Nagaland – A world of its own

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North Eastern region of India comprising the eight states of Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura is endowed with vast natural resources and has enormous potential for improvement. The strategic importance of the region along with its sensitive geopolitical location; extremely diverse nature of its population with different cultural, linguistic, religious, and historical background makes this region characteristically different from the rest of the country. In fact its diversity is so profound that the region may be called a mini India.

Nagaland is one of the eight states in the north-eastern region of India. Approximately, it lies between 25^0 6' and 27^0 4' latitude, north of equator and between the longitudinal lines 93^0 20' E and 95^0 15' E. Its state capital is Kohima and the tribes are **Angami**, **Ao**, **Chakesang**, **Sema**, **Chang**, **Khiamungan**, **Kuki**, **Konyak**, **Lotha**, **Phom**, **Pochury**, **Rengma**, **Sumi**, **Sangtam**, **Yimchungre**, and **Zeliang** as per schedule. The area of the state is 16, 527 sq.km. Population is 19, 88,636 and population density is 120 persons per sq.km. The literacy rate is 67.11%.

Nagaland comprises of a part of the hill ranges, which separates the basins of three major rivers- the Brahmaputra, the Chindwin and the Barak. There are around 1,317 villages in Nagaland. About 150 of these are located in the foothills, along the state's boundary with Assam in the west. The remaining villages are located on the top of ridges or on slopes, at altitudes of 500 to 2,500 meters above mean sea level. As a rule, people who exclusively practice the slash and burn method of cultivation prefer to locate their villages on the top of ridges and those with extensive mountain-slope paddy terraces prefer to locate their village on the slope. For the latter, the location of the village marks the boundary between forest land and cultivated land.

Nagaland has a total land area of 1,650,705 hectares of which about 1,450,000 is owned by the people in the villages. This means that a village which on an average has two hundred households has about 1,400 hectares of land that is about 7 hectares of land per household. Half of the land belonging to the villagers is under cultivation, including the fallow land under the slash and burn type of cultivation. The remaining is under various kinds of forests, with degraded and accessible forest land amounting to about half of this area. Hence the remaining forest land works out to an average of 350 hectares of land. The cultivated and the cultivable land are owned generally by individual families. Hence only about 5 percent of the families in the village may be landless. Whereas in Nagaland there is no incidence of tenancy or share cropping, but in a particular area called Jalukie valley and Dimapur, a system of share cropping has emerged in where the land owners are tribal and the share croppers are non-tribal's from Bangladesh or around Nepal. They do not have any specific unit to measure land.

Agriculture is the main occupation of 90 per cent of population in the state. Rice is the important food grain. Area under **jhum** cultivation is about 74,040 hectare and under terraced cultivation is 61,060 hectare during 1994-1995. The process of industrialization in the state is in its infancy but the need for more industries has been recognized. Minor irrigation works are mostly meant for diverting small hill streamlets to irrigate valleys used for rice cultivation. Some of the important festivals are **Sekrenyi**, **Moatsu**, **Tuluni** and **Tokku Emong**. All the tribes celebrate their distinct seasonal festivals with a pageantry of colour and a feat of music.

Like other inhabitants of the north eastern region, the Nagas too have their share of legend and folklore regarding their origin and evolution through the ages. Nagas are basically tribal people and

every tribe had its own effective system of self-governance from time immemorial. The present Nagaland was only a district called "Naga Hills" within the state of Assam till 1957. It was put under the administration of the Ministry of External Affairs with the nomenclature of Naga Hills Tuensang Area (NHTA) from December 1st 1957 to 18th February 1961. In the 12th and 13th centuries, gradual contact with the Ahoms of present day, Assam was established but this did not have any significant impact on the traditional Naga way of life. However, in the 19th century the British appeared on the scene and ultimately the area was brought under British administration. After Independence, this territory was made a centrally administered area in 1957, administered by the Governor of Assam. It was known as the Naga Hills Tuensang Area. This failed to quell popular aspirations and unrest began. Hence in 1961 this was renamed as Nagaland and given the status of State of the Indian union which was formally inaugurated on 1 December, 1st 1963.

Getting acquainted with the Naga tribes

There are sixteen tribes in Nagaland, each occupying a distinct area. Each Naga tribe has its own legend to give some indication of the course from which its migration took place, though some Naga tribes, such as the **Khiamungan, Pochury, Sangtam,** and **Chang** regard themselves as original inhabitants of these hills. The **Angami** (Ph.1), **Chakhesang**, **Lotha, Rengma and Sema** (Ph.2) tribes have common traditions and myths of origin, and thereby they are said to have originated from a single stock but later on got separated and gradually required separate identities after occupying distinct hill ranges.

Photo 1: Angami fellows with traditional dress

Photo 2-: Sema Girls with traditional dress

Gradually, after occupying separate eco-environmental zones, the smaller Naga tribes established permanent settlements. Some larger tribes, such as the **Ao** (Ph.3) and the **Angami** however kept on shifting their habitats during the initial stage by encroaching into the territories of smaller tribes. Later on economic compulsions forced them also to settle down in specific territories and to maintain solitary groups of Kins following the principles of patrilocal residence and patrilineal descent. The practice of village endogamy followed even today almost universally by all Naga tribes, big or small is a direct result of the reliance on descent principles (and prevalence of 'local warfare' in the Naga hills until the recent past).Under such circumstances almost each major village emerged as a "tribe". It is indeed well known that until the beginning of the century there was no clear recognition of any multi-village interacting ethnic entity and there never existed a wider multi-village political system among the Nagas. Each localized Naga tribe and a vague idea about the maximal limits of its tribal boundary. Besides 'self-name', each tribe was differently identified by its neighboring tribes. Here we see the ethnicity process at work at international level.

