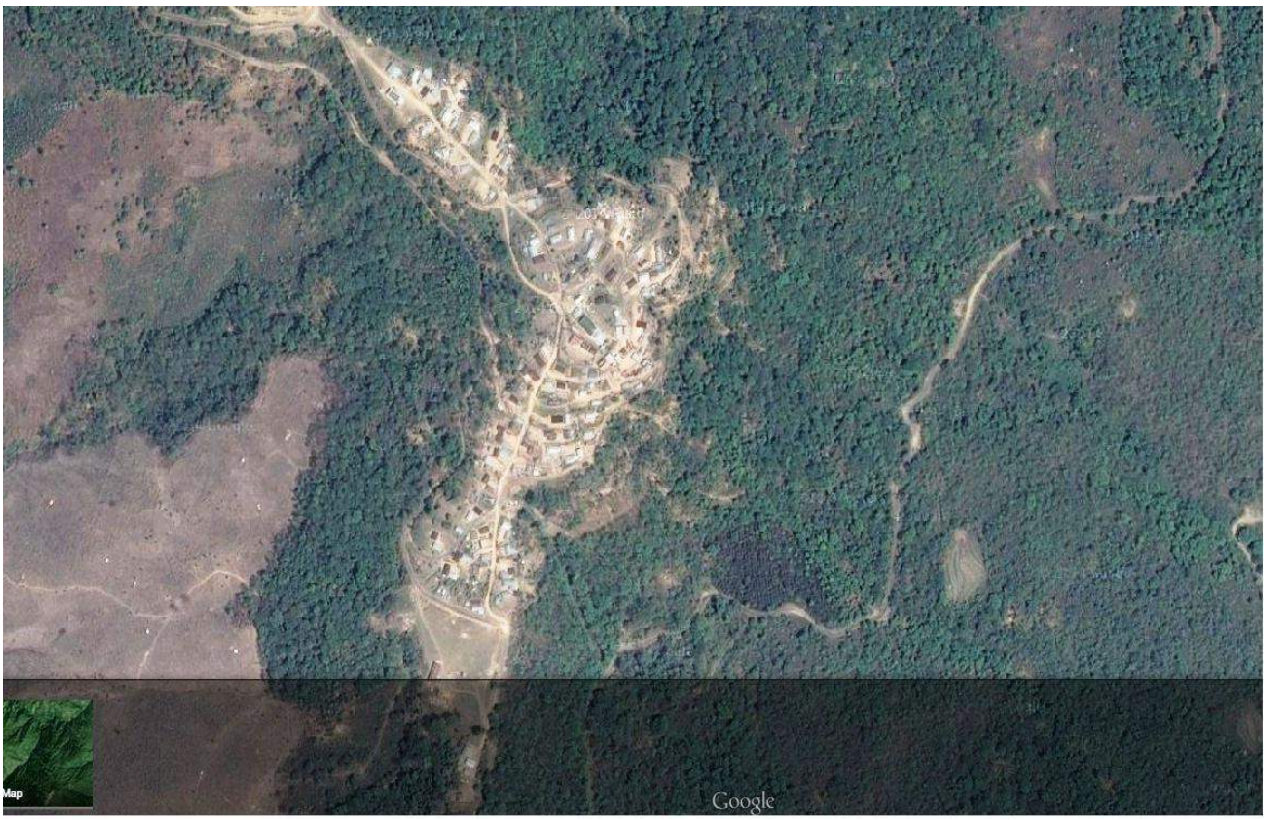


Figure 4. Google map of village Sükhai showing its location and spread

[29] A small portion of Jhum land cultivated at a given time.

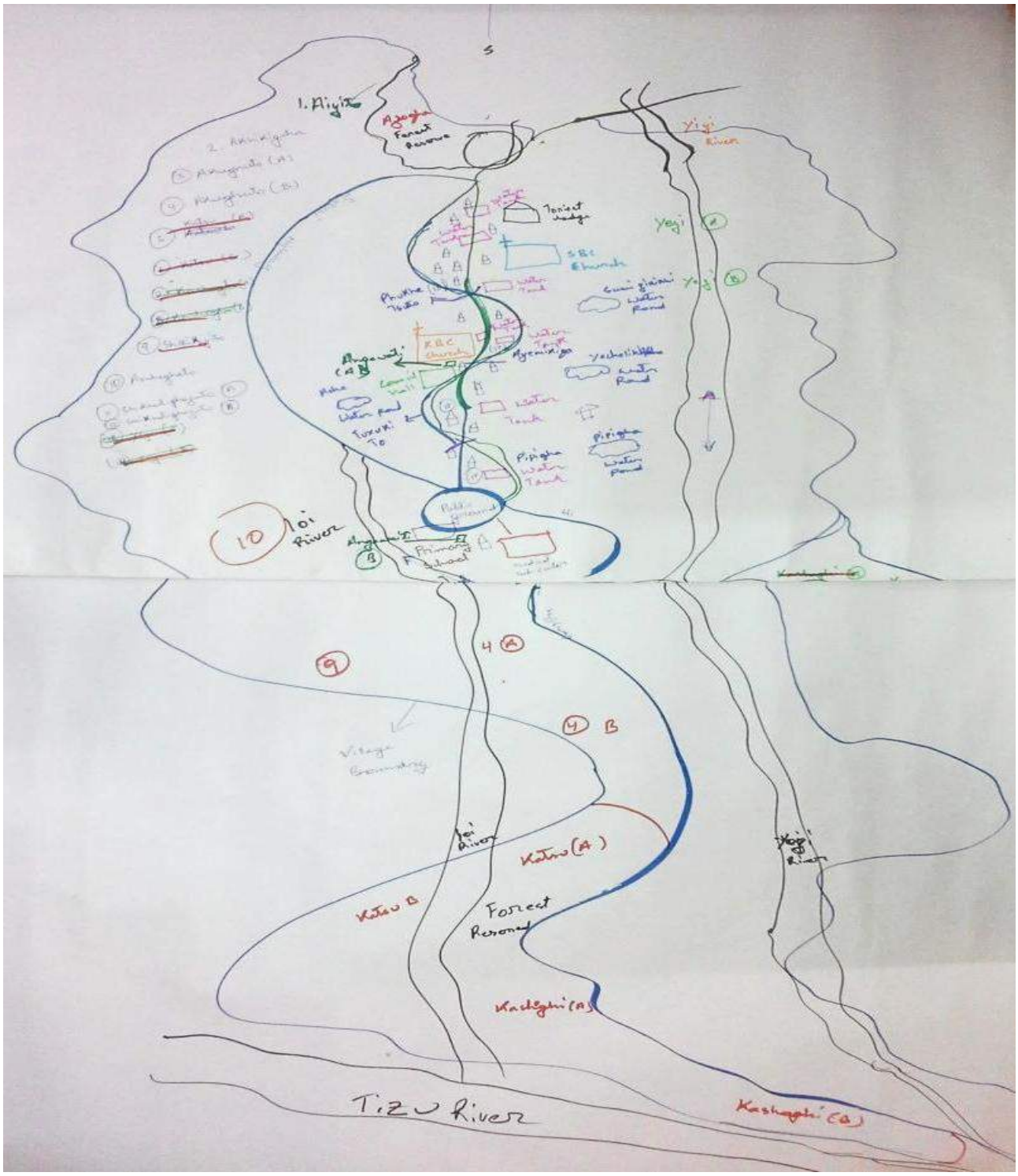


Figure 5 Resource map drawn by community members of Sükhai

Types of Houses in Sukhai

Sükhai village comprises of three types of houses, composed of 1) bamboo and tin, 2) wood and tin, and 3) concrete houses with tin roofs. Houses made of bamboo and tin are the most common. Materials used in house construction are important indicators of the distribution of wealth across households. It was observed that within Sükhai, households with greater wealth had houses built of concrete and/or wood with tin roofs. A typical house in Sükhai village consists of 2-3 bedrooms, a detached kitchen, detached bathroom, and a granary to store paddy, maize and other harvests. Adjoining the granary is a confined space where pigs and hens are raised. Each household maintains a kitchen garden which supplies most of their daily fruits and vegetables.

Photo 9 Different types of houses in Sukhai village

Photo 10 A typical Naga kitchen and the display of animal trophies outsidea Sema House

The population of Sükhai

As of November 2014, Sükhai village had 62 households and a total population of 417, with 184 males and 233 females. The social mapping conducted with the villagers revealed that an average household in Sükhai comprises of 7 members.

Clans within the village Sükhai

A 'clan' can be defined as a group of people tracing descent from a common ancestor. Consequently, personal identity in tribal societies is closely linked to clan membership. As shown in Table 3.2, Jimomi is the dominant clan of Sükhai with over one-third of Jimomi families residing in the village. Murumi and Ayemi are two other major clans of Sükhai with 28.8 percent and 15.1 percent families, respectively. Other clans in Sükhai village include Awomi, Assumi, Kibami and Achumi.

Clan History

The names of clans residing in Sukhai are provided in Table 1.

Table 1. Clans residing in Sükhai

Clan Name	Number of Households
Jimomi	24
Murumi	19
Ayemi	10

Clan Name	Number of Households
Awomi	6
Assumi	4
Kibami	2
Achumi	1
Total Households	**66**

Age profile of Sükhai

The age profile as shown in Figure 6, indicates that Sükhai is a young village with most of the population, (59 percent), in early and middle adulthood i.e. the age group of 18 to 50 years, and 30 percent in childhood, and adolescence, of which 7 percent are below 5 years of age.

Sükhai is in a phase of demographic transition, with the maximum proportion of population between 18 years to 50 years, in comparison with elders i.e. 50 years and above. This trend further corroborates the need for a PBR for villages such as Sükhai to conserve traditional knowledge and practices, for future generations, and for sustaining the natural ecosystem.

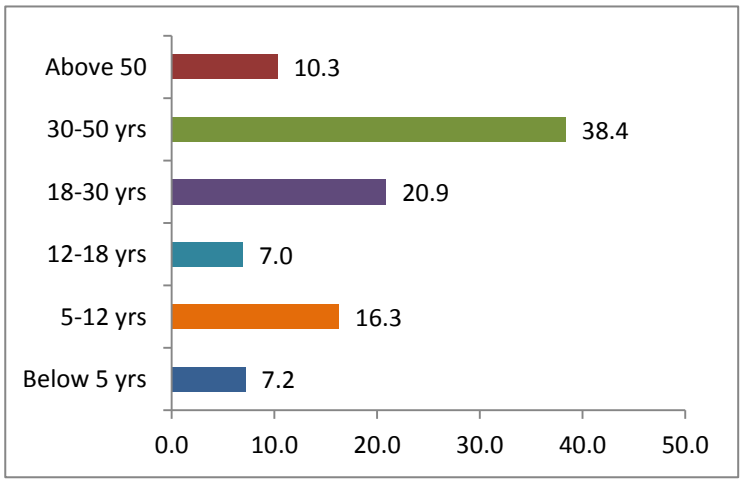


Figure 6 Age Profile

Out-migration from Sukhai

Nagaland has high rural to urban migration. According to Aier and Kithan (2011) migration in Nagaland may be understood as forced circumstances, rather than dictated by desire for change in lifestyles. The reasons for rural-urban migration in Nagaland are the same as for any other

state of India i.e., lack of job opportunities in rural areas, better educational possibilities and better health facilities.[30]

Resonating with the above trends, social mapping exercises reflected a high figure of 21 percent out-migration amongst the people of Sükhai for better job opportunities and education. Children soon after their basic schooling within the village are sent to cities such as Dimapur, Kohima, Sataka, Zunheboto, Delhi and Assam. Sükhai village also lacks basic health facilities, due to which most families have to depend upon health centers in neighboring cities. [31]

The Sükhai economy

Sükhai's economy is largely agriculture and forest-centered. Farming is the primary occupation for the Sema of Sükhai village. Paddy, maize and pulses are the main crops. Though farming is mainly for subsistence, high dependence prevails on the other abundant resources of Jhum lands. The Sema of Sükhai rely on wood derived from the clearing of Jhum lands for cooking, house repair or maintenance, and it also forms a large part of their income. Certain fruits, vegetables and grains harvested from the forest also form a part of their daily diet. Further, each family is involved in animal husbandry which is a source of additional income. Commonly raised animals include pigs, hens and dogs. There is growing interest amongst the people of Sükhai in jobs in the organized sector-some village members are engaged in government services, and have migrated to nearby towns such as Sataka, Zünheboto, Kohima and Dimapur.

Farming in Sükhai

Farming in Sükhai is mostly subsistence in nature. Farmers of Sükhai village continue to practice slash and burn agriculture or jhum cultivation[32]. After clearing, each jhum area is cultivated for two to three years along with the current Jhum. Sükhai village earlier followed a nine-year jhum cycle, but due to a dip in the population of Sükhai the jhum cycle has lengthened to 14 years due to increased fallows. Lengthening of the jhum cyle provides improved scope for natural biodiversity to regenerate.This is an extremely positive sign as jhuming is an excellent way to protect forests and biodiversity and yet grow crops, provided that long fallow periods allow for the forest to regrow.

Paddy, the staple crop, is grown both on jhum land and on the river bed. *Miyeghu* the local variety of paddy is sown in the jhum fields, whereas the hybrid variety of paddy, procured from government agricultural centers are planted near the river bed. Pesticides are only used in hybrid seed crops. According to Sükhai's farmers, jhum cultivation provides sufficient grains for subsistence for a year. The wood drawn from felling of trees, at the time of clearing and burning operations, is used as fire wood, to repair houses, and for fencing.

Apart from grains including paddy and maize, farmers of Sükhai also grow vegetables. Table 2 provides the sowing and harvest time for some of these crops.

[30] Anungla Aier, and Thungchanbeni Kithan, Rural-Urban Migration, A Thematic Report, Department of Planning and Coordination, Government of Nagaland, 2011

31 Refer to section on basic facilities in Sukhai

[32] Jhumming cultivation is an agricultural practice in which forest jhum land is divided on a rotational basis. The practice involves clearing the area by felling trees and setting fire to clear the land.

Photo 11. Paddy being cut in the month of November

According to the farmers of Sükhai, climate change has had a positive effect on agriculture. The weather in Sükhai is comparatively warm and hence more conducive to the growth of paddy. The people have also been able to introduce crops which are found in warm climates. Of course, availability of high yielding variety of seeds is yet another reason for enhanced production.

Table 2. Crops grown in Sükhai

Sowing		Harvest	
March	Maize, Beans, Chilies, Tomatoes, Eggplant, Pumpkin, Cauliflower, Lady finger	June	Chilies, Tomatoes, Eggplant, Pumpkin, Cauliflower, Lady finger
April-May	Paddy (on Jhum Land)	September	Maize
June-July	Paddy (on the *Tizü* river bed)	October	Paddy
		November	Beans

Animal Husbandry

Warriors as they are by nature, the Semas love hunting, and relish the meat of wild animals. Rice is their staple food, which is eaten with meat. The meat is mostly pork, beef and chicken, but it can also be snakes, snails, squirrels, dogs, cats, mithuns, buffaloes, deer, birds, crabs, monkeys, shrimp, insects, worms, and almost everything that is wild. Slaughtering of pigs, cows and mithun is an important feature of Sema festivals such as Ahuna and Tuluni. Some animals are also considered to have medicinal value such as the Hoary Bamboo Rat (*Rhizomys pruinosus*) which is used to treat headaches. The locals chip the front incisors of the rat and withdraw a drop of blood which is then then put on the head of the patient to relieve fever and headaches. It is also used during delivery to help in blood clotting. Soup of the rat is offered to patients suffering from weakness and tuberculosis.

Photo 12. Pigs reared in each and every house for meat

Due to rampant hunting, several wild animals are disappearing from parts of Nagaland, including the Great Hornbill which was once found in the forests of Sükhai, according to the village elders. Animal rearing for subsistence has become important for the people of Sükhai. Consumption of meat, however, has reduced and while variable from household to household, on an average, a household may have a meat dish in their menu only twice to thrice in a week.

Animal husbandry not only contributes to the food basket and nutritional security of the Sema, it is also a source of household income. Table 3 provides details of animals commonly reared by the people of Sükhai.

Table 3. Details of commonly sold livestock

Animal	Use	Method of Keeping	Remarks
Pig (Awo)	Household consumption and commercial rearing. Meat is sold at Rs 180/Kg	Reared in confinement in the backyard of each house.	Reared for meat during festivals and for financial emergency
Dogs (Atsu)	Household consumption and commercial rearing. Meat is sold at Rs 200/Kg	Raised as pets	
Hen (Awu)	Household consumption and commercial rearing. Meat is sold at Rs 500-600/2-3Kg	Reared in open in the backyard of each house.	Hens in the village got infected and died
Mithun (Avi)	Commercial rearing. Meat is sold according the size. Big Mithun – Rs. 1 lakh. Small Mithun (below 2 years) – Rs. 20000 to 30000	Reared in open forest	Considered important for festivals such as Tulhuni and Ahuna
Goat (Ane)	Household consumption and commercial rearing. Meat is sold at Rs 200/Kg	Reared in confinement in the backyard of each house.	
Cow (Amishi)	Household consumption and commercial rearing. Meat is sold at Rs 150/Kg. Also sold according to size Big cow at Rs.15000 to Rs.20000 Small Cow (below 3 years) at Rs. 15000	Reared in open forest	
Cat (Akhosa)	Domesticated	Raised as pets	

Importance of the kitchen garden to the people of Sukhai

A kitchen garden is an important feature of Sükhai with respect to greening and biodiversity conservation. Each house, depending upon the availability of land, maintains a kitchen garden, which comprises of vegetable and fruit plants and trees. These gardens are not only a source of important food groups in the diet of the people of Sükhai, but also help in carbon sequestration. A list of fruit and vegetables commonly found in a kitchen garden of Sükhai village are provided in Table 4.