Ph.3: Ao Girls with Traditional dress

The **Phom** form yet another small Naga tribe. They are also known as **Kahha**. The **Phom** area always remains enveloped by clouds. The cloud in local dialect is called **Phom**. Thus these people came to be called as **Phom**. The **Pochury** who are the last group to be given recognition, form one of the smallest Naga tribes. Till 1987 they were the part of the **Chakhesang** Naga tribal category. The term **Pochury** is an acronym formed by amalgamation of letters derived from three place names- **Sapo**, **Kechuri** and **Khury**. The British described the **Pochury** as the eastern **Sangtam** or eastern **Rengma** interchangeably. The **Pochury** population is distributed in twenty-four villages. Unlike most of the Naga tribes the **Pochury** have some such clans, which have pan-tribal distribution. In the Meluri area the **Pochury** people had a monopoly over salt water, spinning, wooden work, leather work and stone work.

The **Rengma** are divided into two major territorial groups, **Ntenye** (northern) and **Nzong** (southern) groups. The **Rengma** occupy the spur of the ridge running from the **Nidzukru** hill to the Wokha hill. These two groups of the **Rengma** speak different dialects. The facts remains that one section of the **Rengma**, which had migrated to **Mikir** hills in Assam gradually, abandoned many aspects of the Naga culture and language. The **Rengma** in the past maintained certain institutionalized interrelationships at inter- village level mainly by arranging a special feast called **gwa-tho**. The **Rengma** depended on the **Lotha**, **Angami** and **Sema** for salt, but the former produced cotton in plenty and traded the same with the Angami. The **Rengma** have been famous as expert smiths and their spear heads daos were traded over the whole of the Naga Hills areas.

The **Sangtam** are also divided into two main territorial groups located in Chare circle and Kiphire subdivision of Tuensang District in eastern Nagaland, and speak two forms of same dialect. The **Sema** are one of the major and widely scattered Naga tribes of Nagaland. They are mainly concentrated in the Zunheboto District of Nagaland but their settlements may also be found in Kohima, Mokokchung and Tuensang districts, besides in neighbouring Assam.

The **Yimchunger** Nagas form a small community with their population being 22,054. This tribe is divided into three main sub tribes - the **Tikir Makware**, and the **Chirr** speaking different dialects. Endogamy at sub-tribal level is maintained in respective territories. Unlike the term **Zeliangrong** now increasingly being used by the members of three tribes, the **Zemi**, **Liangmei** and **Rongmei**, to identify and project themselves as a single ethno-cultural entity, the term **Zeliang** is used and recognized at administrative level in Nagaland. Thus the **Kabui** or the **Rongmei** tribe in Nagaland is separately recognized at administrative level. The fact that the **Zemi**, **Liangme**i and the **Rongmei** tribesmen who live scattered in distant places in the past, had broken the genealogical base and the moiety system of the **Zeliangrong** people in the long run. The processes of tribalisation, detribalization and sanskritisation have affected the **Zeliangrong** people in different habitats, in the hills and the plains in different degree.

It was **Jadoniang** who revive and reformed the **Rongmei** religion and started the heraka cult in 1925, by amalgamating the Zemi, Liangmei and the Rongmei. After his death, Rani **Gaidinliu** popularized this cult. Besides this cult the rituals like **nga-ngai** (and also **chaga**) provide a symbol and basis for tribal solidarity. Like **Zeliangrong** the word **Chakhesang** is also an acronym formed by letters derived from the names of three tribes. The **Chakhru** and the **Khezha**, who form the main ethnic segments within the **Chakhesang,** are linguistically and culturally close to the **Angami** proper or the **Tengima** (western Angami). These two tribes, located in Phek District, were called as the eastern **Angami** during the British period. The **Chakhesang** people do not form a single endogamous group. Endogamy continues to be maintained at the sub tribal level. The three tribal segments (**Chakhru**, **Khezha**, and **Sangtam**) live in their respective territories, speak their own dialects, and variously practice and follow endogamy and other institutional principles of tribeship.But the **Zeliangrong** are clan exogamy by the customary law. Occupying a particular hill range the **Zounuo-Keyhonuo** was markedly conscious of their tribal identity even in the historical past in a number of ways. The tribe was regarded by the people as the largest unit of internal peace. Killing of a non-**Zounuo-Keyhonuo** Naga was not regarded as a crime. It was rather admired. Outside the **Zounuo-Keyhonuo** territory lived tribes such as the **Chakhru**, **Kheza**, **Mao** and others, occupying their own territories, and maintaining their distinct identities.

Distributed in ten original tribal villages the **Zounuo-Keyhonuo** tribes' men regard their tribal territory as their ancestral land. They believe that their villages were established by the descendants of their tribal ancestors **Zounuo** and **Keyhonuo** who themselves had established **Kigwema** and **Viswema** villages respectively this believe is buttressed by the existence of a tribal genealogical chart linking the founders of all the villages of the tribe with the tribal ancestors on the one hand and connecting through moieties the numerous clans/lineages of each village within the same genealogical/segmentary (pyramidal) structure, on the other. The persistence of tribe depended indeed as much upon the conviction of the **Zunuo-Keyhonuo** people on this genealogical connectedness at maximal tribal level, as on their possession of common kinship, ritual, dialectical and cultural traits and oral traditions, besides their territorial affiliations.