Table 4 Fruits & vegetables commonly found in a kitchen garden of Sükhai

S. No.	Local Name	Scientific Name	Use
1	Aghushibo	*Thelypteris palustris*	Fruit and leaves consumed as vegetables
2	Ahanguniye (MuskMelon)	*Cucumis spp.*	Used as vegetable.
3	Aikhu (Soyabean)	*Glycine max*	A local variety of pulse. It is prepared in leaves (e.g. banana leaf) and is known to be high in vitamins
4	Akakhu (Wild EggPlant)	*Solanum torvum*	Seed used in alcohol preparation. Seeds are also of medicinal value. They are used in special soup preparation to heal cough.
5	Akhakhu	*Solanum indicum*	Fruit of the plant used as vegetable
6	Akhakhu Akijeu	*Solanum gilo*	Fruit of the plant used as vegetable
7	Akhakhu Aklotiu	*Solanum torunm*	Fruit of the plant used as vegetable
8	Akini (Wild Sesame)	*Perilla ocymoides*	Oil extracted from the seeds used in cooking.
9	Akini (Wild Sesame)	*Perilla frutescens*	Oil extracted from the seeds used in cooking.
10	Aku-u (Wild Ginger)	*Zingiber cassumunar*	Used as a spice, as an antibiotic, stomach pain reliever. High medicinal properties.
11	Aniza (Naga Pudhina)	*Mentha longifolia*	Key ingredient for chutney (sauce), garnish for several vegetable preparations. It also holds medicinal value, mostly used during dysentery and vomiting
12	Ashebaghe/aghuye	*Centella asiatica L*	Leaf consumed as vegetable, used in control of high BP
13	Asudeghuna (Sweet tomato)	*Cyphomandra betacca*	Used as vegetable
14	Asukhakhuye	*Solanum indicum*	Consumed as leafy vegetable. Also holds medicinal value. Used in soup preparation for cough
15	Asuyikhu	*Cajanus cajan*	Seed used as vegetable
16	Atsuno	*Allium chinensis*	Similar to onion. It is used in pickle and chutney

S. No.	Local Name	Scientific Name	Use
17	Atsunoqhu (Sorghum)	*Sorghum bicolor*	Consumed as a millet
18	Atuye	-	-
19	Axupi-bo	*Nicotina tabacum*	Used as mouth freshener (sadapaan)
20	A-Yi	*Colocasia esculenta*	Corm used for food
21	Ayikhu (Soyabean)	*Glycine max*	Boiled and fermented to be used as a spice.
22	Beghuna (Wild Tomato)	*Lycopersicon lycopersicum*	Fruit used as a vegetable and in chutney
23	Fern(Khakhuye)	-	leaves used as vegetables
24	Ghatsuye	*Wedelia chinensis*	Leaf vegetable boiled good for gastric
25	Ghatsuye	*Sonchus wightianus*	Leaf consumed as vegetable
26	Ghughuye (Shrub)		Consumed as a vegetable. Mostly eaten with rice
27	Iliye (Fern)	*Diplazium esculentum*	
28	Karela (Bitter Gourd)	*Momordica charantia*	Used as vegetable. Not a native to Nagaland.
29	Khatrashi (Eggplant)	*Solanum melongena*	Fruit used as vegetable
30	Khobaya	*Solanum nigrum*	Used as leafy vegetable. Juice used as a cure for coughs.
31	Khobaye (Wild Gooseberry)	*Physalis minima*	Leaves used as vegetables
32	Khobaye achiu (Cape Gooseberry)	*Physalis peruviana*	Leaves used as vegetables
33	Khughughu		Medicine for teeth. Burn the fruit and siphon smoke through a bamboo pipe to teeth and leeches are removed from nose of cows

S. No.	Local Name	Scientific Name	Use
34	Khulape		Used as fodder for cattle
35	Khuuthi (Climbing Bean)		Seed pods are used in raw chutney. When Ripped seeds are used as legume.
36	Kochu	*Colocasia esculenta*	It grows on river banks. Considered good for acidity.
37	Konathe		A type of bean. Used as pulse or in chutney preparation.
38	Kopi		Similar to cabbage. Eaten as fried vegetable.
39	Kughupuniye		
40	Kumthopuniye	*Impatiens spp.*	Leaves used as vegetables
41	Kumutho-puni-ye	*Impatiens spp.*	(eaten) wild leaf, grown by the water drain
42	Lavatsuna	*Allium hookeri*	Leaves used as vegetables
43	Lozuye	*Clerondendrum fragrans*	-
44	Mighichiniye	*Costus spp.*	Leaves used as vegetables
45	Mighishi	*Capsicum annum*	Fruit used as spice and in chutney
46	Mishinikhaye	*Polygonum chinense*	leaves used as vegetables
47	Moobusu	*Ficus auriculata*	Young tender leaves used as vegetables
48	Naga Dhania	*Eryngium foetidum*	Junglee Naga dhaniya growing on hill side
49	Naghu-kuphu	*Celosia spp*	Vegetable Cocks Comb
50	Nakiniye	*Zanthoxylum rhetsa*	Leaf vegetable. Seeds are used in chutney
51	Nakiniye	*Zanthoxylum armatum*	leaves used as vegetables
52	Nakiniye (Prickly Ash)	*Zanthoxylum Nitidum*	leaves used as vegetables

S. No.	Local Name	Scientific Name	Use
53	Nananiye (Glory Bower)	*Clerondendrum colebrookianum*	Wild climber – used for reducing BP – It is boiled with rice
54	Nikeniye (Buddha Coconut)	*Sterculia alata*	leaves used as vegetables
55	Otsu (Black sesame)	*Sesamum indicum*	Extract oil, used in chutney, sweet tilladoo
56	Shepshe	*Ipomoea batata*	Root consume as food
57	Shoqheye (Indian Gaub Tree)	*Diospyros peregrina*	Leaves used as vegetables
58	Shoqheye(Fern)	*Diplazium esculentum*	Leaf used as boiled vegetable.
59	Washiniye (Painted Leaf Begonia)	*Begonia palmata*	Leaves used as vegetables
60	Washiniye Achiu (Brazilian Begonia)	*Begonia hirtella*	Leaves used as vegetables
61	Yeqhiye (Deccan Hemp)	*Hibiscus cannabinus*	Leaves used as vegetables
62	Yetsuye (Fishwort Plant)	*Houttuynia cordata*	Leaves used as vegetables

Photo 13. A typical kitchen garden in the backyard of a Sukhai house

Status of Basic Services

During resource mapping, the status of services including electricity, water and sanitation, health and education services were also discussed with the people. A description of these services is provided below.

Electricity

All houses within Sükhai are electrified. The village receives a minimum of 12 hours of electricity supply each day.

Water

The village is dependent on water from the three rivers flowing in and around the village, viz. Tizü River, Loyi Stream and Yai Stream. The Semas of Sükhai have laid a sophisticated water distribution system. The water from these river and streams is collected in a tank which is further distributed to each household with water pipes laid over ground. The village also has four natural springs with an opportunity to develop the local fishery within village, and reduce pressure on the Tizü River.

Health

There is one dispensary with a nurse who visits once a month, which according to the community is not sufficient. In case of illness, people travel to Sataka, the nearest town. There are a few learned individuals with traditional knowledge, whose services are sought in the treatment of various ailments. Table 5 provides details of these individuals.

Photo 14 Village health centre in Sukhai

Table 5. Details of traditional healers in Sükhai

Name	Remark
Ghovili (Female)	Cure airborne diseases by massaging with various oils and herbs
Toghel (Female)	
Kaliye (Male)	
Sükhai (Male)	
R K Tokyo (Male)	Well-informed about medicinal plants. He lives in Sataka which is 15 Km away from village.

Education

Education is considered to be equally important for male and female children. Sükhai has a primary school. Thus, most children are sent to nearby towns such as Sataka, Kohima or cities such as Delhi and Guwahati for higher education. Only recently (in 2014) did the village council decide to upgrade the school to the eighth standard. Other than a primary school, Sükhai has

two Anganwadi Centres, one of which is located in the same premises as the primary school while the other operates from the house of the Anganwadi Worker.

Festivals of the Sema tribe

Each Naga tribe has distinct seasonal festivals which they celebrate with a pageantry of colour, and a feast of music. Agriculture is the pivot of Naga society; most festivals revolve round agriculture. At these festivals, the spirits are propitiated with sacrifices by the village elder for a bountiful harvest either before the sowing or on the eve of harvest. Continuing the tradition of sacrificial slaughter of mithun and/or pigs is an important feature of Naga festivities.

The Semas celebrate many festivals which have been carried down for generations- most festivals usually mark the beginning of new seasons, harvesting of new crops or victory at war. Two of the major festivals that are popular among the Sema tribe are Tuluni and Ahuna.

Tuluni

Tuluni held on July 8 is a festival of great significance for the Sema. This festival is marked with feasts as the occasion occurs in the bountiful season of the year. Drinking rice beer forms an indispensable part of the feast. Rice beer is served in a goblet made of bamboo or made from the leaf of plantain. This drink is called *Tuluni* which gives the festival its name. *Tuluni* is also called "*Anni*" which denotes the season of plentiful crops. This midyear festival is a time of communal harmony and merry-making for the Sema community. Slaughtering of pigs, cows and mithun is an important feature of this festival.[33]

Ahuna

Ahuna, held on November 14, is a traditional post-harvest festival of the Sema. *Ahuna* is a Sema traditional agricultural-calendar-end *Tiqhetini* (festival) signifying completion of successful agricultural work. It marks the time when all food items, grains, tubers and a variety of vegetables from the year-long farming, are collected and stored in the Aleh (Granary). Cooking newly harvested rice wrapped in Tsüzükügḧü (*Phrynium marantaceae* leaves) or Saphaye (*Aspidistra elatior*) leaves in fresh-cut bamboo stems is one of the main rituals symbolizing the success of crop cultivation. *Ahuna* is also a time for charting a new beginning – mapping a blue print of a new area for the next agricultural year called the Asüyekithe. For Sema ancestors, it was a time for serious divination invoking the Alhou (creator) and spirits of nature to divine if the next agricultural year would produce a good harvest to sustain the village population. According to these forecasts, measures in the form of precautionary rituals were performed to appease the spirits to ensure that the next agricultural year would be bountiful. The forecasting ritual is performed after *Ahuna* rice is consumed.

[33] wikipedia

Photo 15. Celebrations during Ahuna Festival in Sataka

Decision Making within Sükhai

Each Naga village is like an independent 'sovereign republic' where each village owns and governs its resources, plans development activities, maintains law and order, delivers justice and secures defense. A recognized village in Nagaland has a Village Council (VC) with members elected by villagers in accordance with the prevailing customary practices and as approved by the State Government. Hereditary village chiefs, the Gaon burrhas (GB), are ex-officio members with voting rights of the Village Councils.

Village Council and Village Development Board

According to the Nagaland Village and Area Council Act, 1978, every recognized village in the State is required to have a Village Council. Village Councils (VC) are an important component of the modern governance system in Nagaland. While the District Planning and Development

Boards provides the needed flexibility to ensure a responsive and holistic approach towards development in the district, linkages to the grassroots through the Village Development Boards (VDB) have been established for delivering rural developmental inputs. The key function of the VC, are:

1. To formulate Village Development Schemes to supervise proper maintenance of water supply, roads, forest, education and other welfare activities.
2. To help various government agencies in carrying out development works in the village.
3. To undertake development work on its own initiative or on request by the Govt.

Photo 16. A Still from a Village Council Meeting

Table 6 provides a list of members of Sükhai VC and VDB.

Table 6. list of members of Sükhai VC and VDB

Names	Designation
VILLAGE COUNCIL	
Vikuto Jimomi	Chairman
Kheniho Jimomi	GB
Mighilho Ayemi	GB
Yetoz he Asumi	Speaker/Announcer
Kakugha Jimomi	Secretary

Names	Designation
Khekiho	Council Member
Khughoto Murumi	Council Member
Sukai Jimomi	Council Member
Shero Murumi	Council Member
Atoi Jimomi	Council Member
Ahoshe Jimomi	Council Member
VILLAGE DEVELOPMENT BOARD	
Yez akha Murumi	Secretary
Kahuto Jimomi	Member
Bohoto Murumi	Member
Tokhuvi Asumi	Member
Kealho Awomi	Member
Ghotoli Ayemi	Member

Other Village Committees

Apart from the VC and VDB, Sükhai village has a Public Health Engineering (PHE) committee, Power Committee, Medical Committee and Education Committee for smooth implementation of energy, health and education based projects. The names of the chairman of these committees are provided in Table 7.

Table 7. Names of Chairman of Village Commitees

Village Committee	Name of Chairman
Public Health Engineering	Atovi Achumi
Power	Viyishe Jimomi
Medical	Kaiho Jimomi
Education	Kisheto Jimomi

Conclusion

People based on their relation to Sükhai's natural resources can be broadly divided into two groups – those people who are initimately linked with nature and the changing seasons (the 'insider' group as it were), and the second group of people who are outside the immediate orbit of the village's natural resources. The first group, are the people directly reliant upon ecosystem services, and their nature of interaction with the ecosystem varies in accordance with changes in biodiversity. This group includes the farmers, hunters, and households of Sükhai dependent on timber and non-timber produce from the forest. The second group consists of the people who have an indirect relationship with Sükhai's ecosystems ('the outsiders') and have little influence, on and are little influenced by, the changes in Sükhai's ecosystem. The second group of Sükhai includes Sükhai's migrant members, neighboring villages of Sükhai, and the Forest Department.

Interaction with the people of Sükhai revealed that the village is in a phase of demographic transition with the maximum proportion of population between 18 years to 50 years in comparison to elders i.e. 50 years and above. Furthermore, a change in the aspiration of youth to pursue tertiary sector jobs poses a severe threat to the community's traditional knowledge base. There is an urgent need to conserve not just the biodiversity of Sükhai, but also the community's knowledge of customs and traditional practices that are inextricably tied to the area's biodiversity. PBRs can prove a useful tool in this regard. The forest department should facilitate the process of development of a PBR in Sükhai by training the insider group, for continued and comprehensive documentation.

Conservation is only possible by shifting dependence of people to alternative sources, or by means of sustainable harvests. The potential of common resources can be tapped to reduce or shift dependence of communities on their natural ecosystems. For instance in Sükhai the natural springs provide an opportunity for developing local fisheries, thereby reducing pressure on fish fauna in the Tizu River, and supporting the natural regeneration of aquatic biodiversity.

Chapter 5. Lifescape

Introduction

Along with the "P" for people in the PBR, "B" for biodiversity is also very important. The state of Nagaland is endowed with natural beauty and falls in the Indo-Burma biodiversity hotspot, one of the 34 hotspots identified globally. So far, floral studies reveal over 2400 species of angiosperms, 22 species of bamboo and 340 species of orchids. Around 490 species of butterflies, 400 species of birds and 104 species of mammals have been documented from Nagaland (*Source: nagenvis.nic.in*). The state has the tallest rhododendron in the world, the tallest rice plant, as well as the tallest and the rarest orchids such as the Tiger orchid *Grammatophyllum speciosum*, *Cymbidium tigrinum* and *Bulbophyllum rothschildianum* (*Nagaland FD, 2014*)

Biogeographically, the area of Sükhai falls under the 8B/C2 Khasi sub-tropical wet hill forest primarily overlapping with the 9/C2 Assam sub-tropical pine forest that holds flora typical of this a region. A number of rivers pass through the community conserved area of Sükhai including the river Loyi, and Tsütha which finally merge into the Tizü river. Protecting this ecosystem is not only important for the local biodiversity, and for the people of Sukhai who can continue to draw upon its myriad ecosystem services, but also because these forests have connectivity to other hill ranges such as Satoi that are relatively undisturbed with high biodiversity including the Blyth's Tragopan and possibly the Great Pied Hornbill. This ensures that conservation at the landscape level occurs, and allows for possible movement of species across the landscape, preventing fragmentation of wide-ranging populations of species.

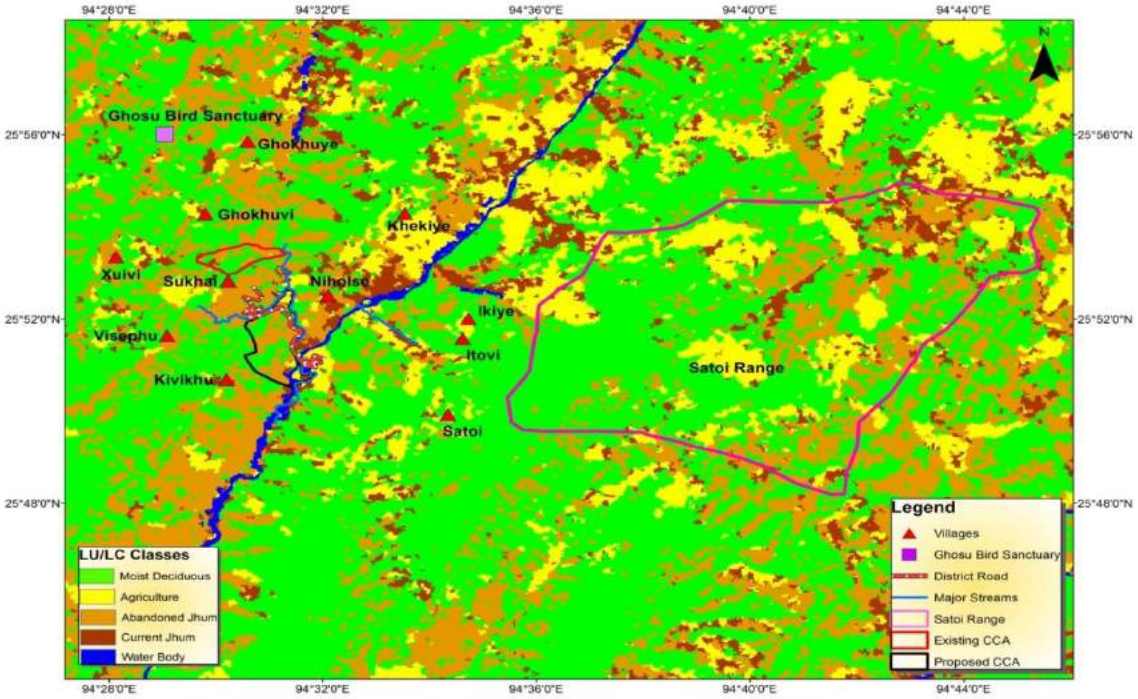


Figure 7. Community Conserved Areas of Sükhai Village

A resolution was passed by Sükhai Village Council in 2002 to conserve the "Azhoqha and Yayi" area of their forests (total area= 351.2 ha) earlier covered under jhum cultivation, so as to safeguard the natural ecosystem including living and non-living resources and maintain it for present and future generations. In addition to this, the village council in 2014 also declared the Kastuqa Forest (total area= 437.8 hecatres) as a conserved area.

The total number of wild plant and animal species present in the Sükhai Community Conserved Area could run into the thousands. A majority of these belong to small invertebrates, and a significant fraction of these remain to be identified. Some could potentially even be new to India or even science. It is therefore not possible to list the entire range of biodiversity found in Sukhai at the present moment. The current focus therefore, is to ensure that the PBR creation process generates some useful and reliable information and documents especially the village elders' traditional knowledge for posterity. It is therefore, entirely appropriate that this focus be largely on the species of interest to the local community. Moreover, the local community is responsible for maintaining this register. They can keep updating it as new information becomes available, and we will give them with soft copies of this report to facilitate this process.

At Sükhai village, the scope for a lifescape[34] study is significant as people's dependence on their natural resources is high.

The people's list of biodiversity

This section includes the people's list of plants, mammals, birds, butterflies and other fauna found in their forests, with their local and scientific names. It was noticed that of the 136 birds observed in and around Sükhai, the locals could identify 124 species. Similarly out of 32 mammals found, 24 were identified by the locals. Around 160 species of plants were identified by the locals in the Sükhai CCA. The people had their own unique names for the species, and often an interesting titbit of accompanying folklore. Table 8 gives an overview of the number of species found in Sükhai belonging to different taxa.

Table 8. An overview of the numbers of plant and wild animal species found in Sukhai

Sr. no.	Name of group	Number of species	Sr. No	Name of group	Number of species
1	Trees - including plants for NTFP, timber, fibre, and medicine.	139	8	Butterflies (A*mimi*) and Moths	140 + 13
2	Herbs	12	9	Fish (*Akha*)	40
3	Grasses	9	10	Amphibians *(Achüi)*	6
4	Plants cultivated in kitchen gardens	30	11	Lizards and skinks (*Atakheh)*	3

[34] Narrative that details the synergy between the environment and an individual's socio-economic circumstance, cultural norms, and behaviours over their lifespan.

Sr. no.	Name of group	Number of species	Sr. No	Name of group	Number of species
5	Ferns	11	**12**	Snakes (*Apighi, Apŏghü)*	23
6	Insects (*Pitheninga*)	37	**13**	Birds *(Aghaü)*	136
7	Livestock	7	**14**	Mammals *(Tüghashi)*	32

It appears that the range of species known to people is correlated with their dependence on the area's natural resources. At Sükhai village, it was observed that the local people knew most of the species from all major taxonomic classes. This is because the *Sema Nagas* are a hunting community and know their forests well. It was found that every major taxonomic class has a local name, use and sometimes folklore associated with it. For example, birds were refered to as *Aghaü*, mammals as *Tüghashi*, insects as *Pitheninga*, bats as *Ashüxa*, and butterflies as A*mimi*. In a reflection of changing times and dependency on natural resources, while the *Gaon Burrahs* and the elders were quick and accurate in identifying various *taxa,* the younger generation had limited knowledge of the biodiversity around them. It was also observed that the hunting community in the village were good at mimicking different bird calls, knew the varied habitats and paths used by mammals, and were quick to find medicinal plants in the forest.

The species documented during PBR information collection process is a smaller subset of the total species and we expect that more species will be added in the list with time.

Flora

Sükhai village lying in the heart of Nagaland has 8B/C2 Khasi sub-tropical wet hill forest primarily overlapping with the 9/C2 Assam sub-tropical pine forest. The floral diversity for village Sükhai is unique with a total of 90 tree species and 22 herb/shrub species that have been identified with the help of locals. A detailed list of the trees, shrubs and herbs have been provided in annexure 5.

Fauna

The inventory of faunal species for the village Sükhai includes 28 mammal species, 136 bird species, 140 butterfly species, 23 reptile species and 6 frog species that were identified and described by the village people. This is probably still a fraction of the total number of species found here, and it is expected that more records will be added to this list. Amongst the mammals, the major ungulate species include the Sambar (*Cervus unicolor*), Indian Muntjac or Barking Deer (*Muntiacus muntjak*) and the Red Serow (*Capricornis rubidus*). Tigers and leopards which occurred 3-4 decades ago are now locally extinct. However, lesser cats like the Jungle cat (F*elis chaus*), Leopard Cat (*Prionailurus bengalensis*) and the Fishing Cat (*Prionailurus viverrinus*) thrive in the forests. Small packs of Wild Dog or *Dhole* (*Cuon alpinus*) are also present. Amongst the large carnivores, only the Asiatic Black Bear (*Ursus thibetanus*) and the Malayan Sun Bear (*Helarctos malayanus*) were reported from Sükhai village. The Critically Endangered (IUCN, 2015) Chinese Pangolin (*Manis pentadactyla*) is also reported to be found in the Sükhai CCA.