Social institution in Naga society:

In the Naga society, elaboration of the descent groups provides a scaffold for organizing social relationships amongst the territorially divided social groupings, particularly the clans and lineages. In Naga society, there is no class or caste. Socially, a tribe consists of subdivisions called clans. These are strictly exogamous A Naga village may more appropriately be defined as a cluster of independent clans occupying distinct clan-territories. These clan localities had come to be described as khels during the British period. Each clan traditionally enjoys its autonomy in terms of its exclusive political, jural and economic rights over well-defined land and forest areas including water resources and fishing areas.A tribe is distinguished by its language, mores and customs. Each tribe tends to treat itself as a race apart.The patrilineal descent is the vehicle of continuity which provides stability to the Naga social structure. The social structure has its special ethical and moral values which enjoing a member to clearly recognize what is its own, what belongs to the neighbor and what belongs to the village as a whole.

The fact remains that rivalry, antagonism and blood-feud among the clans had colored the whole Naga way of life. This was more the case, however, in the pre-colonial and early colonial periods. It may be mentioned, however, that local warfare and head-hunting (Ph.4) portrayed only one aspect of the Naga life. There are evidences to show that under prolonged peaceful conditions and through friendly relationship among certain villages, strong socio-economic and cultural linkages and also trade relations were established among different Naga tribes even during the pre-colonial period.

Ph.4. Wooden Head infront of Moroong

Ph.5 **Khiamungan** Tribes as a symbol of head hunting

Among all Naga communities, t**he Khiamungan** (Ph.5) emerge as culturally, territorially and structurally the most coherent group. A moiety system divides the whole tribal population called mele into two moieties or kao groupings. These two moieties are named as **Lam** and **Shiu**. Each exogamous moiety is divided into a number of non-exogamous clans or **yasangla**. Special privilege; are accorded to these clans. Recruitment of priests and other politico-religious specialists from specific clans indicates a system of social stratification operating at village level. Each village has a chief whom they consider as the highest authority of the village according to their tradition and customary law. The chieftainship has been a characteristic feature of the Naga polity. The Naga village chief has a dual function as the religious and secular head of the village. As religious head the chief is the first man to sow seeds, (Ph.6) the first to plant and the first to harvest. The chief presides over all religious festivals and is the sole authority of the village affairs. The **Ang** of Mon and **Chui** have the sacred blood of the chiefs, pure and undiluted in their veins for which they marry from their own class to acquire the father's rank. Among the Naga chiefs the chiefs of the **Konyak**, **Sema** and the **Mao** were the most powerful ones. The **Ang** and **Wang** clans among the **Konyak** (Fig-7) enjoy highest positions in their respective villages. In terms of chieftainship and Angship the **Konyak** societies may be stratified into four categories: - i) **Jongwang** (ii) **Wangsa** (iii) **Wangsu** and (iv) Ordinary villagers. In administrative matters the **Jongwang** is assisted by the **Wangsa** and the **Wangsu**. An **Ang** may marry as many women as his wealth and influence permitted. But he has to keep one among them as principal wife. Children through principal wife enjoy higher positions and the son of such wife eventually the chief. The most characteristic feature of the **Konyak** chieftainship is the selection of the principal wife only from an **Ang** family of another village. The people in upper **Konyak** area have a republican type of tribal government. Among these people the clans are not arranged hierarchical as in **Mon-Chui** areas. Each Naga family, khel, village and area is well organized into a form of union, association, assembly which is called **Hoho**. Naga **Hoho** model means Naga peoples' assembly or parliament.

Fig-6: The Stone (**Kemevo tsu**) as Worship

Fig-7: **Konyak** Dance

The **Chang** tribe is divided into four exogamous clans **Kangshau**, **Ong**, **Hongang** and **Lamou**.According to their legend, it was the **Kangshau** ancestors who had emerged from the earth before all others. Hence the members of this clan are accorded the highest position in the village level stratification. The new villages are normally founded by members of this clan. The second position in local hierarchy is enjoyed by the members of the **Ang** clan. The chief priest known as **ongbou** is selected from amongst the members of this clan. The members of **Hongang** clan occupy the third position. The oldest member of this clan is regarded as a religious specialist whose duty is to announce the time and date for village festivals. The oldest member of the **Lamou** clan announces the date and time for launching agricultural activities. A direct link is established between the clan system and the system of political and religious domains among the **Changs**. These factors have provided shape to village political life. At the same time, a person with proven ability is given the status **lakpu** (the chief). The **lakpu** derived his position on the basis of his house with special marks. Only the **lakpu** may wear full ceremonial dress during festivals. When the **lakpu** becomes old he is inducted into the village council as arbitrator.The four major clans among the **Changs** are based on certain totemic beliefs. Thus the **Chang** relate that in the beginning, their ancestors, tiger and some other animals had lived together. Some of these animals have assumed the status of clan-spirits. The tiger and tigress are regarded as spirits by the **Ong** clan. The domestic and jungle cats, and birds like crow and eagles, are regarded as spirits among the **Kangsheu**, **Lemou**, and **Hongsang** clans.

The family is the basic domestic group among the Nagas. The individual families are clearly organized in their internal and external relations. They enjoy considerable autonomy within larger descent groups. Each family is a unit of food consumption and property ownership. This shows economic separateness and jural autonomy of every family. However in Naga society, it is expected of the father to work for the unity of the families of male siblings. A significant feature of the Naga kinship system is its patrilineal character. The right of son and are generally the same and both enjoy freedom of movement.Thus the Naga women enjoy almost equal status with men. The status of women is not same in all Naga patriarchial society. For example, **Sema** women enjoy more freedom and dominancy than the other tribes of Naga. They enjoy higher status in the house of husband. In matters of inheritance and succession, rights of men are not recognized to the complete exclusion of women. Among the **Zounou Keyhonou**, however, specific distinction is made between male and female agnates, in terms of their rights to distinctly recognized common clan or lineage properties, called **Kayle**. In general, however, the Naga ideal is to live together in unity, maintaining wider agnatic and cognatic kinship amity and solidarity.

A look into the food habits

The staple food of Nagas is rice. Most of them are non-vegetarian except if he/she is not allowed by doctor i.e. by compulsion not by choice. Meat is a part of their regular diet; it can be dried/smoked/fresh. Meat can be beef, pork or chicken. They eat mithun, dogs, cats, fish, spiders, birds, crabs, snails, insects, oysters, frogs, infact almost all living things except leech because of its spongy and elasticity. Even the elephant is eaten which is considered as a delicacy except Ao Naga. No part of animal is wasted, except shell, teeth bone, nail, horn and hair. According to them intestine and skin are tastiest part of meat. One important and good part of their diet is that they do not use spice and oil while preparing different dishes of meat or fish. Mostly they take boiled meat or vegetables with salt, chilly, local onion, local ginger and local leaf (wild tulsi). The style of cooking differs from place to place according to seasonal availability. They eat lots of herbs, and leaves of exotic plants. Use of animal fat is very common. Pork is favorite for some and dog meat for other. Milk and milk products are not included in their food and drinks.

Some of the herbs and vegetables (local wild) are very common like wild tulsi, wild brinjal, and tomato etc. (Ph.8). Some of the items preserved for lean and thin period by drying like yam, mustard leaf, wild cabbage and Naga etc. (Ph.9). Bamboo shoot is also preserved for 3months to

one year, by indigenous method like, outer covering of shoots shuold be cleaned by slicing and washing with water and the inner part of shoots sliced into smaller pieces and the kept in airtight container with water. They preserve meat by drying and smoking, by hanging on chullah in kitchen. When the fresh meat is not available they cook pieces of smoked/dried meat with vegetables and eat. Bamboo shoot has 2nd position among the food items after meat. They eat it with fish, dried or fresh meat. Preserved bamboo shoot is available in the local market. Besides that, all the aforementioned meat, deer meat, field mice, wild boar, creepy crawlies, hoppitty- hops and snakes also available.

Ph.8: Wild (Naga) tomato

Ph.9: Dried Nagadal

Certain items are considered as taboos by the Nagas either because they are impure or because they are suspected to transmit their characters to the consumers. Most of the restrictions are related to women but is relaxed in respect of old people. Women are not allowed to eat monkeys lest they became extravagant. Pregnant women are not allowed to eat bear, a symbol of stupidity, because of the fear that the child borne will be stupid. The tiger and the leopard are not taken because of the old belief that man, tiger and leopard were all brothers at the beginning of creation. There are some special items given to women just after delivery. Cat's meat, which is given the first preference, pork, chicken, crab along with rice water (the extracted water after cooking of rice). Meat is taken without any spices. It is boiled in water and salt is added to it. For newly born baby, the rice water with honey (rice water-extracted water after cooking rice) is provided. One of the special items in their occasions and festivals is dry rice (special variety of rice fried by oil).These type of items vary from tribe to tribe. Meat(pork/beef) is special item for presenting as a gift in wedding and even funeral (Ph.10). Sharing of drink and meat are the most common items for festivals/occasions.

The common drinks of Nagas are tea and rice beer. Drinking of rice beer is very common. It is especially drunk by almost all the Naga tribes either as **Zutho** or **Ruhi** or **Madhu** or **Yi**. A guest is first welcomed by this wine/rice beer. They consume it during festival, special occasions, even in daily diet, in field or at home (Ph.11). Three drinks common are **Zutha**, **Ruhi**, and **Dzutse**. When the **Zutho** becomes strong it is called **Okhe**. It is nutritive in content and if hygienically prepared is a desirable drink. It is taken by all, including the youngsters. Even the drink is kept inside the coffin along with other food items (meat & others) and his belongings.

Ph.10: Beef as a special gift for wedding

Ph.11: A Naga dish with rice beer in glass

Drinking of wine (local) from wild fruits like passion fruit, wild guava, wild apple, wild banana etc is also observed. The hardness of drink (rice beer/ wine) depends on the duration of preservation of and concentration. Beer is made of cooked rice (sticky) + boiled millet powder+ ½ cup of paddy powder (for 2kg of rice). Following are the types of beer along with the local rates.

- Rice beer (best quality) Rs 35-50/- per lt.
- Rice beer (medium quality) Rs 20-35/- per lt.
- Rice beer (low/ light quality) Rs 15-20/- per lt.
- Wine (passion fruit) best quality Rs 70-90/- per lt.
- Wine (passion fruit) medium quality Rs 50-70/- per lt.
- Wine (passion fruit) low quality Rs 28-50/- per lt.