A few ornithological surveys have been carried out in Nagaland. These studies suggest that at least 487 avian species occur in Nagaland (Choudhury-1997, 2001, 2003b, 2005). As many as 136 birdspecies were identified by the villagers of Sükhai from the pictorial field guides. Villagers are knowledgeable about bird calls, their food plants, behaviour and times of the day during which they are most active. Many of the birds from the checklist prepared by the community were also seen by our team during our field surveys. These included patridges like the Rufous-throated Partridge (*Arborophila rufogularis),* the Hill Patridge (*Arborophila torqueola*) and the Mountain Bamboo Patridge (*Ambusicola fytchii*), the Kalij Pheasant (*Lophura leucomelanos*) and frugivorous birds like the Great Barbet (*Megalaima virens),* Blue-throated Barbet (*Megalaima asiatica*) and Pompadour Green Pigeon (*Treron pompadora*).

Reptiles and amphibians are poorly studied from Nagaland and the recent herpetological surveys carried out by Ramki *et.al.* in 2011 recorded a total of 71 taxa; 1 turtle, 29 snakes, 9 lizards, 31 frogs and 1 species of caecilian while Bhupathy & Kumar in 2013 recorded a total of 52 taxa; 5 turtles, 16 lizards and 31 snakes belonging to 14 families. Based on the pictorial guide, villagers identified 23 species of snakes the most common species including the Indo-chinese Rat Snake (*Ptyas korros*), Red necked Keelback (*Rhabdophis subminiatus*), Short-nosed Vine Snake (*Ahaetulla prasina*) and Monocoled Cobra (*Naja kaouthia*). King Cobra (*Ophiophagus hannah*) was also reported by the locals mostly around the *Tizü* river. The detailed list of faunal groups is in Annexure 4 to 9.

With regard to the other smaller fauna, villagers are well versed with those that are edible and have local names for them. Some of these fauna are listed in Table 9

Table 9. List of Fauna

Common Name	Local Name	Whether Eaten
Worm	Alapü	Yes
Leech	Aiveli	No
Flea	Ahi	No
Mosquito	Akaomi	No
Sand-fly	Ammü	No
Horse-fly	Amüthü	No
Butterfly	Amimi	No
Firefly	Asüghao	No
Fly	Ayelakhu	No
Wasp, Bee	Akhi	Yes
Grasshopper	Leotsü/Atukha	Yes

Common Name	Local Name	Whether Eaten
Spider	Talhakhü	Yes (Mostly *Nephila* spp. eaten)
Aquatic Centipede	Alazha	Yes
Aquatic Snail, slug	Tühnaqü/Chokibo	Yes
Scorpion	Achüwoh pa'za	No
Ant	Alhache	Yes

Several of the species found at Sukhai are of global or national significance such as restricted range species, globally endangered species or those protected under the Indian Wildlife (Protection) Act. This includes at least 26 species at village Sükhai. These mainly include mammals like Sambar (*Cervus unicolor*), Mithun (*Bos frontalis*), Malayan Sun Bear (*Helarctos malayanus*), and Asiatic Black Bear (*Ursus thibetanus*) which fall under the *'vulnerable'* category, while the Wild Dog or Dhole (*Cuon alpinus*) and the Fishing Cat (*Prionailurus viverrinus*) fall under the *'endangered'* category and the Chinese Panglolin under the '*critically endangered'* category of the IUCN Red Data list (IUCN, 2015).

Amongst butterflies, Green Sapphire (*Heliophorus moorei tytleri*), Pointed Ciliate Blue (*Anthene lycaenina lycambes*), Pea Blue (*Lampides boeticus*), Common Gem (*Poritia hewitsoni*), Common Baron (*Euthalia aconthea garuda*), Common Albatross (*Appias albina darada*) are listed under schedule II, while the Striped Blue Crow (*Euploea mulciber mulciber*) falls under schedule IV of the Indian Wildlife (Protection) Act (WPA). Amongst reptiles, the King Cobra (*Ohpiophagus hannah*), and the Burmese Python (*Python bivittatus*) fall under the 'vulnerable' category of IUCN while Monocoled Cobra (*Naja kaouthia*) is included in the scheduled species list of the WPA.

A number of fish species found in the Tizü river that flows along the boundary of Sükhai CCA are rare and are included in the IUCN Red Data List. These include *Neolissochilus hexagonolepis, Tor tor* and *Schistura manipurensis* that are *'*near threatened*,' Devario acuticephala; Devario naganensis, Schizothorax richardsonii, Schistura nagaensis and Schistura prashadi* which are 'vulnerable' and *Tor putitora* which is 'endangered'.

Plants of economic importance

Several plant species are economically important to the local people and are sold for timber or fuelwood. The documented list (Table 10) comprises 30 timber species that are of the utmost importance to the villagers. The timber species are divided into Class A, B and C depending on their quality which in turn leads to price variation. Wood is measured in a local unit called a 'safety or Thak', and the cost of 1 Thak is approximately equal to Rs 350. The different price range available are Rs 9000 per mini-truck of class A of fuelwood, Rs 7000 per mini-truck of class B of fuelwood and Rs 5000 per minitruck of class C of fuelwood.

Table 10 List of plant species of economic importance

No.	Sema Name	Common Name	Botanical Name	Family	Sale price	Class (Category)
1	Milisu	Bonsom	*Phoebe goalparensis, Hutch*	Lauraceae	650	A
2	Khusu	Hollock	*Terminalia myriocarpa, Heurek et Mell.*	Combretaceae	580	A
3	Tsughusu	Gamar	*Gmelina arborea, Linn.*	Verbanaceae	650	A
4	Azuyisu	Choroi/Koroi (Black Siris)	*Albizzia odoratissima, Benth.*	Mimosaceae	500	A
5	Atsutsosu				500	A
6	Ghakusu	Walnut	*Juglans nigra*, Linn	Juglandaceae	500+	A
7	Muwosu				650	A
8	Angusu	Nahar	*Mesua ferrea L.*	Calophyllaceae	650+	A
9	Achighisu	Tita Chope/Tita sopa	*Michelia champaca, Linn.*	Magnoliaceae	650+	A
10	Sahusu	Pine	*Pinus kesiya* Royle ex Gordon	Pinaceae	600+	A
11	Achehesu	Badaam (Almond), Pahaari Badam	*Mansonia dipikae, Kanjilal.*	Sterculiaceae	600+	A +
12	Kholesu				400+	B
13	Khotsusu				400+	B
14	Kinilhosu				400+	B
15	Shekuthisu				400	B
16	Moausu				400	B
17		Jayopoma/jiapoma	*Lannea coromandelica* (Houtt.) Merr (syn *L. grandis*)	Anacardiaceae	400	B
18		Bochipoma/bogipoma	*Chukrasia velutina,Wt.&Arn.* (C. tabularis)	Meliacae	400	B
19	Khukhusu	Semal	*Bombax ceiba L.*	Malvaceae	360	B
20	Cholikhamosu				400+	B
21	Shedusu				450	B+
22	Litsasu				400	B
23		Barapat/Borpat	*Ailanthus grandis, Prain.*	Simarubaceae	400	B
24	Tughusu				360	B
25	Lutusu				360	B
26	Yapasu				360+	B

No.	Sema Name	Common Name	Botanical Name	Family	Sale price	Class (Category)
27	Awchkhachebosu				360	B
28	Tsuzhasu				360	B
29	Michisu	Gogura	*Schima wallichii* Choisy	Theaceae		B+
30	Awunhechesu					B+
	Note: Timber is of A and B class. + means slightly more than the number listed.					

Table 11 List of Bamboo species of economic importance

Local Name	Scientific name	Descritpion by locals
Achegho		Same size as *bambusa tulda*
Akulu		Used for making flute in the olden days
Ammah		
Aphobo	*Dendrocalamus latiflorus*	
Apibo	*Bambusa tulda*	Thick bamboo with small hole
Apiqu		Very Slippery
Atsuteh		
Awitibo	*Bambusa balcooa*	
Awuyi		
Ayeghü		Bbranches used for broom
Ayichepu		Very small
Ayichi		Bigger tha Ayichi found in deep forest
Ayicho		
Ayihu		
Kulchuhabo		
Nunnah		Used mostly as walking stick
Shihu		Best bamboo for handicraft
Tughakhahu	*Dendrocalamus hamiltonii*	
Türübo		

We also carried out detailed vegetation sampling by laying quadrats in the community conserved area of village Sükhai to understand the dominant tree species and composition of the forest. The details are as follows:-

Plant species richness and diversity

The 31 plots sampled in Sukhai included 57 species of trees (species > 20 cm gbh), 49 species of shrubs and tree saplings (plants <20 cm gbh but > 1 m in height) and 12 species of herbs including vines and climbers.

An analysis of the species accumulation curves generated with Estimate S (Fig 8) for trees, shrubs and saplings (plants > 1 m height), however suggests that this forest holds far more tree species than have been currently sampled in the 31 plots, since the species accumulation curves continue to steeply rise.

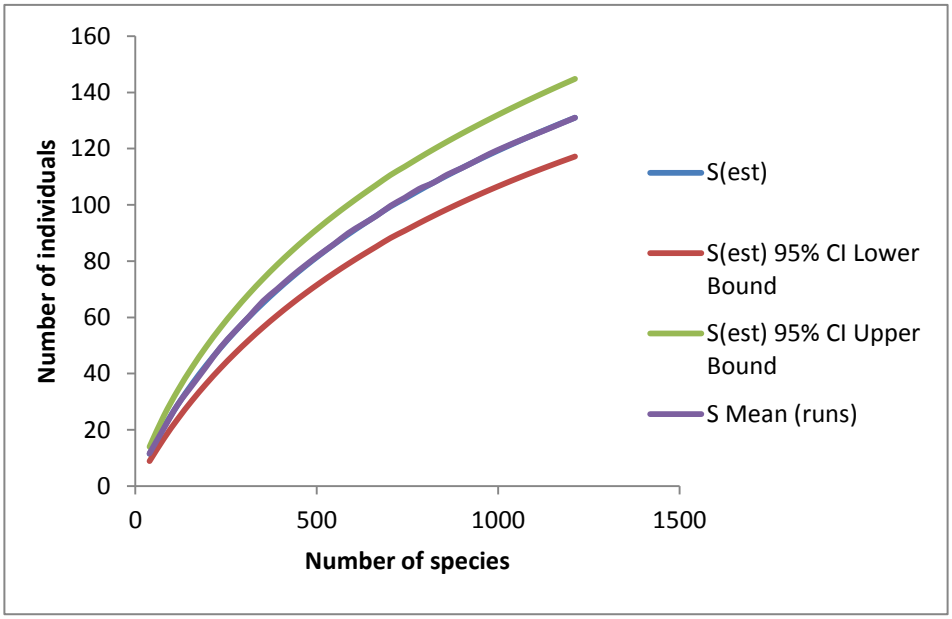


Figure 8. Species accumulation curves (observed and estimated) using Estimate S

The species estimators from Estimate S do not provide an accurate estimate of the real species richness of this forest suggesting that much more sampling will be required to determine the true species richness of this forest.

In terms of species diversity for trees, the reciprocal Simpson's index is 11.91 suggesting that there are about 12 common species in this forest. Using Estimate S, the Shannon-Wiener diversity index is 3.24 which is comparable to other species rich, tropical forests. These forests have a history of being under jhum cycles and are thus regenerating, secondary forests. Despite this, they have high species diversity. This suggests that adjacent primary forests if any, would be far more plant species rich, and therefore, more sampling is required both in these forests and in the surrounding dense forests of Nagaland to begin to get a sense of the region's rich plant biodiversity. In terms of density, these forests have a tree density of 0.8 trees/ha.

The species diversity of shrubs which includes tree saplings is 3.28 for the Shannon-Wiener index and 17.05 for the reciprocal Simpson's index. The tree density values are 0.4 trees/ha.

Wild Meat and Hunting

Wildlife hunting is an age-old practice and humans have been hunting wild animals for many generations. Wildlife is an important resource for those communities that live in and around forests and is exploited for various reasons, including food, additional income, cultural practices and as a sport. Over the last few decades the extraction of wild meat has become a serious concern globally as hunting leads to the extinction of wildlife populations (Bennett et al., 2002; Robinson & Bennett, 2000).

In the state of Nagaland, hunting was the primary mode of subsistence till shifting agriculture was adopted. Hunting continues to play an important role in the socio- and cultural life of the Naga. The popular tradition of hunting amongst the Nagas promotes and upholds clan and family relationships as people hunt together, and share the game on different occasions. For instance, even today among the various tribes of Nagaland, the hunters take pride and honour in decorating their houses with the skulls of hunted animals and birds- a sign of their hunting prowess. Hunting is a culturally embedded practice in the Naga way of life, and apart from helping to strengthen clan and family ties, is used to honour guests who are welcomed with hunted game. Wild meat is an important source of protein and a livelihood source as hunted game is sold to meet the other needs of the family. Yet another practical reason for hunting, among the Nagas whose mainstay of the economy is agriculture, is to prevent wild animals and birds from damaging agricultural crops. Hunting also helps to carry on the traditional knowledge of techniques, practices and trapping methods that have been passed down for centuries, thus fostering the continuance of this ancient practice (Lohe, 2014).

Naga tribes continue to hunt and trap usingdifferent traditional and ingenious traps and techniques, and increasingly, the gun. Hunting in the past was often a test physical endurance as different hunting methods were employed. The techniques of hunting, including the use of different types of trapping methods are often region-specific, closely linked to the topography, and the social and economic sytems in place. There are various instances and ways of hunting documented by historians. Some of the practices documented by Hutton (1921) in his book on the Sema Naga are detailed below.

"Various type of trapping methods used by Sema Nagas includes aitho, used for deer; ashepu, another of the same type; and sügŏtsa, used for snaring pheasant, partridge, and other birds. Of traps and snares the Semas use the pitfall (akhwo), digging a pit, putting long "panjis "at the bottom, and covering the top with light brushwood, thin sticks of reeds, etc., sprinkled with earth and thickly covered with dead leaves. The fall trap (heka) is used in the fields for monkeys and baited with a cucumber. When the monkey pulls at this a bamboo shelf loaded with stones falls down and flattens him."

Similarly, different ways of fishing used by Sema Nagas in river Tizü include;

1. *Fishing by weirs (akhu), in which the fish are caught in baskets facing upstream and inserted in holes in a weir built across the river of stones, sticks, bamboos, and mud. This method is probably practiced by all Semas within reach of any large river*
2. *Fishing with the rod. This method is universal and consists in attaching a fine of twisted fibre to the tapering end of a light bamboo, and an iron hook (usually of umbrella wire) to the end of the line.*

3. *Fishing with a net. There are three sorts of nets, the large drag-net (shithi), the small drag-net (akhame), and the landing-net (akhasho). The shithi needs a dozen men to drag it, while akhame can be worked by four men. The hand-net, akhasho, is used generally in conjunction with some other method of fishing, but in muddy water, when a flood is subsiding and the fish are rising and feeding freely.*

However, the use of guns has become increasingly common, and popular with easier and higher probabilities of catching prey than hunting with the dog, spear and catapult. The muzzle-loading gun is commonly used by hunters which are locally made, and present in almost every household of the hunter community. However, this has led to rapid depletion of wildlife with many species on the brink of local extinctinction. Similarly, aggressive ways of fishing, like use of poisons (use of bleach and lime powder), dynamite and electrocution using battery packs has also led to reduction in fish populations of the Tizü flowing along the boundary of Sükhai CCA. The fear of losing all the fish and the natural ecosystem, is one of the reasons leading to the declaration of the reserve area by the people of Sukhai.

We documented the species of animals hunted by the people along with their uses (Table 12). Several species are of medicinal and of ornamenal value However, after the declaration of the CCA there has been a complete ban on hunting of all species within the CCA area.

Table 11. Documented use value of wild fauna

S. No	Common Name	Scientific Name	Local Name	Present Status	Used as
1	House (Grey Musk) Shrew	*Suncus murinus*	Ajitshu	Common	Not eaten or used in any way
2	Field mouse	*Mus booduga*	Aghalo	Common	Not eaten or used in any way
3	Greater Short-nosed fruit Bat	*Cynopterus sphinx*	Ashuqha	Common	Not eaten or used in any way
4	Lesser Short-nosed fruit Bat	*Cynopterus brachiyotis*	Ashuqha	Common	Not eaten or used in any way
5	Rhesus Macaque	*Macaca mulatta*	Ashüki	Uncommon	The bitter liver is used as medicine
6	Slow loris	*Nycticebus coucang*	Kujokini shuki	Uncommon	Eaten
7	Wild Dog	*Cuon alpinus*	Atine	Rare	Eaten, good for pregnancy
8	Malayan Sun Bear	*Helarctos malayanus*	Ava	Rare	Bile was sold earlier. Meat Eaten

S. No	Common Name	Scientific Name	Local Name	Present Status	Used as
9	Asiatic Black Bear	*Ursus thibetanus*	Ava	Rare	Bile was sold earlier. Meat Eaten
10	Leopard Cat	*Prionailurus bengalensis*	Anghshü	Uncommon	Meat is eaten, skin used for decoration
11	Jungle Cat	*Felis chaus*	Yeghili	Rare	eaten
12	Fishing Cat	*Prionailurus viverrinus*	Anengü	Rare	eaten
13	Large Indian Civet	*Viverra zibetha*	Aqhü	Uncommon	Meat eaten-more oily in winter
14	Himalayan Palm Civet	*Paguma larvata*	Aküfü	Rare	Meat eaten-more oily in winter
15	Eurasian Otter	*Lutra lutra*	Achieghe	Rare	Eaten. The claws are used to clear the bone of fish stuck in the throat.
16	Yellow-throated Martin	*Martes flavigula*	Akhetsii	Uncommon	Used for asthma in form of soup
17	Small Indian Mongoose	*Herpestes javanicus*	Kighiu	Uncommon	
18	Ferret Badger	*Melogale spp*		Rare	Meat Eaten.
19	Wild Boar	*Sus scrofa*	Amini	Common	Meat is eaten
20	Sambar	*Rusa unicolor*	Aqhü	Uncommon	It is eaten and the antlers are used for ornamentation
21	Barking Deer	*Muntiacus muntjak*	Ashe	Uncommon	Tasty and preferred food
22	Red Serow	*Capricornis rubidus*		Rare	
23	Goral	*Naemorhedus goral*	Achüyi	Uncommon	Eaten and antlers were earlier sold in Burma

S. No	Common Name	Scientific Name	Local Name	Present Status	Used as
24	Mithun	*Bos frontalis*	Avi ala	Common	Meat eaten and the horn is kept as a trophy
25	Hoary-bellied Squirrel	*Callosciurus pygerythrus*	Akili	Common	Common and available. Eaten
26	Chinese Pangolin	*Manis pentadactyla*	Ashiphi	Rare	Sold to Burmese traders. Cost of 1 Kg scales amount to Rs 13 thousand.
27	Orange-bellied Himalayan Squirrel	*Dremomys lokriah*	Sakhükili	Common	Common and available. Eaten
28	Himalayan Striped Squirrel	*Tamiops macclellandi*	Azügha	Uncommon	Eaten
29	Red Giant flying squirrel	*Petaurista peturista*	Atulo	Rare	Eaten
30	Hoary Bamboo Rat	*Rhizomys pruinosus*	Achighi	Common	To treat headaches. The front incisors are chipped and a drop of blood which is withdrawn from the rat and then put on the head of the pateint to relieve fever and headaches. It is also used during delivery to help in blood clotting. Weakness and TB are treated with the soup of the rat
31	Asiatic Brush-tailed Porcupine	*Atherurus macrourus*	Kithicheqü	Rare	Stomach contents are dried and stored and are good for cough
32	Himalayan Crestless	*Hystrix brachyura*	Acheqhü	Rare	Stomach contents are dried and

S. No	Common Name	Scientific Name	Local Name	Present Status	Used as
	Porcupine				stored and are good for cough
	*Asian Elephant	*Elephas maximus*	Ahü	Locally Extinct	More than 1 lakh is paid for ornaments made from the tusks (from Dimapur)
	*Hoolock Gibbon	*Hylobates hoolock*	Akuhu	Locally Extinct	Eaten

Chapter 6. The Community Conserved Area of Sükhai village

Community Conserved Areas can be loosely described as," natural and/or modified ecosystems containing significant biodiversity values and ecological services, voluntarily conserved by (sedentary and mobile) indigenous and local communities, through customary laws or other effective means (The IUCN World Parks Congress of 2003, as cited in Corrigan and Granziera, 2010)." These include ecosystems under minimum as well as substantial human influence.[35]

Conservation efforts by communities include continuation of traditional conservation and sustainable-use practices, revived and/or modified traditional practices, or completely new initiatives taken up by the communities when faced with external or internal threats to their resources or their access to the resources.