Other items of wine are not so costly, people prepare themselves in the house.

Drinking of fruit juice also is very common in Naga tribes. Name of some common fruit juice (wild) are:-

- Grape juice – **Khube dzü**
- Bell juice – **Bel dzü** (passion fruit)
- Banana juice – **Teffe dzü** (Ph.12)
- Naga apple juice – **Chephoushi dzü**.
- Gooseberry juice – **Khulushi dzü**
- Pine apple juice – **Anaras dzü**
- Peach juice – **Zarsii dzü**
- Plum juice – **Plum dzü**

Ph.12: Banana Juice (Okhushedzü)

The Nagas are very much fond of chillies in the form of chutnies. Naga chilli (Ph.13) is used not only for chilly pickles, but also for beef and pork pickles.

Preparation of different type of pickles

- Chilly pickles – Chilly + Salt+Ginger+M.Oil
- Beef pickles – Boiled beef+salt+Chilli(Raja)+Plain chilly
- Pork pickle – Boiled pork+Salt+raja/Naga chilli+Plain chilli

Ph.13: Naga chili/raja morich/jolokia

Wild fruits (dried form) which are found abundantly are costlier than fresh fruits. Wild apple (100g) packet is Rs.5 to 15. Some of the family depends on wild fruits, wild vegetables and wild honey as the source of income. Some of the regions like pfuchema in Southern Angami, Jotsoma from Western Angami area very famous for honey like **mima** which are sold @ Rs.200/kg. Selling of bee with beehives in market is also another source of income. The larval and pupa stage of the honey bees are considered as a delicacy. Many of the people earn from different types of orchid plants from forest. Collection of small bamboo variety is done which is used for making broom, fishing stick etc.They have lot of medicinal plants which are either grown in kitchen gardens or found in the forests. Most of them are totally dependent on herbal or indigenous medicine for common ailments. The names of the medicinal plants used by the people along with their scientific name, parts used and nature of diseases cured are given below.

Some of the indigenous food items are:

- **Anüshe (colocassia) leaf biscuit**

Anüshe is an ethnic food item of **Ao** Naga Community under Mokokchung district of Nagaland. It is used as apetisu and also for use during lean period when the availability of fresh leaf is less. For preparation, large quantity of colocasia leaves is required. The leaves are collected and kept for some period till they become yellowish. The ribs of the leaves are excluded for the preparation. After this the leaves are pound nicely till they are made into paste. The pound paste leaves are then wrapped with banana leaves in which small holes are made in the bottom part. This is then placed in one place, over which a heavy object like stone is kept for about 3 to 4 hours to drain out juice. Thereafter, it is transferred to the metallic plate, which is placed over the fire. Ash is spread over the metallic plate before placing the wrapped colocasia leaves over it. Heavy objects are again placed over it and time to time it is turned over. After a few hours, it is ground again with addition of dry chili, salt and spices. Some people do not add anything. This paste is again made into biscuit form, having a diameter of about 2 inches, for drying over the fire. The taste is better if dried quickly. Hence people go for overnight drying.

Preparation in powdered form: Dried Anüshe is heated in a pan with continuous stirring and then pound in large mortar into powder. Cooked smoked meat, dry chili, salt and other local species are added to it and ground again. This can be taken as such with rice. This ethnic food has very good market value, costing Rs 160–180 per kg and has been in practice since time immemorial by almost all the **Ao** Naga community.

- **Grasshopper as food item**

Grasshopper as food item is used by the people of Phek, Kohima and Dimapur districts of Nagaland. Grasshoppers are usually collected after the harvest of paddy, especially at night, with the help of torch light or lamp. This is a seasonal food item which can be collected only after the harvest of paddy. The wings and stomach of the insects are removed and it is washed with clean water. It is then fried in vegetable oil with the ingredients like ginger, garlic, chili, salt, oil, onion, fermented bamboo shoot etc. Water is usually not added and it is cooked dry. It can be collected from field and also can be purchased from market. The risk factor is that, some people are allergic to grasshopper. This practice has been followed by almost all the people in the village since time immemorial. The dried grasshoppers are crushed with chilli in the form of powder for longer preservation and value addition as apetiser.

- **Snail**

Snail as a food item is consumed by almost all the Nagas but it is more popular among the tribes of **Chakhesang**, **Angami**, **Rengma** and **Zeliang**. This is considered as a special food item and by some poor families as a substitute of meat. Not all the species of snails but only a few species, which are found in terrace fields and fishery ponds, are edible. Usually two species are consumed; one has elongated shell and the other with round shell. The fleshy part is eaten. The snails are collected from one's own terrace fields and ponds or can be purchased from market. The materials used in the preparation of food item are snail, salt, chili, tomato or fermented bamboo shoot, vegetable oil etc. The shell of the snail is washed properly with the help of a brush. The operculum is removed and the other pointed end is cut with a knife. After proper cleaning it is cooked according to desire. It can be cooked along with meat, especially pork or fried with vegetable oil. Another method of preparation is with fermented bamboo shoot. After cooking for about 45 minutes it can be served. Almost all the farmers, except a few who do not like it, consider snails as a special food item and have been practicing this since time immemorial.

- **Fermented til (sesame) seed and crab**

This ethnic food preparation is popular among the **Rengma** Naga community under Kohima district of Nagaland. In this practice til seeds are cleaned and pound into paste to which crabs are added in a proportionate quantity and crushed again. After proper pounding it is taken out and kept in a container for fermentation. It takes about 2 days to ferment in summer and a little longer period in winter. After proper fermentation, it is wrapped in banana leaves and placed over fire for drying or it can be buried under hot ash in the furnace for some time till it gets cooked. Now it can be used for preparing **chutni**/pickle.

- **Preparation of chutni/pickle**

Green chilies and tomatoes are placed over the burning charcoal for sometime and then taken out and ground in a mortar with a pestle. A particular species of local onion, called **anasi** or **khurie** in **Rengma** and **Tenyidi** dialect, respectively is also added to it and crushed. Small quantity of fermented til seed and crab is added and mixed properly. Salt is added to taste and is ready to serve.Til seed are readily available in the house or can be purchased from the market. This has been practiced by almost all the people of **Rengma** Naga community since time immemorial.

- **Use of indigenously prepared fresh and dry fermented bamboo:**

The fermented bamboo shoot, both wet and dry form, is an indigenously prepared food item, used mainly by **Rengma**, **Lotha**, **Angami**, **Zeliang** and some other tribes of Nagaland. The product is used as taste-maker in the food preparation and also some people believed that this neutralizes the

effect of poison or toxin in any food item, when cooked along with it. Onset of monsoon initiates the new growth of bamboo shoot. Soft and succulent shoots (top) are harvested and sliced or crushed to pieces. It is then kept in airtight containers, preferably plastic/wooden/glass for fermentation. After 30–35 days, it becomes ready for consumption as fresh-fermented bamboo shoot. For dry bamboo shoot, fermented fresh shoots are dried on a clean woven bamboo mat/plastic sheet under the sun, which is kept away from domestic birds and animals to prevent it from contamination, as it is directly consumed without further washing/cleaning. The dried shoots can be stored/kept in any container for use. The product can be stored for very long period, if stored properly. No preservative is required for its preservation. This is practiced by every family in the village for time immemorial.

- **Dry gooseberry/amla as mouth refresher**

This is practiced in villages of Medziphema, Chumukedima etc. in Dimapur district of Nagaland .The practice is to preserve gooseberry for off-season. For preparation, gooseberry or amla is boiled in a container in water. Seed or nut is removed and the fleshy portion is broken into pieces. These pieces are taken into a container and sugar is sprinkled over it. If gooseberry is 1 kg, 400–500 g sugar will be required. Then the container is covered with lid. After 3–4 days, sugar gets dissolved and the juice is taken out and can be used as drink. This juice helps in controlling blood pressure and stomach problems. The pieces of gooseberry will be dried nicely in the sun (keeping these pieces over a paper). When it is dried, it can be packed in small polythene bags and can be stored for about 8–10 months. These gooseberry pieces are used as mouth refresher and appetizer also. It is eaten at any time.This product is believed to have therapeutic value in controlling blood pressure as well as stomach problems. The product is packed in small polythene bags and is sold in the market through which one can earn money. An average 25 farm families in the village use the practice which is in use for the last 50 years. The reason for non-use of this practice is due to non-availability of the material i.e. gooseberry. Some farm families prepare pickle with gooseberry as another product. In this method, chilli and salt are added and boiled. It is then dried well under the sun.

- **Bamboo shoot as food item**

This is a food item for the people of Nagaland, Manipur, Arunachal Pradesh and Meghalaya. Young shoots of bamboo are collected and the outer coverings are sliced out. The inner soft part is taken which is then sliced into smaller pieces. The sliced shoots are kept in a basket and then covered with banana leaves. It is then kept for 2–3 months after which the liquid portion is drained off. The remaining sliced shoots are packed in an airtight container. This can be preserved for years together. Young tender shoots are also taken as such with other food items. This product is used for preparation of different curries, as preservative in pickle and supplement of tomato during off season. Decoction of the shoot, when taken with teaspoonful of honey once or twice a day cures respiratory disease.This practice is followed by all the people of Nagaland and Meghalaya for about 100 years.

- **Ngüghü, a dried fermented mustard leaf**

Ngüghü is dried fermented mustard leaf, which is used as taste maker in preparation of different varieties of local delicacies. This is a popular food item in Nsünyu, Khontsünyu, Tseminyu etc. in Kohima district of Nagaland, which is gaining popularity even among other tribes. This is usually prepared during summer season, where mustard leaves are harvested from mixed farming with paddy. For preparation, a pit of about 2–3 feet deep and 2–3 feet wide is dug. Then it is covered properly with either **athama** or **amejan** leaves both at the bottom and sides. Mustard leaves are washed and kept under the sun for some time to reduce the moisture content. Then the leaves (mustard) are placed in the pit nicely, so that minimum air space is maintained in pit. After this, the

mustard leaves are covered at the top with either of the two leaves used. Lastly, it is covered with earth making it airtight and raised from the surroundings so that water lodging does not take place. After about 3 weeks, mustard leaves get fermented and are removed from the pit and dried in the sun. The materials used for the preparation is locally available. Fermentation period should be monitored carefully so that spoilage is reduced to the minimum. The practice has been in use since time immemorial by almost all the farmers in the villages. A slight modification has been made by some farmers by using large polythene bags instead of athama or amejan leaves for covering the mustard leaves.