Pathak and Kothari (2005) identified rampant and unregulated timber extraction as the key reason for rapid degradation of the virgin forests of Nagaland, particularly in privately owned forests. In Nagaland, rampant and unregulated hunting has seriously depleted wildlife populations. Many of the hills that were blanketed by thick forests have been deforested. The treasured hornbill feathers and beaks that wealthy people wore as head-gear have now become even more precious because of their unavailability. Almost all that is left of the hornbill today in Nagaland is the annual hornbill festival which commemorates this charismatic bird now rarely sighted in the forests.

Conservation Efforts in Nagaland

According to Pathak and Kothari (2005), community conserved areas (CCAs) in Nagaland range from completely inviolate zones to multiple-use zones. Further, they identify different systems adopted by villages for conservation which are described below.

Forest reserves

Forest reserves are declared for various reasons: to preserve water sources of the village, to obtain a sustained supply of biological resources, or as buffer zones for a more strictly protected area. Hunting is allowed in some cases, not in others.

Wildlife reserves

Wildlife reserves are completely inviolate zones where all kind of hunting, fishing and biomass collection is strictly prohibited. Most wildlife reserves can be easily distinguished from the other forests by their appearance, as well as the sounds and signs of birds and other animals.

[35]Pathak, N, S Chowdhury and R Bandekar (in press), Directory of Community Conserved Areas in India, Kalpavriksh, Pune, India.

Wildlife reserves as core areas with forest reserves as buffers

One of the best-known examples of this kind of effort is Khonoma village. The village declared a 20 sq km area as a Nature Conservation and Tragopan Sanctuary in 1998, where absolutely no hunting or resource use is allowed. The sanctuary is surrounded by a clan forest, which is much larger in area and is considered as a buffer to the sanctuary. No hunting and extraction except wild fruits and vegetables and one truckload of firewood per family per year is permitted from this zone.

Wetland reserves

In some villages such as Ghukiye, Lozaphuhu and Chishlimi, villagers on their own, or with other neighbouring villages, have formulated well-defined rules and regulations for fishing in wetlands such as river stretches. These rules restrict use of explosives, chemicals and electricity for fishing.

Seasonal bans on hunting

Bans on seasonal hunting, particularly during the breeding season, is another practice adopted in many districts. February to May is the most active hunting season, as agricultural responsibilities are few. Villagers in favour of a seasonal hunting ban feel that such bans are more effective to start with, as a complete ban would be difficult to adhere to and would antagonise people. Some villages such as Ghukiye have selectively banned certain kinds of hunting tools such as air guns, which are considered to be more harmful when used irresponsibly.

Complete ban on hunting

Khonoma is probably the only known example in Nagaland where hunting is banned in the entire village through the year. There are occasional incidents when villagers go to other areas and hunt, but at the same time there is a growing realization that it is unfair to do so.

Biodiversity Conservation in Sükhai

Sema, a head-hunting tribe of Nagaland have been documented to inhabit Sükhai in the early 18th century. Men of Sükhai village are efficient in hunting; as young children they learn to use the catapult, air guns, and to lay animal traps. The elders of the village have vivid memories of hunting endangered wildlife such as the elephant (*Elephas maximus*), tiger (*Panthera tigris*) and Stump-Tailed macaque (*Macaca arctoides*). However, with time the local biodiversity has dwindled. It is increasingly difficult for the villagers to land a catch, especially big fish from Tizü River which was once flourished in aquatic biodiversity. The current state of aquatic wildlife in Sükhai is attributable to the adoption of unsustainable hunting practices such as use of explosives, chemicals and electric currents for fishing. The local people now recognize how precarious the situation is both for fish and for wildlife populations. Morever, areas for conserving wildlife are now easier to set aside as the village requires less jhum land than before. In addition, the local people want this area to become an important center of ecotourism and hope that this CCA will in the long run help generate local livelihoods from ecotourism including bird and wildlife watching.

Increasingly cognisant of the escalating scale of the problem, and the importance of biodiversity conservation and sustainable management of resources, the villagers of Sukahi came together to adopt conservation practices. A resolution was passed by Sükhai Village Council in 2002 to conserve "Azhoqha and Yayi" area (total area= 351.2 ha) earlier covered under jhum cultivation, so as to safeguard the natural ecosystem including living and non-living resources and maintain it for present and future generations. In addition to this, the village council in 2014 also declared the Kastuqa Forest (total area= 437.8 hecatres) as a conserved area. Thus, the total forest land conserved by Sükhai village is 789 ha. In addition to protecting this 789 ha of forest, the people of Sükhai have passed a resolution to conserve 5,407 meters of Tizü river.

Conservation Practices in Sükhai

In Sükhai, decisions relating to conservation are taken after considerable discussion. A biodiversity board was constituted in 2002 to work towards Sükhai's conservation effort. The final decision on wildlife reserves or other measures are taken only after approval from village elders and the village council (VC). The members of the board along with the citizen of the village undertake these conservation and sustainable use initiatives without any assistance from the government. Sukhai is an evocative example of a spontaneous and self-generated CCA in Nagaland that is increasily representative of an ever growing trend towards conservation in the State.

To uphold the conservation agenda within Sükhai, the village biodiversity board framed some rules, namely;

- A blanket ban on hunting wild animals and birds,
- A ban on fishing by use of explosives, chemicals and generators. Violation of this rule would result in the imposition of severe penalties and fines;
- Strict prohibition of cutting of fire-wood/felling of trees for domestic and/or commercial purposes in the conserved area.

The biodiversity board has also notified a fine of Rs. 25000, on use of explosives or chemicals or generators or soil battery for fishing. A copy of the resolution is in Fig 7.

OFFICE OF THE
SUKHAI VILLAGE COUNCIL
Zunheboto : Nagaland.

Ref. No..... ***Dated.....***

Sukhai
20/02/2010

RESOLUTION:

Consequent upon the state Government directive and Resolutions adopted during the meeting of all Nagaland village councils/VDB's/all communitisation department meeting held at Ganesh Nagar on 29th Nov to 1st Dec 2009.

The Sukhai village council and general public adopted to maintain Bio-Diversity Conservation" at Sukhai Village. In this connection " AZHOQHA & YAYI" area declared as community Reserved Forest so as to conserve or preserve the natural resources including living and non living resources and maintain the ecosystem within the village for the present and upcoming generation. It has also resolved to organized village Bio-Diversity board and empower to frame rules/laws and programme for the effective management functional systems.

Further it is also re-affirm and resolved the following for the concerned citizens and stake holders.

1. Imposed complete blanket ban for Hunting Wild animals and birds, fishing by using explosives, chemicals, generator shall be impose heavy penalty and fine.

1. Explosives Rs.25000/- (Rupees Twenty Five Thousand) only
2. Chemicals Rs. 25000/- (Rupees Twenty Five Thousand) only
3. Generator Rs. 25000/- (Rupees Twenty Five Thousand) only
4. Coil battery Rs. 25000/- (Rupees Twenty Five Thousand) only

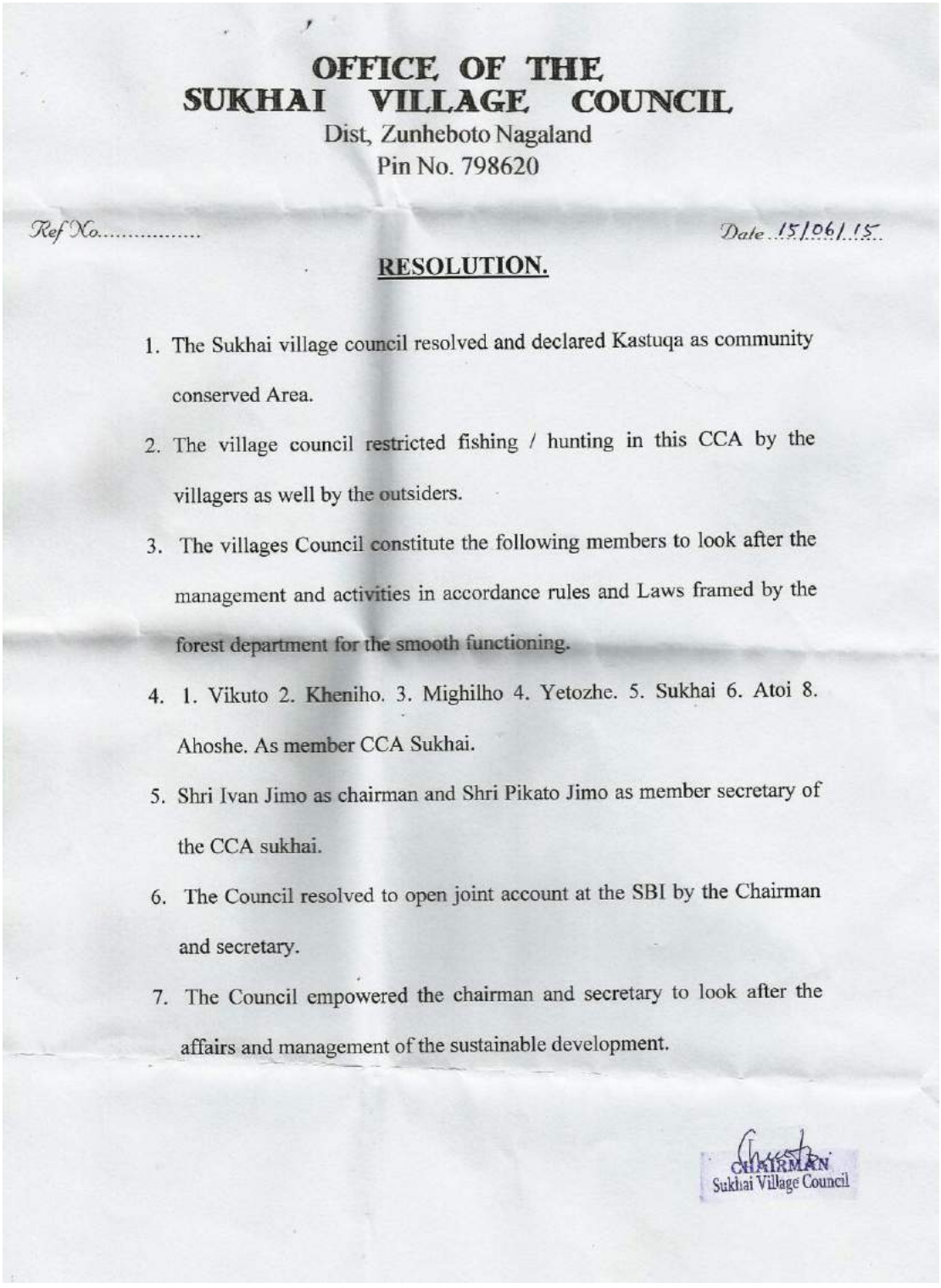
2. Village Bio-Diversity board has been given fully empowered to look after the said activities and submit the progress report to the village council periodically i.e. every year, the term of the office shall be period of five years (2010 to 2015)
3. Henceforth cutting fire woods/felling trees for domestic or commercial purposes is strictly restricted within the said declared area.
4. Shri.IVAN ZHIMOMI is appointed as Convenor of the Board and empowers to constitute the Board members with maximum limit of 7 (seven) members with two members reserved for women and submit the members list to the village council within the period of one month.

Copy to:

1.The Principal Chief Conservator of Forest Nagaland for information, Kohima, Nagaland
2.The Deputy Commissioner, Zunheboto, Nagaland for information .
3.The Additional Deputy Commissioner, Satakha, for information,
4.The Superintendent of Police Zunheboto for information.
5.The District Forest Officer Zunheboto for information and necessary action.
6.All the immediate village council for information and strict compliance.
7.All Dailies Nagaland Post/Eastern Mirror/Morung Express/Nagaland Page.
8.Office Guard.

(VIKUTO ZHIMO) G.B.
V.C.C.Sukhai
Chairman
Sukhai Village Council
Zunheboto Nagaland.

Figure 9. The resolution adopted by Sükhai village for conservation for Azhoqha and Yayi (Old CCA)



OFFICE OF THE
SUKHAI VILLAGE COUNCIL
Dist, Zunheboto Nagaland
Pin No. 798620

Ref No..... Date 15/06/15

RESOLUTION.

1. The Sukhai village council resolved and declared Kastuqa as community conserved Area.
2. The village council restricted fishing / hunting in this CCA by the villagers as well by the outsiders.
3. The villages Council constitute the following members to look after the management and activities in accordance rules and Laws framed by the forest department for the smooth functioning.
4. 1. Vikuto 2. Kheniho. 3. Mighilho 4. Yetozhe. 5. Sukhai 6. Atoi 8. Ahoshe. As member CCA Sukhai.
5. Shri Ivan Jimo as chairman and Shri Pikato Jimo as member secretary of the CCA sukhai.
6. The Council resolved to open joint account at the SBI by the Chairman and secretary.
7. The Council empowered the chairman and secretary to look after the affairs and management of the sustainable development.

CHAIRMAN
Sukhai Village Council

Figure 10. The resolution adopted by Sükhai village for conservation for Kastuqa (New CCA)

GIS-based mapping of the Kastuqa Forest

In Nagaland the problem of fragmentation of land holdings is not an issue on account of the peculiar pattern of land-ownership, tenure and use prevalent in the state.

The ownership of land and the individual rights are governed by customary laws of the community. These customary laws are un-codified, and yet very effectively applied and interpreted by the traditional village councils in the event of dispute. Due to the unique ownership and management system of the Nagas, there is little or no alienation of the people from their land and resources.

The Kastuqa Forest identified by the people of Sukhai, belongs mostly to the clans and the Village Council. The demarcation of the boundaries of the community conserved area is governed by the rules of customary law. This forest land whose boundaries are known to the Village Council of Sukhai and the Village Councils of other neighbouring villages is protected, and the locals abide by the rules. A detailed survey of the boundaries of the community conserved area of Sukahi was undertaken by TERI along with the village community, based on which a GIS-based map of the area has been prepared. The total area of Kastuqa community conserved area sums according to this map is 437.8 ha. Figure 9 provides the map of the Azhŏqha and Yayi CCA area, while the GIS map of the Kastuqa forest CCA is included in Figure 10.

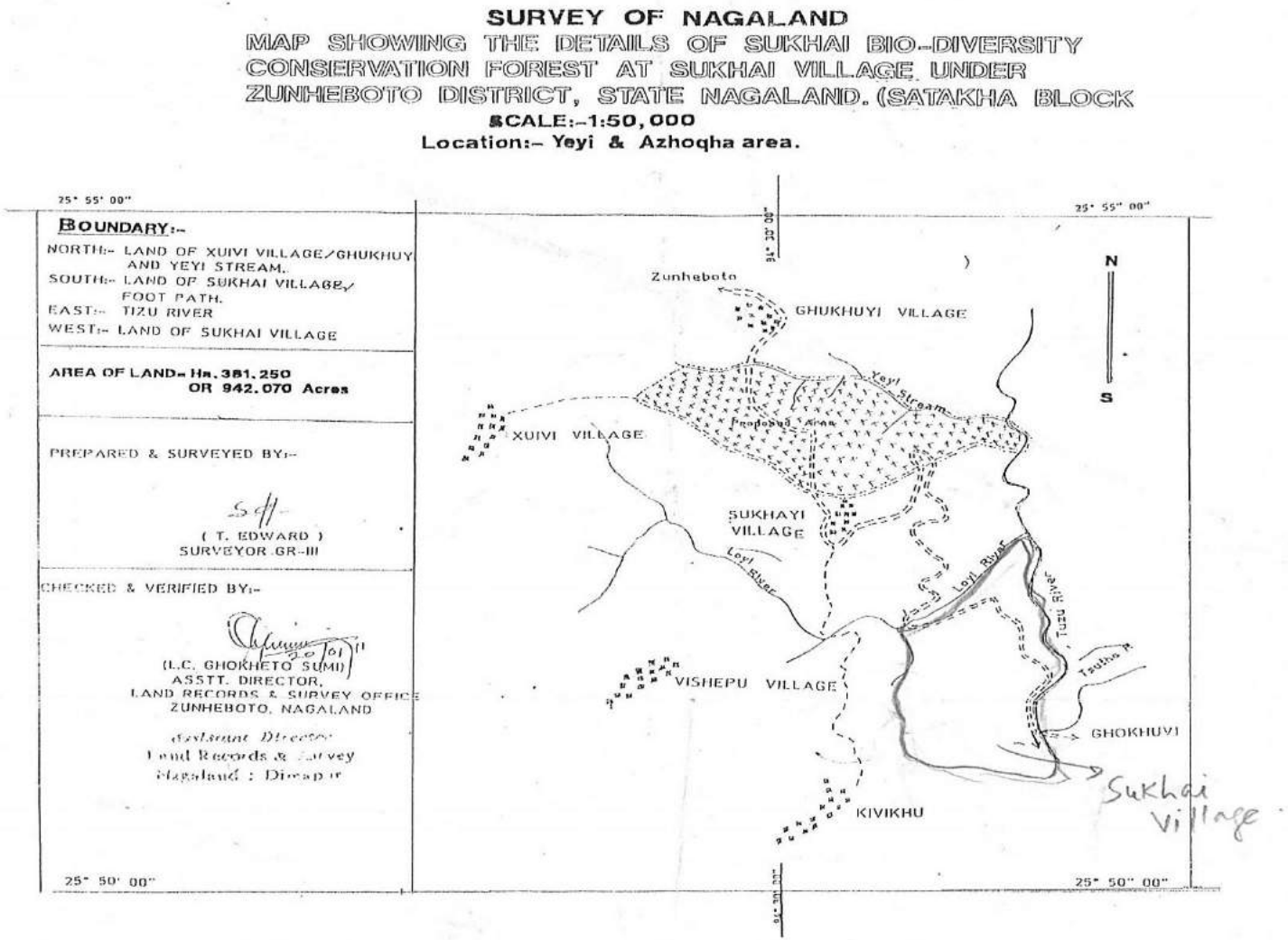


Figure 11. The Old Community Conserved Area (Azhõqha and Yayi) of Sükhai prepared by Sükhai Village Council

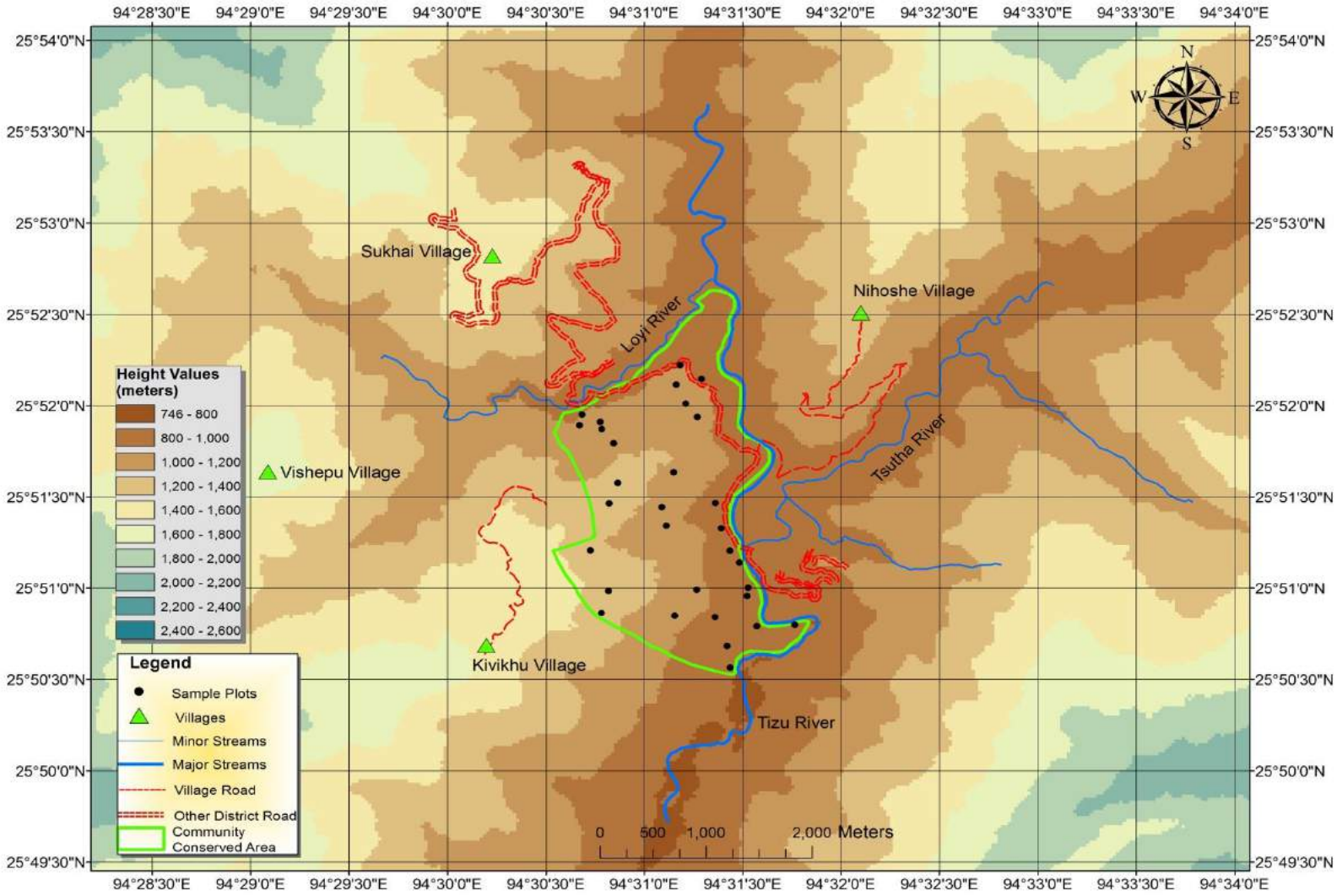


Figure 12. The New Community Conserved Area (Kastuqa Forest) of Sukhai prepared by TERI