- **Ziegi-tsang dui as food item**

Zeigi-tsang dui is a decocted semi-liquid of mustard leaf which is prepared in Poilwa village in Kohima district of Nagaland and is popular among the Zeliang tribe of Nagaland. Mustard leaf, cooking vessels, airtight container and fire woods are the materials required for preparation of this food item. Mustard leaves are washed properly and dried in the shade for about 3 days till the leaves turn yellow and grinded in paste form. It is then kept in an airtight container with water for fermentation for a week. The paste is then squeezed to get the juice. The juice is then boiled in a cooking vessel by continuously stirring and removing the froth into a semi-liquid form and it is then preserved in a bamboo cup. It could be preserved up to 2 years if properly covered. This practice is being followed by all the farmers in the village for more than 100 years. Materials used in the preparation are locally available.

The natural resources of the state

Land

Individual ownership of land was absent in Naga society. The land was classified as either clan land or village land. Even today some follow their traditional land holding. All clan land will be village land but all village land will not be clan land. Only those who are very rich purchase land. And that's how private or individual ownership came into existence. But that land should be permitted from the seller party's clan members. Till today they don't have any specific measuring unit for land or any given area. To measure the land they have some kind of boundaries (demarcated area) through laws which is called customary law. Customary law is very strong among all the Naga tribes, be it in Nagaland or Manipur (**Tankhul**/**Zeliangrong**) or Arunachal Pradesh. Transfer of land is going on from generation to generation. The land is divided among the sons and not the daughters. The ownership differs from community to community among the Naga tribes. For example among the **Ao**, **Sema**, **Lotha** etc. the first son of the family owns the main share of the land but in Angami tribe, the youngest son gets major part of the property. Though the land can be used for cultivation, they lack the authority to sell, lease or deal with any monetary work of the land. They have specific land for cultivation either for Jhum or terraced cultivation.

With regard to land, they follow some rules and regulations which include:

1) For purchase of land by any person, he needs to consult with other members of the clan. It is only after the consent granted by the other members of the clan that the land can be purchased.

2) For share cropping and shifting cultivation they do not have specific tenure. They shift from one place to another depending on the variety of crops, types of cultivation.

3) An individual cannot take his sole decision regarding share cropping. It depends on other members of the clan.

4) All the members of the clan participate for lease to land or any monetary decisions by all the members of the clan.

5) The benefits whether to be shared by individual or all the members depends on the decision taken by the clan members.

6) Clan fund is used for purchasing of land. All the members of clan contribute equal amount of money and that money is used for purchase of land which will be called as clan land.

7) Restricted forests are not allowed for cultivation and any other purposes. They have specific forests for fuel or furniture / constructive purposes.

8) (i) An important rule is that forest products can be sold but not forests. They are of the belief that forests are their traditional property/right and should be preserved. And for this reason, the percentage of forest land is more than in any other areas. They feel that the sale of forest is giving away their tradition/identity.

(ii) If any one migrates from one place to another he need to donate his share of forest land to other members of the clan but the sale of forest land cannot be done.

(iii) If anyone in the clan wants to sell land for need of money in time of emergency, he should make known his problem to the other members of the clan. The members of the clan will try to solve the problem by themselves without the involvement of any outsider. The land is either purchased by an individual or a group of members in the clan.

(iv) Plantation in forest with clan to clan or any others, there should be agreement for tenure and monitory benefit or products. Everything will be decided by the members of the clan not individually.

(9) For any land dispute or other problems that arise in clan will be solved by clan members; for inter clan, the Village Council Chairman. But inter clan affairs from Village Council will again come to clan members to make situation normal. The punishment will be shared by the other members of the clan for inter clan affairs.

Land use:

Land use	**Area in '000 ha**	**Percentage**
Total geographical area	1,658	
Reporting area for land utilization	1,538	100.0
Forest	863	56.11
Not available for cultivation	61	3.97
Permanent pasture and grazing land	0	0
Land under misc. tree, crops & grove	129	8.39
Cultivable wasteland	70	4.55
Fallow land other than current fallow	85	5.53
Current Fallow	105	6.83
Net area sown	225	14.63

Source: Land use statistics – At a Glance 1996-97, Ministry of Agriculture, GOI, 2000

Forests of Nagaland:

Though Nagaland is a small state, it has been endowed with a wide variety of forest types on account of its unique geographic locations and wide range of physiographic terrain obtained in the state. Forest occupy an area of approximately 8, 62,930 ha, of which government forest account for 11.7%. The private forests vested with the villagers are being haphazardly, unscientifically exploited without taking into consideration the future supply.

ShiftingCultivation:

Shifting cultivation is widely prevalent in the state. In a study undertaken by the FSI, it is estimated that an area of about 0.39 ha has been affected by shifting cultivation during 1987 to 1997. The area currently affected by the activity is estimated to be 0.17 million ha.

Forest Resources:

The recorded forest area in the state is 0.86 million ha, which is 52.05% of the geographic area of the state. An area of 88.36% of the recorded area is under private control and the rest under State Govt. Reserved, Protected and unclassed forests constitute 1%, 6% and 93% respectively. The forest types found in the state are Tropical Wet Evergreen, Tropical Moist Deciduous, Montane Wet Temperate, and Sub Tropical Pine Forests.

Protected Areas:

There are 3 wildlife sanctuaries and 1 national park in the state. The total area under protected area network is 22,643 ha, constituting only 1.37% of the geographic area.

Forests in villages

There are 1,216 villages in the state of which 669 villages have forest as land use. The total forest area in these villages is 0.49 million ha and the population of these villages is 0.53 million. The villages having less than 100 ha, between 100-500 ha and more than 500 ha forest in each village constitute 53 %, 27% and 20% of the total villages, respectively. The Table given below provides a classified account of villages by forest area and population.