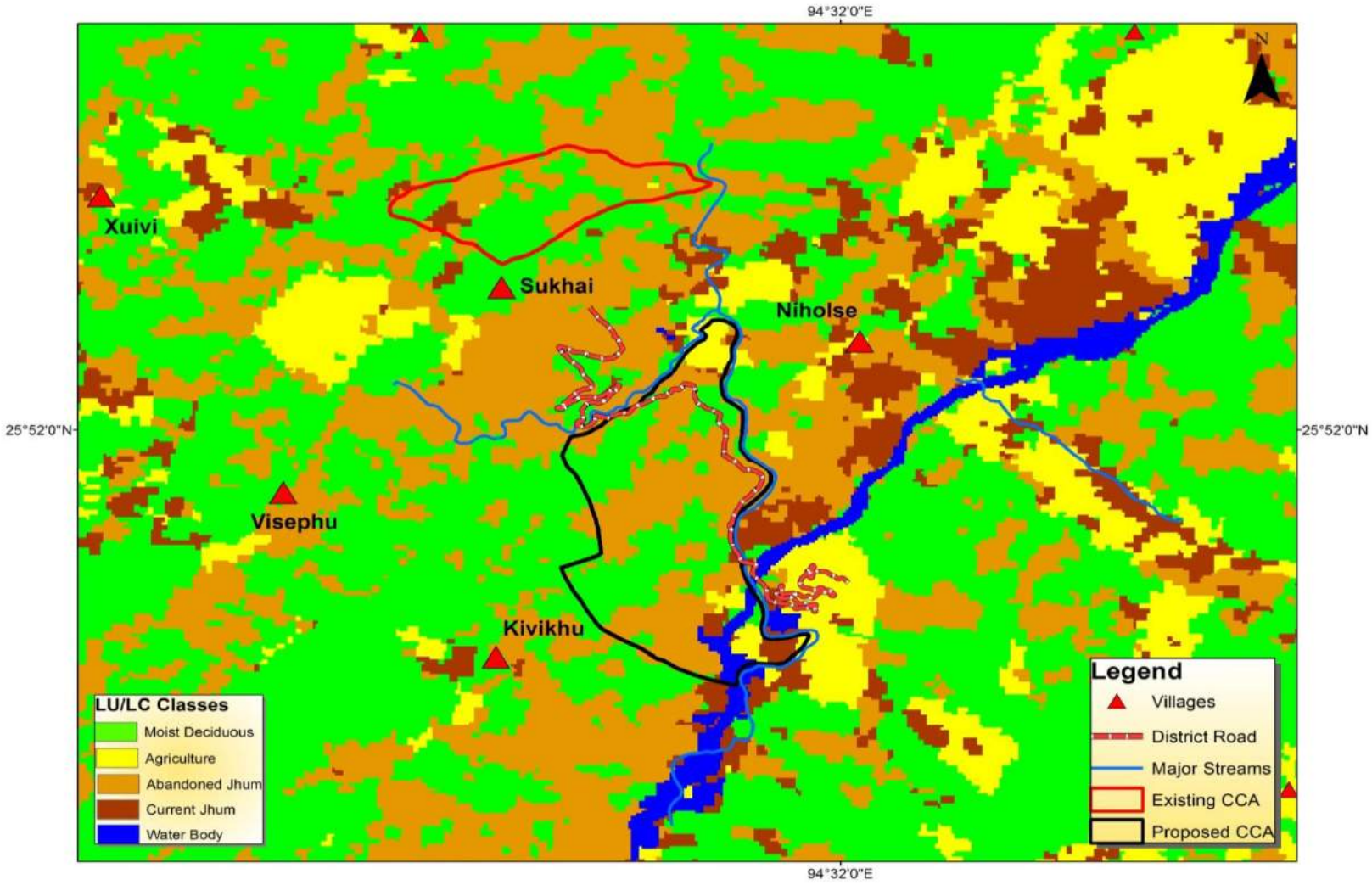


Figure 13. The landuse/landcover map of the old and new community consrved areas in Sukhai

Note. The existing CCA is the Ahoquha and Yayi CCA while the proposed (new CCA) is the Kastuqa forest

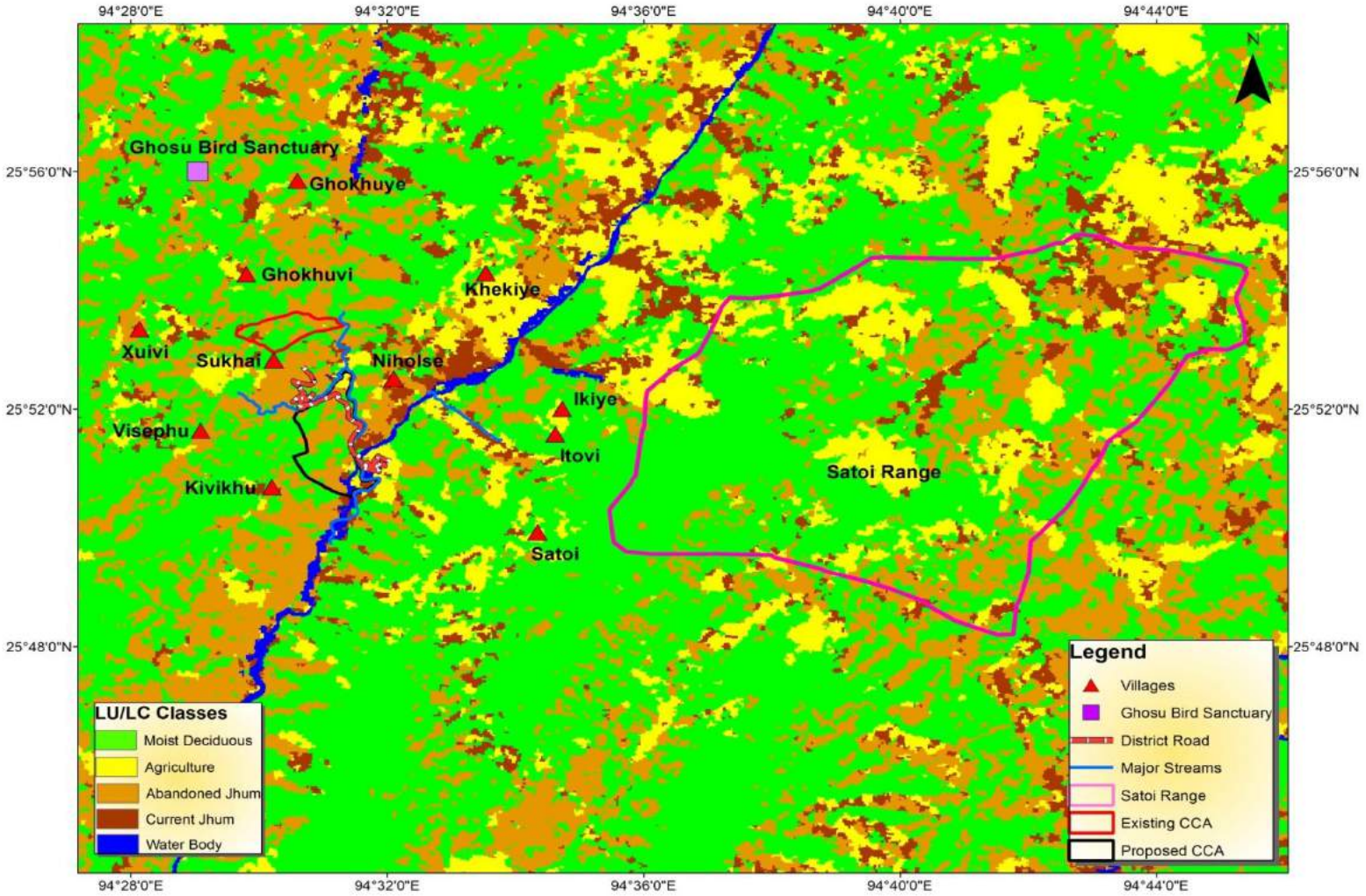


Figure 14. Map showing the Azhoqha and Yayi (Old CCA) and Kastuqa Forest (New CCA) and their connectivity to biodiversity rich areas such as the Satoi range

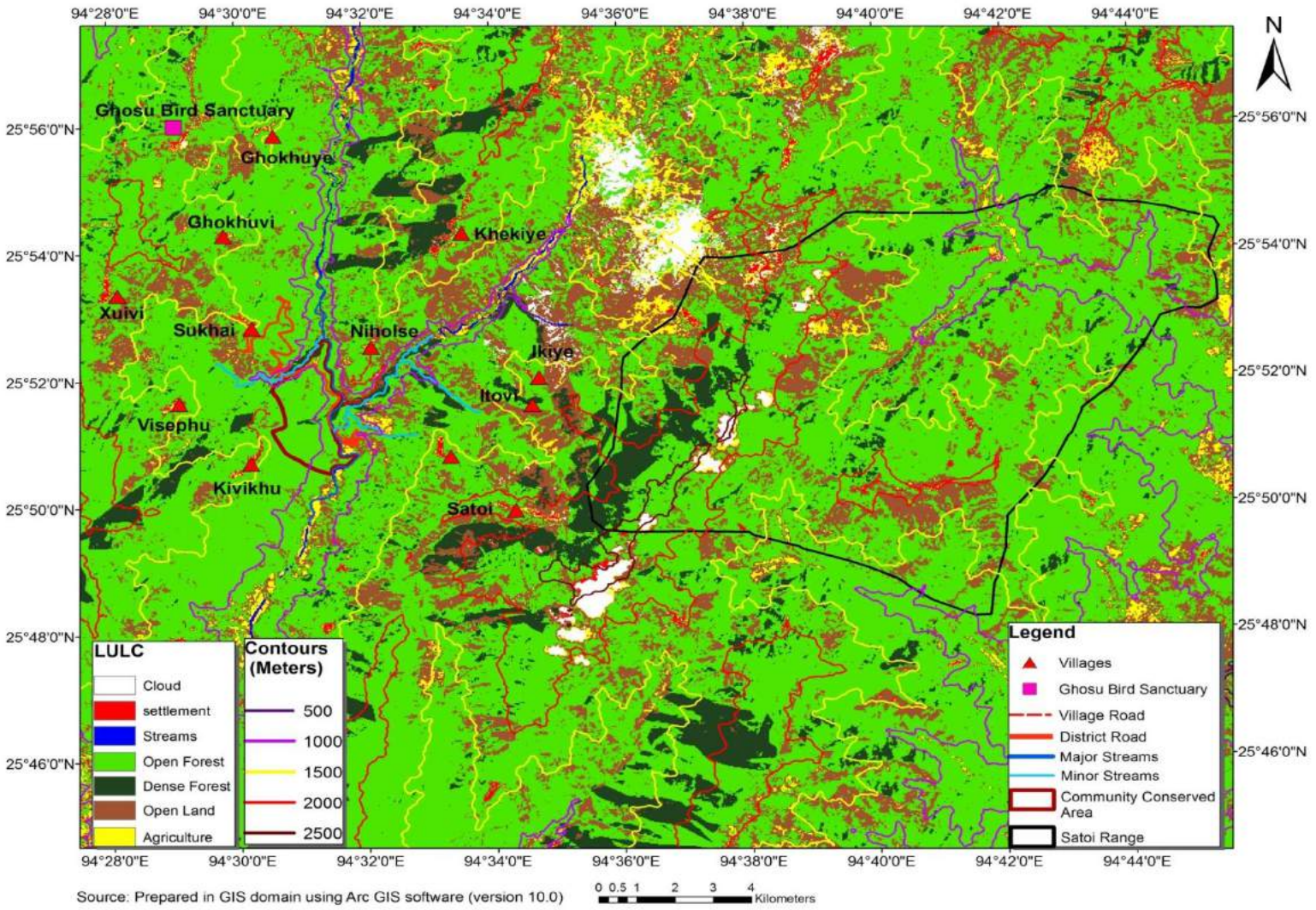


Figure 15. Map showing tthe the Azhoqha and Yayi (Old CCA) and Kastuqa Forest (New CCA) as well as the occurrence of dense and open forests (With Contour Lines)

Factors for Biodiversity Conservation in Sükhai

Several factors were observed to play a role in contributing to conservation, as well as in impeding conservation in Sükhai. This section attempts to discuss these factors, which are also summarized in Box 2.

Factors contributing to conservation

High out-migration

Sükhai has a high out-migration rate of 21 percent. Village children soon after completion of their primary education are sent to towns or cities to complete their schooling and higher education. Trained in tertiary sector jobs, the youth of Sükhai are motivated to continue to live in towns or cities with better job opportunities. This has reduced the need for lands under jhum cultivation as well as other resources derived from the forests including hunted wildlife and non-timber forest products. In such abandoned jhum patches, the forest can be seen to be regenerating forming patches of secondary growth forests.

Increase in the fallow period between jhuming cycles

Reduced pressure on natural resources due to declines in the population of Sükhai has also positively impacted the Jhuming cycle. According to the elders of the village, the length of the jhuming cycle within Sükhai has increased from seven to fourteen years. This allows the cleared jhum patches to regenerate and transition into dense, secondary growth forests.

Successful CCAs provide a positive role model for others

Several CCA initiatives undertaken by other villages such as those of Khonoma, and Sendenyu village of Kohima district, and of Luzophuhu village of Phek district are of some of the positive role models for the people of Sukhai. Motivated by the success of these CCAs and the fame they have attracted, most Nagaland communities are now conserving a portion of their forests with enhanced fervour.

Perceived economic gains

Most households, especially the ones that have migrated out but who retain ties to their village, perceive the conserved area as an asset. One of the village members expressed the desire to convert his ancestral home into a tourist lodge with the hope that the Sükhai conservation effort will succeed, and eventually attract a lot of tourists.

Factors impeding biodiversity conservation in sukhai

High dependence on natural resources

For the majority of households in Sükhai, jhuming and selling of natural resources drawn form the forest provides an important source ofincome. For successful conservation initiatives it is important to create alternative source or to adopt measures to ensure sustainable harvests.

Hunting, a cultural acceptable practice

Hunting continues to be a major road block to the conservation of wildlife. The use of less destructive hunting methods, smaller populations and extensive forests coupled with traditional wise-use practices, protected wildlife in the past. Today, however, the use of guns and the abandoning of many traditional wise-use practices have made wildlife increasingly vulnerable to local extinction.

Taste for wild meat

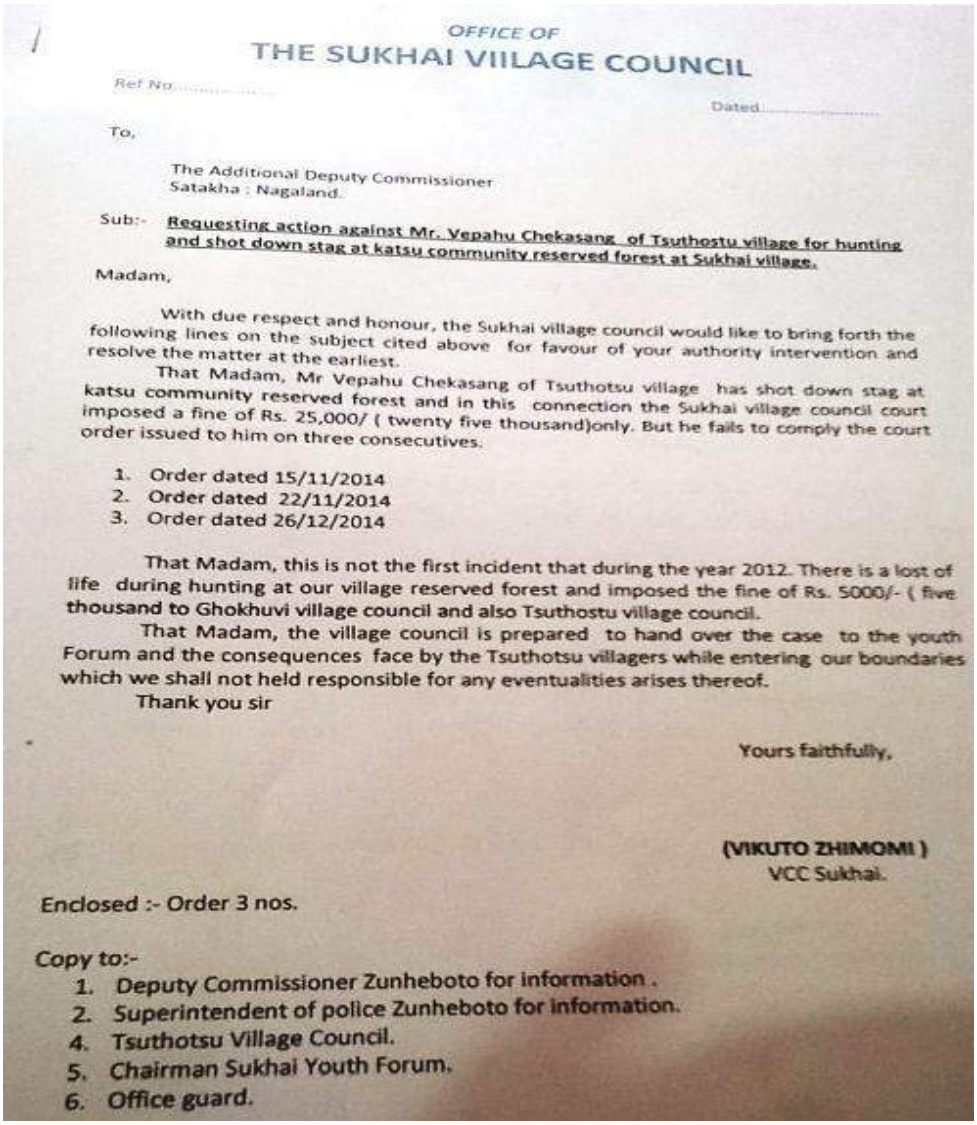
Wild meat forms an important part of the diet of people of Sükhai. Although households all own domestic livestock, the Sema being a hunting tribe harbor a great preference for wild meat. This imposes a continued threat to wild animal populations.

Trespassing by neighboring villages

In Sükhai several instance of trespassing were recorded by neighboring villages. Table 13 provides details of fines imposed on neighboring towns or villages for trespassing and hunting while Fig. 14 contains an example of a resolution passed in one such instance. Thus while villages may protect their own areas, they often then trespass into other village's CCAs to hunt or collect forest produce, an example of 'leakage'. Wildlife also does not respect boundaries and during the chase deer may stray into other village's CCAs. There is need to create sensitivity amongst communities on the need for conservation not just within a CCA, within a village,or a group of villages, but as a larger principle important for protecting their cultural traditions, biodiversity and traditional ways of life.

Table 12. Fines imposed on trespassers

Year	Fines imposed	Reason
2003	Rs. 3,000/-fine imposed on Tsuthotsa village, Chakesang tribe in Phek District	
2005	Rs. 5,000/-fine imposed on Tsuthotsa village, Chakesang tribe in Phek District	
2012	Rs. 10,000/-fine imposed on Tsuthotsa village, Chakesang tribe in Phek District	
2014	Rs. 5,000/-fine imposed on offenders from Zunheboto town	
2015	Rs. 25,000/-fine imposed on Tsuthotsa village, Chakesang tribe in Phek District.	For hunting a deer in the Kastuqa forest



OFFICE OF
THE SUKHAI VIILAGE COUNCIL

Ref No.....

Dated.....

To,

The Additional Deputy Commissioner
Satakha : Nagaland.

Sub:- **Requesting action against Mr. Vepahu Chekasang of Tsuthostu village for hunting and shot down stag at katsu community reserved forest at Sukhai village.**

Madam,

With due respect and honour, the Sukhai village council would like to bring forth the following lines on the subject cited above for favour of your authority intervention and resolve the matter at the earliest.

That Madam, Mr Vepahu Chekasang of Tsuthotsu village has shot down stag at katsu community reserved forest and in this connection the Sukhai village council court imposed a fine of Rs. 25,000/ (twenty five thousand)only. But he fails to comply the court order issued to him on three consecutives.

1. Order dated 15/11/2014
2. Order dated 22/11/2014
3. Order dated 26/12/2014

That Madam, this is not the first incident that during the year 2012. There is a lost of life during hunting at our village reserved forest and imposed the fine of Rs. 5000/- (five thousand to Ghokhuvi village council and also Tsuthostu village council.

That Madam, the village council is prepared to hand over the case to the youth Forum and the consequences face by the Tsuthotsu villagers while entering our boundaries which we shall not held responsible for any eventualities arises thereof.

Thank you sir

Yours faithfully,

(VIKUTO ZHIMOMI)
VCC Sukhai.

Enclosed :- Order 3 nos.

Copy to:-

1. Deputy Commissioner Zunheboto for information .
2. Superintendent of police Zunheboto for information.
4. Tsuthotsu Village Council.
5. Chairman Sukhai Youth Forum.
6. Office guard.

Figure 16. Order passed against offenders from Chakesang village for violating the rules of the Sükhai CCA

Table 13. 4 Factors contributing to, and impeding biodiversity conservation in Sükhai

Contributing factors	Impeding factors
• High out-migration, especially among youth of Sükhai • Increase in number of Jhuming cycles from seven to fourteen • Successful CCAs provide positive role model • Perceived economic gains	• High dependence on natural resources • Hunting a cultural acceptable practice • Taste for wild meat • Trespassing by neighboring village

Conclusion and way forward

The people of Sükhai are largely dependent on forests and natural resources for their livelihood, agriculture and other commodities such as timber and firewood. Recognizing signs of depleting resources, the village council in consultation with village members has resolved to conserve area under four of their jhuming lands, in addition to 5,407 meters of Tizü River. The VC has imposed a complete ban on hunting and cutting of trees from the CCA, and use of chemical explosives and other harmful methods for fishing are prohibited. Some suggested measures to enhance management of the Sukhai CCA are discussed below.

Conservation involving local communities is a process. To achieve conservation there is a need to generate greater awareness and build a common understanding of what conservation means and why and the initiatives leading to positive outcomes. The villages should understand that the trespassing of any CCA boundary is unfair, and the rules of another village or clan must also be respected.

People are reservoirs of knowledge on nature and traditional management practices, especially the village elders. High out-migration, and the increased motivation of village youth to engage in newer forms of livelihood while also bringing its own set of benefits, leads to the loss of traditional knowledge and practices. To sustain this knowledge it is important to document it before it is lost and to train younger community members. This can be achieved by building the capacity of local people, especially youth to develop and maintain People's Biodiversity Registers. The youth can also be encouraged to document the biodiversity of their forests, and to patrol such areas to ensure their conservation. The local school teachers must be trained to use these rich forests as their classrooms to teach their students about biology, culture, local folklore and science in general.

There is a need to create locally available alternatives to meet community requirements without impinging upon the natural ecosystem. In the case of Sükhai for example, the village has four natural water springs which provide an opportunity to develop fisheries within the village to meet their demand for fish, reducing their dependence on the Tizü River.

There have been examples across the globe of how religion can play an important role in conservation. The role of the church in inculcating a culture of conservation can prove beneficial in safeguarding and maintaining the forests and biodiversity of Nagaland. The forest department and church can work in tandem to advocate biodiversity conservation in each village, in addition to or along with the creation of community conserved areas.

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Appendix 1. Format for preparation of a village profile

Participant Profile

NAME	AGE	SEX

A. Geographical Location

S. No.		
1.	Name of the village	
2.	GPS coordinates of the village	Latitude Longitude
3.	Name of the Forest Range	
4.	Name of the Forest Division	
5.	Name of village council head and phone number	
6.	Name of nearby market and its distance from the village	
7.	Name of nearest Bank and its distance	
8.	Name of nearest town and its distance	
9.	Nearest National Highway and its distance	
10.	Nearest State Highway and its distance	
11.	Average elevation above MSL	
12.	Altitude (M):	
	Highest	
	Lowest	

B. Social Composition

13.	Total number of households in the village			
14.	Total Village Population			
15.	Total Male Population			
16.	Total Female Population			
17.	Age Composition	Total	Male	Female
	less than 1 year			
	1-5 years			
	5-14 years			
	14-18 years			
	18-21 years			
	21-50 years			

	50 years and above			
18.	Name of Tribe(s) in the village			
19.	Clan details:			
	Name of Clan	Number of Houses		
20.	Khel Details			
	Name of Khels	Number of Houses		
21.	List of primary occupation			
22.	List of secondary occupation			

Appendix 2. Format for village and resource mapping

VILLAGE AND RESOURCE MAPPING

NAME	AGE	SEX

DETAILS FROM RESOURCE MAP

S. No.	Code number of landscape from PRA map	Name of landscape	Ownership type	Service provided by landscape	Number of households dependent	Any change in the extent on service received since past 10 years	Reason for change	Management Practices	Other details	Inference for intervention

FOREST LAND DETAILS

	Details of forest land	Area	Flora/Fauna/NTFP	Change in flora fauna and NTFP in last 10 years	Reason for change	Details on Management
	Total Forest					
	CCA (Forest land)					

DETAILS of MIGRATION

	Migration Type	Purpose	Number of Families	Number of people	Time	Duration	Benefits
	Outward migration						
	Inward migration						

SETTLEMENT and SOCIAL COMPOSITION

S. No.	Type of settlement (kutcha/semi kutcha and pucca household)	Location description	Number of household	Population	Clan/Khels	Change in Settlement and Social Composition in last 10 years	Reason for change

OCCUPATION

CLAN/KHEL	Families & Major Occupation	Sub-Occupation	Month	Depending Landscape	Major resources accessed and seasons of access	Landscape Management Practice (for common land)	Change in occupation in last 10 years	Reason for change	Resource Management Practice

C. STATUS OF BASIC AMENITIES IN THE VILLAGE

C.1 Health

Type of Heath Care institution	Number	Distance from the Main Village
GOVERNMENT		
Primary Health Centre		
Community Health Centre		
District Hospital		
Anganwadi Centre		
PRIVATE		
Nursing Home		
Dispensary		
Traditional Healers		

Details of Alternative medicine (if available within village)

C.2 Education

Institution Type	Number	Name	Distance from Main Village
Play School			
Nursery			
Primary School			
Secondary School			
High School			
College an Higher education (Bachelors/Diploma/Masters/any other degree)			

C.3 Water

Water bodies in the village

	Name of the water-body (Lake, tanks, streams, rivers)	Ownership	Area (approx.)	Use (irrigation/domestic)	Seasonality (months when water is available)
	No. of wells				
	No. of bore wells				

Change in availability of basic amenities

	In last 10 years	Reason for Change
Health Services		
Education Institution		
Water Resource		

Appendix 3. Format for Social Mapping of the village

FORMAT 3
SOCIAL MAPPING

S.No	Name of the head of the household	Clan Name	Total Family Members	Number of Migrant Members	Number of Males	Number of Females	Below 5 years	5-12 years	12-18 years	18-30 years	30-50 years	50 years and above

Appendix 4. Identified Flora of Sükhai CCA

S. No	Scientific Name	Local Name
1	Aghaupukhusu	*Morus laviagata*
2	Aghishibo	*Luffa cylindrical*
3	Aguzabo(Bet)	*Licuala spinosa*
4	Akhusu	*Acmella oleracea*
5	Akochi	*Triumfetta rhomboidea*
6	Ambusu (Mujothi)	*Mangifera Indica*
7	Amiphisu	*Acer oblongum*
8	Amubo(Mujothibo)	*Mallotus philippinenisis*
9	Amughasu	*Canarium resiniferum*
10	Anguzusu (Timur)	*Zanthoxylum acanthopodium*
11	Anizasu	*Ocimum kilimandscharicum*
12	Aphisu	*Quercus serrata*
13	Apughubo	*Laportea crenulata*
14	Asahwbo	*Pinus patula/Pinus caribae*
15	Asakhu	*Acacia concinna*
16	Atsushombo(Van haldi)	*Hedychium aurantiacum*
17	Awunhechothisu	*Syzygium cumini*
18	Awoxusu	*Zingiber offcinalis*
19	Awanhechothisu	*Prunus cornuta*
20	Ayaghubo	*Amomum subulatum*
21	Ayingu	*Cucumis spp*
22	Ayepha	*Curculigo capitulata*
23	Ayichi	*Bridelia species*
24	Azuyisu	*Albizia lebbeck*

S. No	Scientific Name	Local Name
25	Burma grass	*Lantana camara*
26	Charithisu	*Prunus cerasoides*
27	Chizusu	*Michelia champaca*
28	Choghuthi (Ritha)	*Sapindus mukorossi*
29	Ghakuthi	*Juglans regia*
30	Hhanusu	*Kydia calycina*
31	Japani grass	*Eupatorium odoratum*
32	Kanak champa	*Pterospermum acerifolium*
33	Khabosu	*Litsea citrata*
34	Khachesu	*Wrightia tomentosa*
35	Khashathisu /Khaghati	*Artocarpus chaplasha*
36	Khalusu	*Salmalia malabaricum*
37	Khamoosu	*Litsea citrata*
38	Khaukughusu	*Macaranga indica*
39	Khanusu	*Bauhinia purpurea*
40	Kheloni	*Pteropermum acerifolium*
41	Kinilsanaho	*Sterculia urens*
42	Kithimiqasu	*Oroxylum corniculata*
43	Kholesu	*Spondia auxullaries*
44	Kholethisu	*Embelica officinalis*
45	Khonesu	*Kydia calycina*
46	Khughuthi	*Ficus cunia*
47	Khukasu	*Salmalia malabaricum*
48	Khukusu	*Bombax ceiba*
49	Kilisanaha (Khagsa)	*Ficus hispida*
50	Kinilosu	*Engelhardita spicata*

S. No	Scientific Name	Local Name
51	Kithimikiqasu	*Oroxylum indicum*
52	Kuhusu	*Duabanga grandiflora*
53	Lutusu	*Alnus nepalensis*
54	Lazasu	*Celtis eriocarpa*
55	Lhatsusu	*Cinamomum spp*
56	Litsasu	*Erythrina stricta*
57	Mainsau	*Chukrasia tabularis*
58	Michisu	*Schima walichii*
59	Mighesu	*Saurauia fasciculata*
60	Milisu	*Morus laevigata*
61	Miripisu	*Bahunia variegata*
62	Moosu	*Albizzia stipulate*
63	Motha	*Cyperus rotundus*
64	Mubusu	*Ficus cunia*
65	Mukhubo	*Rubus paniculatus*
66	Murasusu	*Debregeasia velutina*
67	Murupi	*Bauhinia varigata*
68	Mutsutipisu	*Leucosceptrum canum*
69	Naaniye	*Clerodendrum colebrookianum*
70	Nikesu	*Givotia rottleriformis*
71	Pughusu	*Quercus spp.*
72	Pogosu	*Picus pachiphylla*
73	Sapotusu	*Albizzia procera*
74	Shedusu	*Bischofia javanica*
75	Suchosthisu	*Ficus semicordata*
76	Silikughusu	*Populus ciliata*

S. No	Scientific Name	Local Name
77	Thanhesu	*Tectona grandis*
78	Thochisu	*Callicarpa arborea*
79	Thombosu	*Albizia chinensis*
80	Thughusu	*Trema orientalis*
81	Thumusu	*Rhus semialata*
82	Thochisu	*Callicarpa arborea*
83	Tsutsumilisu	*Cassia spp*
84	Tsuzasu	*Phoebe goalparensis*
85	Tuzusu	*Quercus incana*
86	Tughusu	*Terminalia orientalis*
87	Tung oil	*Vernicia fordii*
88	Yaghasu	*Cateins spp*
89	Yepasu	*Betula alnoides*
90	Zunhesu	*Leucosceptrum spp*
	Herbs/Shrubs	
	Common Name	***Scientific Name***
1	Aghaulogi	*Melastoma malabathricum*
2	Boboloye	*Aconogonium molle*
3	Apughu	*Laportea crenulata*
4	Sulithi	*Rubus ellipticus*
5	Anhechhubo/Ayemhi	*Rubia sikkimenisis*
6	Qhumunabo	*Artemisia vulgaris*
7	Muqhuye	*Ambrosia spp*
8	Apighikusu bo	*Arisaerma tortuosum*
9	Chitabo	*Biden spilosa*

S. No	Scientific Name	Local Name
10	Qhatsuyebo	*Crassocephalum crepidiodes*
11	Aghuye	*Centilla javanica*
12	Sahubo	*Cirsium spp*
13	Itiye	*Diplazium esculentum*
14	Japan lupi	*Eupatorium odoratum*
15	Losulonibo	*Mimosa pudica*
16	Yevuthi	*Rubus moluccanus*
17	Topughabo	*Triumfetta rhomboidea*
18	Akikuchopubo	*Thysonolaena maxima*
19	China lupi	*Mikinia micrantha*
20	Asaqhubo	*Smilax spp*
21	Azuthakighi	*Mucuna bractiana*
22	Kughukutsuye	*Plantaga major*
23	Akhkhu Aghuzubo	*Debregeasis longifolia*

Appendix 5. Mammals of Sükhai CCA

S. No	Order	Common Name	Scientific Name	Local Name	IUCN Red List Status
1	**Insectivora**	House (Grey Musk) Shrew	*Suncus murinus* (Linnaeus, 1766)	Ajitshu	LR-lc
2	**Chiroptera**	Greater Short-nosed fruit Bat	*Cynopterus sphinx* (Vahl, 1797)	Ashuqha	LR-lc
3		Lesser Short-nosed fruit Bat	*Cynopterus brachiyotis* (Muller, 1838)	Ashuqha	LR-lc
4	**Primates**	Rhesus Macaque	*Macaca mulatta* (Zimmermann, 1780)	Ashüki	LR-lc
5		Slow Loris	*Nycticebus coucang* (Lacépède, 1800)	Kujokini shuki	LR-lc
6	**Carnivora**	Wild Dog	*Cuon alpinus* (Pallas,1811)	Atine	EN
7		Malayan Sun Bear	*Helarctos malayanus* (Raffles, 1821)	Ava	VU
8		Asiatic Black Bear	*Ursus thibetanus* (G. Cuvier,1823)	Ava	VU
9		Leopard Cat	*Prionailurus bengalensis* (Kerr, 1792)	Anghshü	LR-lc
10		Jungle Cat	*Felis chaus* (Schreber, 1777)	Yeghili	LR-lc
11		Fishing Cat	*Prionailurus viverrinus* (Bennett, 1833)	Anengü	EN
12		Large Indian Civet	*Viverra zibetha* (Linnaeus, 1758)	Aqhü	LR-NT
13		Himalayan Palm Civet	*Paguma larvata* (C.E.H. Smith, 1827)	Aküfü	LR-lc
14		Eurasian Otter	*Lutra lutra* (Linnaeus, 1758)	Achieghe	LR-NT
15		Yellow-throated Martin	*Martes flavigula* (Boddaert, 1785)	Akhetsii	LR-lc
16		Small Indian Mongoose	*Herpestes javanicus* (É. G. Saint-Hilaire, 1818)	Kighiu	LR-lc

S. No	Order	Common Name	Scientific Name	Local Name	IUCN Red List Status
17		Ferret Badger	*Melogale spp* (Gray, 1831)		LR-lc
18	**Aritodactyla**	Wild Boar	*Sus scrofa* (Linnaeus, 1758)	Amini	LR-lc
19		Sambar	*Rusa unicolor* (Kerr, 1792)	Aqhü	VU
20		Barking Deer	*Muntiacus muntjak* (Zimmermann,1780)	Ashe	LR-lc
21		Red Serow	*Capricornis rubidus* (David, 1869)		LR-NT
22		Goral	*Naemorhedus goral* (Hamilton Smith, 1827)	Achüyi	LR-NT
23		Mithun	*Bos frontalis* (Lambert,1804)	Avi ala	VU
24	**Pholidota**	Hoary-bellied Squirrel	*Callosciurus pygerythrus* (I. Geoffroy Saint Hilaire, 1832)	Akili	LR-lc
25		Chinese Pangolin	*Manis pentadactyla* (Linnaeus, 1758)	Ashiphi	CR
26	**Rodentia**	Orange-bellied Himalayan Squirrel	*Dremomys lokriah* (Hodgson, 1836)	Sakhükili	LR-lc
27		Himalayan Striped Squirrel	*Tamiops macclellandi* (Horsfield, 1840)	Azügha	LR-lc
28		Red giant flying squirrel	*Petaurista petaurista* (Pallas, 1766)	Atulo	LR-lc
29		Hoary Bamboo Rat	*Rhizomys pruinosus* (Blyth, 1851)	Achighi	LR-lc
30		Field Mouse	*Mus booduga* (Gray, 1837)	Aghalo	LR-lc
31		Asiatic Brush-tailed Porcupine	*Atherurus macrourus* (Linnaeus, 1758)	Kithicheqü	LR-lc
32		Himalayan Crestless Porcupine	*Hystrix brachyura* (Linnaeus, 1758)	Acheqhü	LR-lc

Sources: Field data validated by experts and from the scientific literature; Molur et.al., (2002).

Legend

IUCN Red List categories:

CR-Critically endangered, EN-Endangered, VU-Vulnerable, LRnt-Lower Risk near threatened, LRlc-Lower Risk least concern, LR-cd-Lower Risk conservation dependent, DD-data deficient, NE-Not evaluated

Appendix 6. Birds of Sükhai CCA

S. No.	Common Name	Scientific Name	Local Sema Name	IUCN Red List Status
1	Hill Patridge	*Arborophila torqueola*	Akhi	
2	Rufous-throated Partridge	*Arborophila rufogularis*	-	LR-lc
3	Mountain Bamboo Patridge	*Ambusicola fytchii*	Aili	LR-lc
4	Red Junglefowl	*Gallus gallus*	Lolivü	LR-lc
5	Kalij pheasant	*Lophura leucomelanos*	Aghi	LR-lc
6	Speckled Piculet	*Picumnus innominatus*	Akhokho	LR-lc
7	White-browed Piculet	*Sasia ochracea*	Achüshü	LR-lc
8	Rufous woodpecker	*Dendrocopos hyperythrus*	Kasüghü	LR-lc
9	Bay woodpecker	*Blythipicus pyrrhotis*	Kasüghü	LR-lc
10	Grey-capped Pygmy Woodpecker	*Dendrocopos canicapillus*	Kasughu-also	LR-lc
11	Great Barbet	*Megalaima virens*	Chengü	LR-lc
12	Golden-throated Barbet	*Megalaima franklinii*	Echemü	LR-lc
13	Blue-throated Barbet	*Megalaima asiatica*	Shakhü	LR-lc
14	Coppersmith Barbet	*Megalaima haemacephala*	Sheqhü	LR-lc
15	Common Hopooe	*Upupa epops*	Natugha	LR-lc
16	Red-headed Trogon	*Harpactes erythrocephalus*	Kühüyü	LR-lc
17	Indian Roller	*Coracias benghalensis affinis*	Atsüü	LR-lc
18	Dollarbird	*Eurystomus orientalis*	-	LR-lc
19	Common Kingfisher	*Alcedo atthis*	Alisii	LR-lc
20	White-throated Kingfisher	*Halcyon smyrnensis*	-	LR-lc
21	Common Hawk Cuckoo	*Hierococcyx varius*	Pipilhü	LR-lc
22	Large Hawk Cuckoo	*Hierococcyx sparverioides*	Ahhaqü	LR-lc
23	Eurasian Cuckoo	*Cuculus canorus*	Akheü	LR-lc

S. No.	Common Name	Scientific Name	Local Sema Name	IUCN Red List Status
24	Plaintive Cuckoo	*Cacomantis merulinus*	Alhaqü	LR-lc
25	Drongo Cuckoo	*Surniculus lugubris*	-	LR-lc
26	Greater Coucal	*Centropus sinensis*	Akhakhü	LR-lc
27	Alexandrine Parakeet	*Psittacula eupatria*	Achoki	LR-lc
28	Rose-ringed parakeet	*Psittacula krameri*	Achoki	LR-lc
29	Slaty-headed parakeet	*Psittacula himalayana*	Achoki	LR-lc
30	Red-breasted Parakeet	*Psittacula alexandri*	Achoki	LR-lc
31	Collared Scops Owl	*Otus bakkamoena*	Akhokho	LR-lc
32	Spot-bellied Eagle Owl	*Bubo nipalensis*	Akhokho	LR-lc
33	Tawny Fish Owl	*Ketupa flavipes*	Akhokho	LR-lc
34	Collared Owlet	*Glaucidium cuculoides*	Akhokho	LR-lc
35	Asian Barred Owlet	*Glaucidium brodiei*	Akhokho	LR-lc
36	Spotted Owlet	*Athene brama*	Akhokho	LR-lc
37	Brown Hawk Owl	*Ninox scutulata*	Akhokho	LR-lc
38	Large-tailed nightjar	*Caprimulgus macrurus*	Ashigüngü	LR-lc
39	Oriental Turtle Dove	*Streptopelia orientalis*	Akheü	LR-lc
40	Spotted Dove	*Streptopelia chinensis*	Mikhedü	LR-lc
41	Pin-tailed Green Pigeon	*Treron apicauda*	-	LR-lc
42	Emerald Dove	*Chalcophaps indica*	Achüi	LR-lc
43	Pompadour Green Pigeon	*Treron pompadora*	Chengü	LR-lc
44	Wedge-tailed Green Pigeon	*Treron sphenura*	Adüngü	LR-lc
45	Mountain Imperial Pigeon	*Ducula badia*	Adürgu akighü	LR-lc
46	Oriental Honey-Buzzard	*Pernisptilorhyncus*	Alhüghü aghlo	LR-lc
47	Black Kite	*Milvus migrans*	-	LR-lc

S. No.	Common Name	Scientific Name	Local Sema Name	IUCN Red List Status
48	Crested Serpent Eagle	*Spilornis cheela*	Ahüqhü akijeü	LR-lc
49	Shikra	*Accipiter badius*	-	LR-lc
50	Black Eagle	*Ictinaetus malayensis*	Alhüguahütaü	LR-lc
51	Indian Cormorant	*Phalacrocorax fuscicollis*	Kivü	LR-lc
52	Little Egret	*Egretta garzetta*	Kilaü	LR-lc
53	Intermediate Egret	*Mesophoyx intermedia*	-	LR-lc
54	Cattle Egret	*Bubulcus ibis*	-	LR-lc
55	Indian Pond Heron	*Ardeola grayii*	-	LR-lc
56	Long-tailed Shrike	*Lanius schach*	Atülü	LR-lc
57	Common Green Magpie	*Cissa chinensis*	Tüqhu-u	LR-lc
58	Rufous Treepie	*Dendrocitta vagabunda*	-	LR-lc
59	Grey Treepie	*Dendrocitta formosae*	Müdükhakhü	LR-lc
60	Black-hooded Oriole	*Oriolus xanthornus*	Eao	LR-lc
61	Moroon Oriole	*Oriolus traillii*	Eao	LR-lc
62	Long-tailed Minivet	*Pericrocotus ethologus*	Ichemü	LR-lc
63	Short-billed Minivet	*Pericrocotus brevirostris*	-	LR-lc
64	Black Drongo	*Dicrurus macrocercus*	-	LR-lc
65	Ashy Drongo	*Dicrurus leucophaeus*	Akhakhü	LR-lc
66	Bronzed Drongo	*Dicrurus aeneus*	Khaülahe	LR-lc
67	Spangled drongo	*Dicrurus hottentottus*	Mililoqhu	LR-lc
68	Lesser Racket-tailed Drongo	*Dicrurus remifer*	Milisaxe	LR-lc
69	Greater Racket-tailed Drongo	*Dicrurus paradiseus*	-	LR-lc
70	Eye-browed Thrush	*Turdus obscurus*	Tsütoti	LR-lc
71	Dark-throated Thrush	*Turdus ruficollis*	-	LR-lc
72	Verditer Flycatcher	*Eumyias thalassina*	Avetsüqü	LR-lc

S. No.	Common Name	Scientific Name	Local Sema Name	IUCN Red List Status
73	Large Niltava	*Niltava grandis*	Avetsüqü	LR-lc
74	Rufous-bellied Niltava	*Niltava sundara*	Kirala	LR-lc
75	Pale-chinned Flycatcher	*Cyornis poliogenys*	Yoyopü	LR-lc
76	Blue-throated Flycatcher	*cyornis ruberculoides*	-	LR-lc
77	Grey-headed canary Flycatcher	*Culicicapa ceylonensis*	Tüghasoqha	LR-lc
78	Pygmy Blue Flycatcher	*Cyornis hodgsoni*	-	LR-lc
79	Siberian Rubythroat	*Luscinia calliope*	Ijü	LR-lc
80	White-capped Water Redstart	*Chaimarrornis leucocephalaus*	-	LR-lc
81	Little Forktail	*Enicurus scolueri*	Abaya	LR-lc
82	Black-backed Forktail	*Enicurus immaculatus*	-	LR-lc
83	Slaty-backed Forktail	*Enicurus schistaceus*	-	LR-lc
84	Spotted Forktail	*Enicurus maculatus*	-	LR-lc
85	Great Tit	*Parus major*	-	LR-lc
86	Green-backed Tit	*Parus monticolus*	Tsükhekhe	LR-lc
87	Yellow-browed Tit	*Sylviparus modestus*	Awolre	LR-lc
88	Black-Throated Tit	*Aegithalos concinnus*	-	LR-lc
89	Crested Finchbill	*Spizixos canifrons*	Thüümü	LR-lc
90	Black-crested Bulbul	*Pycnonotus melanicterus*	Kiphikuru	LR-lc
91	Red-Whiskered Bulbul	*Pycnonotus jocosus*	Müdüdungü	LR-lc
92	Red-vented Bulbul	*Pycnonotus cafer*	Müdüdungu	LR-lc
93	Flavescent bulbul	*Pycnonotus flavescens*	Thümü	LR-lc
94	White-throated Bulbul	*Alophoixux flaveolus*	Kasughü	LR-lc
95	Black Bulbul	*Hypsipetes leucocephalus*	Amiyi	LR-lc
96	Slaty-bellied Tesia	*Tesia olivea*	-	LR-lc

S. No.	Common Name	Scientific Name	Local Sema Name	IUCN Red List Status
97	Thick-billed Warbler	*Acrocephalus aedon*	Logiü	LR-lc
98	Mountain Tailorbird	*Orthotomus cuculatus*	Zürüti	LR-lc
99	Dark-necked Tailorbird	*Acrocephalus aedon*	Avetsüqho	LR-lc
100	Buff-barred Warbler	*Phylloscopus pulcher*	-	LR-lc
101	Ashy-throated Warbler	*Phylloscopus maculipennis*	-	LR-lc
102	Hume's Warbler	*Phylloscopus humei*	-	LR-lc
103	Blyth's Leaf Warbler	*Phylloscopus reguloides*	-	LR-lc
104	Golden-spectacled Warbler	*Seicercus burkii*	-	LR-lc
105	Grey-hooded Warbler	*Seicercus xanthoschistos*	-	LR-lc
106	Grey-cheeked Warbler	*Seicercus poliogenys*	-	LR-lc
107	Broad-billed Warbler	*Tickellia hodgsoni*	-	LR-lc
108	Rufous-faced Warbler	*Abroscopus albogularis*	-	LR-lc
109	Black-faced Warbler	*Abroscopus schisticeps*	-	LR-lc
110	White-crested Laughing Thrush	*Garrulax leucolophus*	Ingu-ü	LR-lc
111	Greater-necklaced Laughing Thrush	*Garrulax pectoralis*	-	LR-lc
112	Rufous-necked Laughing Thrush	*Garrulax ruficollis*	Tsütopü	LR-lc
113	Yellow-throated Laughing thrush	*Dryonastes galbanus*	Thüqhü	LR-lc
114	Striped Laughing thrush	*Trochalopteron virgatum*	-	LR-lc
115	Chestnut-crowned Laughing Thrush	*Garrulax erythrocephalus*	Aioo	LR-lc
116	Red-faced Liochicla	*Liocichla phoenicea*	Tsütopü	LR-lc
117	Puff-throated Babbler	*Pellorneum ruficeps*	-	LR-lc
118	Spot-breasted Scimitar Babbler	*Pomatorhinus erythrocnemis*	-	LR-lc
119	White-browed Scimitar Babbler	*Pomatorhinus schisticeps*	-	LR-lc
120	Streak-breated Scimitar Babbler	*Pomatorhinus ruficollis*	Sikihie	LR-lc
121	Coral-billed Scimitar Babbler	*Pomatorhinus ferruginosus*	Ahoghe	LR-lc

S. No.	Common Name	Scientific Name	Local Sema Name	IUCN Red List Status
122	Rufous-capped Babbler	*Stachyris ruficeps*	-	LR-lc
123	Siver-eared Mesia	*Leiothrix argentauris*	Achita	LR-lc
124	White-browed Shrike Babbler	*Pteruthius flaviscapis*	-	LR-lc
125	Rusty-fronted Barwing	*Actinodura egertoni*	-	LR-lc
126	Golden-breasted Fulvetta	*Alcippe chrysotis*	-	LR-lc
127	Yellow-throated Fulvetta	*Alcippe cinerea*	-	LR-lc
128	White-browed Fulvetta	*Alcippe vinipectus*	-	LR-lc
129	Grey Sibia	*Heterrophasia gracilis*	Aichiü	LR-lc
130	Crimson Sunbird	*Aethopyga siparaja*	Kühu-ü	LR-lc
131	Fire-tailed Sunbird	*Aethopyga ignicauda*	-	LR-lc
132	Streaked Spiderhunter	*Arachnothera magna*	-	LR-lc
133	House Sparrow	*Passer domesticus*	-	LR-lc
134	Eurasian Tree Sparrow	*Passer montanus*	Shokheti	LR-lc
135	Forest Wagtail	*Dendronanthus indicus*	Aiti	LR-lc
136	Crested Bunting	*Melophus latami*	-	LR-lc

Source: Field data; verified by experts and from scientific literature.

Legend

IUCN Red List categories:

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Appendix 7. Reptiles of Sukhai CCA

S. no	Family	Common Name	Scientific Name	Local Name	IUCN Red Data List Status
	Suborder-Sauria (Lizards)				
1	Agamidae Gray, 1827	Unidentified Forest Lizard	-		-
	Sub order-Serpentes (Snakes)				
1	Typhlopidae Merrem, 1820	Brahminy Worm Snake	*Ramphotyphlops brahminus* (Daudin, 1803)	Mükhürü	LR-lc
2	Uropeltidae J.P. Müller, 1832	Shieldtail spp.	*Shieldtail spp.*		LR-lc
3	Boidae Gray, 1825	Common Sand Boa	*Gongylophis conicus* (Schneider, 1801)	Tümüpüghüi	LR-lc
4		Red Sand Boa	*Eryx johnii* (Russell, 1801)		LR-lc
5	Pythonidae Fitzinger, 1826	Burmese Python	*Python bivittatus* (Kuhl, 1820)		VU
6	Colubridae Oppel, 1811	Red necked Keelback	*Rhabdophis subminiatus* (Schlegel, 1837)	Atsütsa	LR-lc
7		Short-nosed Vine Snake	*Ahaetulla prasina* (Boie,1827)	Tsütsüla	LR-lc
8		Green Rat Snake	*Ptyas nigromarginata* (Blyth,1854)	Azhǫchǫ	LR-lc
9		Indo-Chinese Rat Snake	*Ptyas korros* (Schlegel, 1837)	Khapighi	LR-lc
10		Ornate Flying Snake	*Chrysopelea ornate* (Shaw, 1802)		LR-lc
11		Tawny Cat Snake	*Boiga ochracea* (Gunther,1868)		LR-lc

S. no	Family	Common Name	Scientific Name	Local Name	IUCN Red Data List Status
12		Common Cat Snake	*Boiga trigonata* (Schneider, 1802)		LR-lc
13		Eastern Cat Snake	*Boiga gokool* (Gray,1835)		LR-lc
14		Light Barred Kukri	*Oligodon albocinctus* (Cantor,1839)	Atsütsŏ	LR-lc
15		Common Trinket Snake	*Coelognathus helena* (Daudin, 1803)		LR-lc
16		Green Trinket Snake	*Rhadinophis prasinus* (Blyth,1854)		LR-lc
17		Eastern Trinket Snake	*Orthriophis cantoris* (Boulenger, 1894)		LR-lc
18		Large Spotted Cat Snake	*Boiga multomaculata* (Boie, 1827)		LR-lc
19		Common Bronze Snake	*Dendrelaphis tristis* (Daudin, 1803)		LR-lc
20		Cantor's Black-headed Snake	*Sibynophis sagittarius* (Cantor, 1839)		LR-lc
21	Elapidae Boie, 1827	Banded Krait	*Bungarus fasciatus* (Schneider, 1801)		LR-lc
22		Monocoled Cobra	*Naja kaouthia* (Lesson, 1831)	Akümhŏ	LR-lc
23		King Cobra	*Ophiophagus hannah* (Cantor, 1836)		VU
24	Viperidae Boie, 1827	Pope's Pit Viper	*Trimeresurus popeorum* (Smith, 1937)	Azotsütsa	LR-lc

Source: Field data verified by experts and from scientific research books/journals

Legend

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Appendix 8. Amphibians of Sükhai CCA

S. no	Family	Common Name	Scientific Name	IUCN Red Data List
1	Bufonidae Gray, 1825	Common Indian Toad	*Duttaphrynus melanostictus* (Schneider, 1799)	LR-lc
2		Paddyfield or Cricket Frog	*Fejervarya spp* (Bolkay, 1915)	LR-lc
3		Skittering Frog	*Euphylectis cyanophlyctis* (Schneider, 1799)	LR-lc
4	Microhylidae Günther, 1858	Ornate Narrow-Mouthed Frog	*Microhyla ornata* (Duméril & Bibron, 1841)	LR-lc
5	Rhacophoridae Hoffman, 1932		*Philautus spp* (Gistel, 1848)	LR-lc
6		Indian Tree Frog	*Polypedates spp* (Tschudi, 1838)	LR-lc
7		Twin-spotted Tree Frog	*Rhacophorus bipunctatus* (Ahl, 1927)	LR-lc

Source: Field data verified by experts and from scientific literature.

Legend

IUCN Red List categories:

CR-Critically endangered, EN-Endangered, VU-Vulnerable, LRnt-Lower Risk near threatened, LRlc-Lower Risk least concern, LR-cd-Lower Risk conservation dependent, DD-data deficient, NE-Not evaluated

Appendix 9. Butterflies and Moths of Sükhai CCA

No.	Common Name	Scientific Name
	BUTTERFLIES	
	Family Hesperiidae, Subfamily Coeliadinae	
1	Brown Awl	*Badamia exclamationis*
2	Pale Green Awlet	*Burara gomata gomata*
3	White Banded Awlet	*Hasora taminatus bhavara*
	Family Hesperiidae, Subfamily Hesperiinae	
4	Forest Hopper	*Astictopterus jama olivascens*
5	Straight Swift	*Parnara cf.guttatus*
6	Tufted Ace	*Sebastonyma dolopia*
7	Dark Palm-Dart	*Telicota bambusae bambusae*
8	Spotted Demon	*Notocrypta feisthamelii alysos*
9	Indo-Chinese Common Banded Demon	*Notocrypta paralysos asawa*
10	Unidentified Swift species	*Polytrmis spp*
	Family Hesperiidae, Subfamily Pyrginae	
11	Fulvous Pied Flat	*Pseudocoladenia dan fabia*
12	Common Spotted Flat	*Celaenorrhinus leucocera*
	Family Lycaenidae, Subfamily Curetinae	
13	Bright Sunbeam	*Curetis bulis bulis*
14	Toothed Sunbeam	*Curetis dentata dentata*
	Family Lycaenidae, Subfamily Lycaeninae	
15	Golden Sapphire	*Heliophorus brahma brahma*
16	Green Sapphire	*Heliophorus moorei tytleri*

No.	Common Name	Scientific Name
	Family Lycaenidae, Subfamily Polyommatinae	
17	Pointed Ciliate Blue	*Anthene lycaenina lycambes*
18	Silver Forget-me-not	*Catochrysops panormus exiguus*
19	Elbowed Pierrot	*Caleta elna noliteia*
20	Common Hedge Blue	*Acytolepis puspa gisca*
21	Plain Hedge Blue	*Celastrina lavendularis limbata*
22	Dark Cerulean	*Jamides bochus bochus*
23	Pea Blue	*Lampides boeticus*
24	Zebra Blue	*Leptotes plinius plinius*
25	Common Lineblue	*Prosotas nora ardates*
26	Dark Grass Blue	*Zizeeria karsandra*
	Family Lycaenidae, Subfamily Poritiinae:	
27	Common Gem	*Poritia hewitsoni*
	Family Lycaenidae, Subfamily Theclinae:	
28	Plane	*Bindahara phocides phocides*
29	Common Tit	*Hypolycaena erylus himavantus*
30	Common Flash	*Rapala nissa nissoides*
31	Long-banded Silverline	*Spindasis lohita himalayanus*
32	Club Silverline	*Spindasis syama peguanus*
33	Common Acacia Blue	*Surendra quercetorum quercetorum*
	Family Nymphalidae, Subfamily Apaturinae:	
34	Courtesan	*Euripus nyctelius nyctelius*
35	Circe	*Hestinalis nama nama*

No.	Common Name	Scientific Name
	Family Nymphalidae, Subfamily Biblidinae:	
36	Angled Castor	*Ariadne ariadne pallidior*
37	Common Castor	*Ariadne merione tapestrina*
	Family Nymphalidae, Subfamily Charaxinae:	
38	Great Nawab	*Charaxes eudamippus eudamippus*
39	Common Nawab	*Charaxes athamas athamas*
40	Tawny Rajah	*Charaxes bernardus hierax*
41	Yellow Rajah	*Charaxes marmax marmax*
	Family Nymphalidae, Subfamily Cyrestinae:	
42	Map Butterfly	*Cyrestis thyodamas thyodamas*
	Family Nymphalidae, Subfamily Danainae:	
43	Plain Tiger	*Danaus chrysippus chrysippus*
44	Striped Tiger	*Danaus genutia genutia*
45	Glassy Tiger	*Parantica aglea melanoides*
46	Chocolate Tiger	*Parantica melaneus plataniston*
47	Chestnut Tiger	*Parantica sita sita*
48	Dark Blue Tiger	*Tirumala septentrionis septentrionis*
49	Long-branded Blue Crow	*Euploea algea deione*
50	King Crow	*Euploea klugii klugii*
51	Striped Blue Crow	*Euploea mulciber mulciber*
	Family Nymphalidae, Subfamily Heliconiinae:	
52	Yellow Coster	*Acraea issoria issoria*
53	Indian Fritillary	*Argynnis hyperbius hyperbius*

No.	Common Name	Scientific Name
54	Red Lacewing	*Cethosia biblis tisamena*
55	Leopard Lacewing	*Cethosia cyane cyane*
56	Large Yeoman	*Cirrochroa aoris aoris*
57	Rustic	*Cupha erymanthis*
58	Common Leopard	*Phalanta phalantha phalantha*
59	Vagrant	*Vagrans egista sinha*
60	Cruiser	*Vindula erota erota*
	Family Nymphalidae, Subfamily Limenitidinae:	
61	Common Sergeant	*Athyma perius perius*
62	Orange dash Sergeant	*Athyma cama cama*
63	Staff Sergeant	*Athyma selenophora selenophora*
64	Common Baron	*Euthalia aconthea garuda*
65	Gaudy Baron	*Euthalia lubentina lubentina*
66	Powdered Baron	*Euthalia monina kesava*
67	Commander	*Moduza procris procris*
68	Dark Archduke	*Lexias dirtea khasiana*
69	Common Sailer	*Neptis hylas varmona*
70	Common Glider	*Neptis sappho astola*
71	Yellow Sailer	*Neptis ananta ochracea*
72	Pallas's Sailer	*Neptis sappho astola*
73	Common Earl	*Tanaecia julii appiades*
74	Commander	*Moduza procris procris*
	Family Nymphalidae, Subfamily Nymphalinae:	

No.	Common Name	Scientific Name
75	Orange Oakleaf	*Kallima inachus inachus*
76	Autumn Leaf	*Doleschallia bisaltide indica*
77	Great Eggfly	*Hypolimnas bolina jacintha*
78	Peacock Pansy	*Junonia almana almana*
79	Chocolate Pansy	*Junonia iphita iphita*
80	Yellow Pansy	*Junonia hierta hierta*
81	Lemon Pansy	*Junonia lemonias lemonias*
82	Blue Pansy	*Junonia orithya ocyale*
83	Indian Blue Admiral	*Kaniska canace canace*
84	Indian Red Admiral	*Vanessa indica indica*
85	Common Jester	*Symbrenthia lilaea khasiana*
86	Painted lady	*Vanessa cardui cardui*
	Family Nymphalidae, Subfamily Pseudergolinae:	
87	Tabby	*Pseudergolis wedah wedah*
88	Popinjay	*Stibochiona nicea nicea*
89	Wizard	*Rhinopalpa polynice birmana*
	Family Nymphalidae, Subfamily Satyrinae:	
90	Common Palmfly	*Elymnias hypermnestra undularis*
91	Spotted Palmfly	*Elymnias malelas malelas*
92	Dusky Diadem	*Ethope himachala*
93	Common Red Forester	*Lethe mekara zuchara*
94	Common Evening Brown	*Melanitis leda leda*
95	Dark Evening Brown	*Melanitis phedima bela*

No.	Common Name	Scientific Name
96	Common Treebrown	*Lethe rohria rohria*
97	White line Bushbrown	*Heteropsis malsara*
98	Lilacine Bushbrown	*Mycalesis francisca sanatana*
99	Lepcha Bushbrown	*Mycalesis lepcha kohimensis*
100	Tiger Brown	*Orinoma damaris damaris*
101	Common Five-ring	*Ypthima baldus baldus*
102	Himalayan Five-ring	*Ypthima sakra sakra*
	Family Papilionidae, Subfamily Papilioninae:	
103	Green Dragontail	*Lamproptera meges indistincta*
104	Tailed Jay	*Graphium agamemnon agamemnon*
105	Common Bluebottle	*Graphium sarpedon sarpedon*
106	Lime Butterfly	*Papilio demoleus demoleus*
107	Spangle	*Papilio protenor euprotenor*
108	Lesser Zebra	*Graphium macareus indicus*
109	Five-bar Swordtail	*Graphium antiphates pompilius*
110	Common Batwing	*Atrophaneura varuna astorion*
111	Common Windmill	*Byasa polyeuctes*
112	Common Rose	*Pachliopta aristolochiae aristolochiae*
113	Common Peacock	*Papilio bianor*
114	Paris Peacock	*Papilio paris paris*
115	Common Mime	*Papilio clytia clytia*
116	Great Blue Mime	*Papilio paradoxa telearchus*
117	Red Helen	*Papilio helenus helenus*

No.	Common Name	Scientific Name
118	Yellow Helen	*Papilio nephelus chaon*
119	Great Mormon	*Papilio memnon agenor*
120	Common Mormon	*Papilio polytes romulus*
121	Common Birdwing	*Troides helena cerberus*
	Family Pieridae, Subfamily Coliadinae:	
122	Common Emigrant	*Catopsilia pomona pomona*
123	Three-spot Grass Yellow	*Eurema blanda silhetana*
124	Small Grass Yellow	*Eurema brigitta rubella*
125	Common Grass yellow	*Eurema hecabe hecabe*
126	Spotless Grass Yellow	*Eurema laeta sikkima*
	Family Pieridae, Subfamily Pierinae:	
127	Common Albatross	*Appias albina darada*
128	Chocolate Albatross	*Appias lyncida eleonora*
129	Spot Puffin	*Appias lalage lalage*
130	Common Gull	*Cepora nerissa nerissa*
131	Red-spot Jezebel	*Delias descombesi descombesi*
132	Hill Jezebel	*Delias belladonna lugens*
133	Great Orange-tip	*Hebomoia glaucippe glaucippe*
134	Yellow Orange-tip	*Ixias pyrene familiaris*
	Large Cabbage White	*Pieris brassicae nepalensis*
135	Cabbage White	*Pieris canidia indica*
136	Psyche	*Leptosia nina nina*
137	Pale Wanderer	*Pareronia avatar*

No.	Common Name	Scientific Name
138	Spotted Sawtooth	*Prioneris thestylis*
	Family Riodinidae, Subfamily Nemeobiinae:	
139	Dark Judy	*Abisara fylla*
140	Punchinello	*Zemeros flegyas flegyas*
	MOTHS	
No.	**Common Name**	**Scientific Name**
1	Atlas Moth	*Attacus atlas*
2	Wild Eri Silk Moth	*Sania canningi*
3	Western Chinese Moon Moth	*Actias parasinensis*
4	Golden Emperor Moth	*Loepa spp.*
5	Large Pink & Green Moth	*Callambulyx rubicosa*
6	False Tiger Moth	*Dysphania militiaris*
7	Giant Uraniid Moth	*Lyssa zampa*
8	Spotted Swallowtail Moth	*Micronia aculeate*
9	Crimson speckled Moth	*Utethesia lotrix*
10	Blue Neochera	*Neochera marmorea*
11	Goat Sucker Owl Moth	*Erebus caprimulgus*
12	Green coat Slug Moth	*Parasa darma*
13	Veined Brown Slug Moth	*Scopelodes venosa*

Source: Field data verified by experts and from scientific literature.

Appendix 10. Fish of Sükhai CCA

S. no	Scientific Name	IUCN Red Data List Status
1	*Semiplotus semiplotus* (Bleeker,1859)	LR-lc
2	*Bangana dero* (Hamilton,1822)	LR-lc
3	*Neolissochilus hexagonolepis* (McClelland, 1839)	NT
4	*Puntius ticto ticto* (Hamilton,1822)	LR-lc
5	*Poropuntius burtoni* (Mukerji,1933)	LR-lc
6	*Tor putitora* (Hamilton,1822)	EN
7	*Tor tor* (Hamilton,1822)	NT
8	*Barilius barila* (Hamilton,1822)	LR-lc
9	*Devario acuticephala* (Hora, 1921)	VU
10	*Devario naganensis* (Chaudhuri,1912)	VU
11	*Raiamas guttatus* (Day,1870)	LR-lc
12	*Schizothorax richardsonii* (Gray, 1832)	VU
13	*Garra kempi* (Hora, 1921)	LR-lc
14	*Garra lissorhyncus* (McClelland, 1838)	LR-lc
15	*Garra naganensis* (Hora, 1921)	LR-lc
16	*Garra nasuta* (McClelland, 1838)	LR-lc
17	*Schistura manipurensis* (Chaudhuri, 1912)	NT
18	*Schistura nagaensis* (Menon, 1987)	VU
19	*Schistura prashadi* (Hora, 1921)	VU
20	*Schistura sikmaensis* (Hora, 1921)	LR-lc
21	*Lepidocephalus guntea* (Hamilton, 1822)	LR-lc
22	*Mystus bleekeri* (Day, 1877)	LR-lc

S. no	Scientific Name	IUCN Red Data List Status
23	*Amblyceps mangois* (Hamilton, 1822)	LR-lc
24	*Glyptothorax sinise manipurensis* (Blyth,1860)	LR-lc
25	*Glyptothorax spp*(Blyth,1860)	LR-lc
26	*Channa orientalis* (Bloch & J. G. Schneider, 1801)	LR-lc
27	*Mastacembelus armatus* (Lacepède, 1800)	LR-lc

Source: Kosygin & Vishwanath, 1998.

Legend

IUCN Red List categories:

CR-Critically endangered, EN-Endangered, VU-Vulnerable, LRnt-Lower Risk near threatened, LRlc-Lower Risk least concern, LR-cd-Lower Risk conservation dependent, DD-data deficient, NE-Not evaluated

Pictures

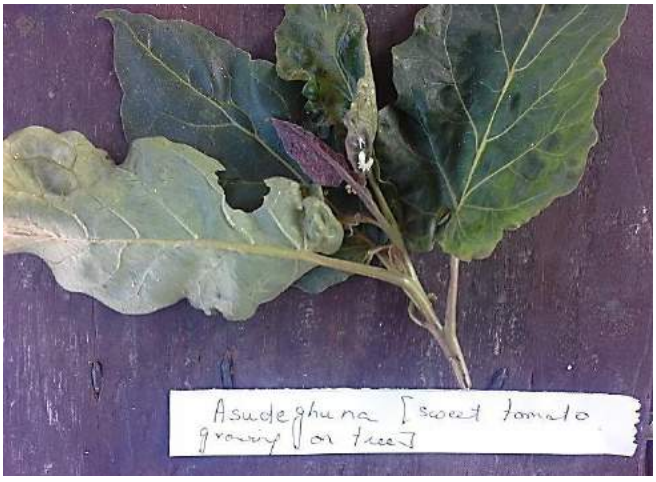

Photo 17. Documentation of Biodiversity in Sükhai CCA

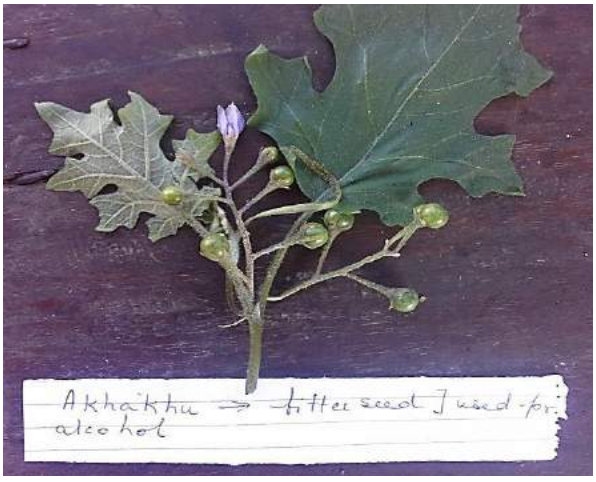

Photo 18. Documentation of Traditional Practices

Photo 19. River Tizü flowing on the boundary of Sükhai CCA

Photo 20. Lush Green Sükhai CCA on the right with jhum cultivation by Nihoshe village on the left of Tizü river

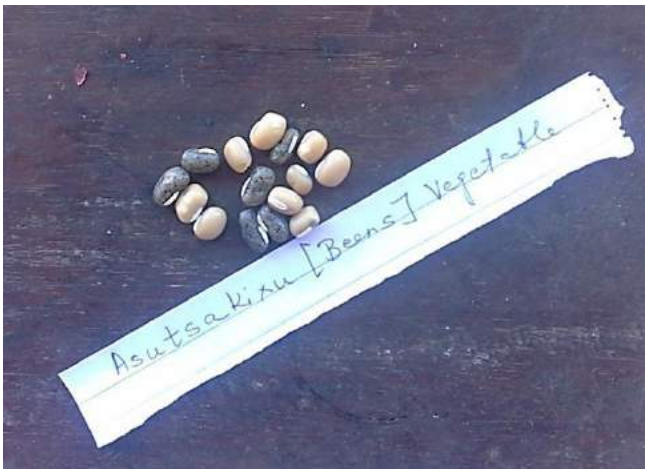
Wild Edible Plants and Crops

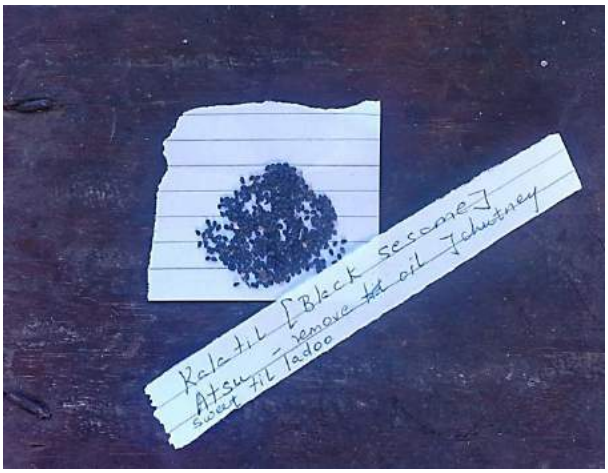


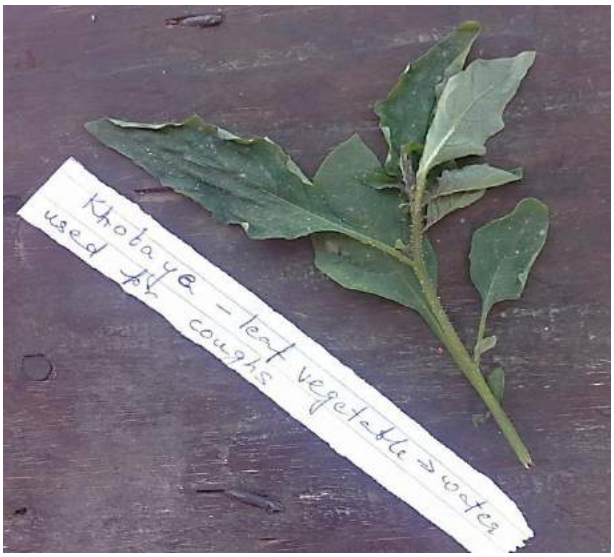



Asutsuna - [like lasuni] - vegetable
& pickle, chutney


Kadu petta [Ahamguniye] - pumpkin

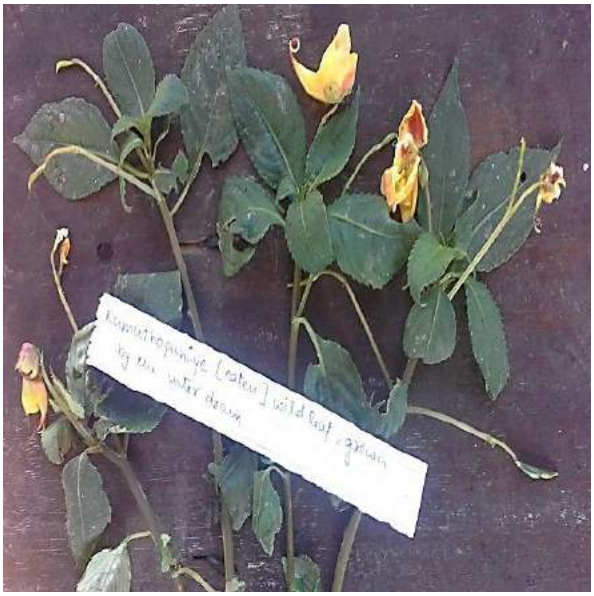

Asutsa Kixu [Beans] Vegetable

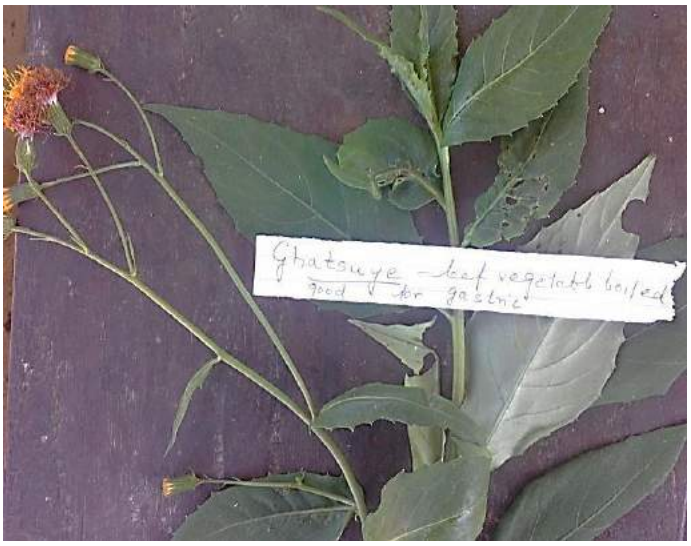

Kala til [Black sesame]
Atsu - Sesame oil Chutney
Sweet til Tadoo


Khotaye - leaf vegetable
used for coughs

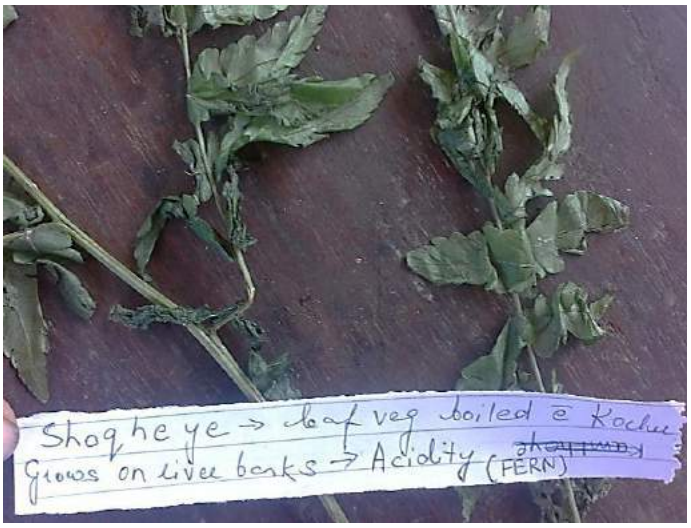

Akhushi - vegetable

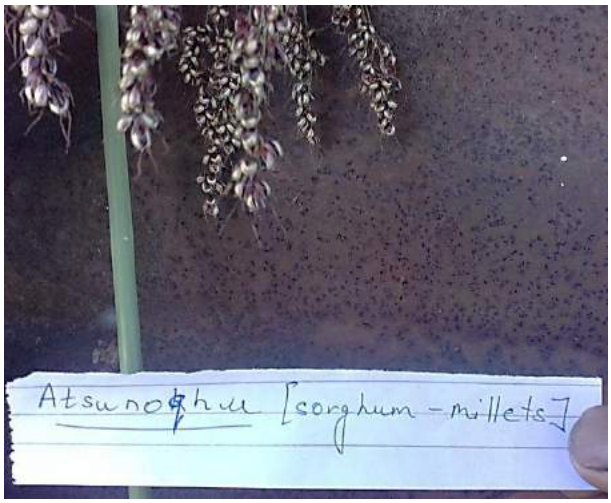

Natsunye - leaf vegetable & Seeds
as chutney




Ghatsuye – leaf vegetable boiled
food for gastric

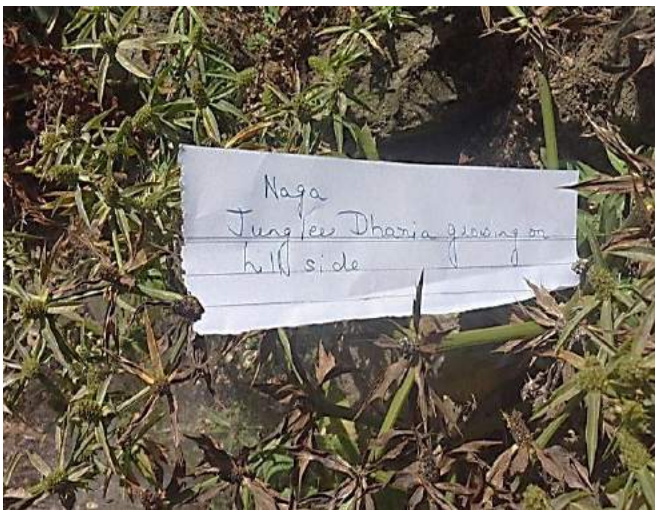

Khuuthi → Chutney or boiled
[Seed pods] raw [legume] ripe


Shoghe ye → leaf veg boiled & Kachu
Grows on river banks → Acidity (FERN)


Atsunoghu [sorghum - millets]


Naga dal Aikhu - boiled in leaves
(eg banana)
High in vitamins


Konathe [A type of bean] → cooked
or raw → like a dal or chutney


Naga
Jungle Dhania growing on
hill side


Kopi - leaf type of
cabbage


Ahagu [English]

A glimpse of the biodiversity recorded from Sükhai CCA- Mammals

Himalayan Black Bear

Barking Deer

Hoary Bamboo Rat

Hoary-bellied Squirrel

Goral

Sambar

A glimpse of the biodiversity recorded from Sükhai CCA- Birdlife

Eurasian Jay

White Throated Laughing thrush

Great Barbet

Slaty Parakeet

Kalij Pheasant

Bamboo Patridge

A glimpse of the biodiversity recorded from Sükhai CCA- Amphibians and Reptiles

Rhacophorus bipunctatus

Polypedatus spp

Short-nosed Vine Snake

A glimpse of the biodiversity recorded from Sükhai CCA-Butterflies

Spotted Sawtooth

Red Lacewing

Five-bar Swordtail, Bluebottle & Choclate Albatross

Paris Peacock

Yeoman deriving nutrients from dead crabs

Pallas' Sailer feeding on Wild Dog Scat

A glimpse of the biodiversity recorded from Sükhai - Other Invertebrates

Un-identified Scorpion

Nephila spp Spider

Earthworm

Damselfly- Stream Glory

Fishes

Crab found in a stream