Forests as land use in villages:

Forest area	**No. of villages**	**Total Forest area (ha)**	**Population**
Less than 100 ha	354.00	9,725.00	215,962.00
100 - 500 ha	183.00	49,974.00	139,162.00
More than 500 ha	132.00	430,855.00	176,161.00
Total	669.00	490554.00	531285.00

Joint Forest Management:

Joint forest management was initiated in 1997. A total of 55 Community Forest Committees are managing an area of 650 ha. In Nagaland, more than 85% of forests are privately owned. In private forests, the forest department shall be funding agency and shall realize prevailing royalty at the time of harvest. The land owner shall not utilize such areas for non-forestry purpose. In Government forests, the forest department shall be funding agency for all the forestry works and shall have 80% of the forest produce and the remaining 20% shall be given to the participating communities.

Forest Plantations:

Forest plantations are mostly done in areas affected by shifting cultivation. The common practice of creating plantation is to identify a micro project area of minimum 30 ha and divide it into, a more or less equal number of annual coupes. Important schemes of afforestation are tree cultivation under JFM, area oriented fuel and fodder project, afforestation of special sites, afforestation in eco-sensitive areas. There has been no plantation during 1997 to 1999. Plan-wise progress of plantations and breakup of species are given as below.

Forest Cover:

The forest cover based on interpretation of satellite data of Dec, 1998 is 14,164 sq.km. which is 85.43% of the geographic area of the state. The extent of dense and open forest has been assessed as 5,137 sq.km. and 9,027 sq.km respectively. A decrease of 57 sq.km. in forest cover has been observed in the present assessment compared to the previous one. The difference between the data periods of the two assessments is about 4 years.

The decrease of 1,707 sq. km. of open forest is on account of conversion of 1,475 sq.km of open forest to dense forest, 3 sq.km to scrub and 235 sq.km to non forest. The decrease is also associated with conversion of 4 sq.km. of dense forest and 2 sq.km of non forest to open forest.

Conservation of the natural resources by the localites

About 85% to 90% of land in Nagaland is under community ownership. Originally, the Nagas were head hunters and food gatherers. They have land for shifting cultivation, settled cultivation and forests reserves to meet food, vegetables, medicine, fruit, fuel, timber and other requirements. Wild meat is an integral part of tribal culture in Nagaland. Indigenous gun for hunting is present in almost every house. Degrading of forests and high rate of hunting has led to a quick decline in the population of wild animals, density of orchids, wild medicine, fruits (wild products). Inspite of some student organization and village council adoption of rules to prevent the collection of any wild products, people do not follow the rules. But it has been observed that the people of Khonoma village have accepted the wild life protection act. They have formulated rules and regulations for the management of the Khonoma sanctuary and ecosystems. The villagers do not destroy the forests and its products for which Khonoma has been declared as “Green village”.

Indigenous agricultural practices are based on scientific knowledge of plants, conservation practices and land use systems, for e.g. the Alder (*Alnus nepalensis*) based sustainable cultivation practices of farming community in Nagaland. Alder tree stumps which are over 100 years old can be seen in the swidden fields of the Angami Nagas. This nitrogen – fixing tree is pollarded, usually after 4 – 6 yrs, following the jhum swidden cycles of 2 yrs cropping and 2 – 4 yrs fallow. Wood is used for domestic needs. Some part of the leaves are used as medicine to stop bleeding and rest of leaves is left in the fields to enhance retentions of moisture of the soil, to add humus to soil and as

mulching material. To great extent, all practices relating to propagation, pruning, harvesting, protection against insect pests, storage and drying of fruits, practices of maintaining soil fertility and animal husbandry were mostly traditional.

They have taboos as well as rituals related to conservation of forest, wild products, the ultimate objective of which is the conservation of ecosystem. For e.g. **Angami** people as a team of young girls and boys go and collect bamboo (small and thin)and broom grass from the forest for chasing chicken, fishing and sweeping purposes before Sekhreni festival, which indicate they do not disturb the forest all the times.

Conservation of:

i) Soil & water:

a) A form of bamboo fence (called **Tempale**) is erected (especially in the slope) to prevent the top soil and fertile soil from being washed away by rain. A sort of small stones and logs (small) are placed hither and thither or wherever necessary to check soil being carried away by rain.

b) Trees are planted, especially in the sloppy areas to hold soil and thus prevent soil erosion.

c) Adopted terrace cultivation to prvent soil erosion.

ii) Conservation of crops:

a) Paddy

Paddy, after harvest are collected and kept in a very big container made of bamboo called **Mosem/Okhi** which has a capacity of 200 – 250 bags **(Moluk)**. A kind of funnel shaped structure called **Tsukbong** is kept in the middle of the container so that air is allowed to circulate inside the container and thus prevent the paddy from getting spoilt/rot, in Angami areas they use net type structure as innerwall of the **okhi** made of bamboo for the same purpose as like **Ao** tribe and they cover with orha and the join between grannery and orha (lid) they plaster with mud to prevent from insectss. In this way paddy is kept throughout the year without being spoilt. Thus about 5 – 7 bamboo containers (**Mosem/ Okhi**) are kept in a special hut meant for paddy called granary which is constructed at a distance away from residential house in **Ao** houses but in **Angami** houses they keep granary in front of the drawing room or both side of the main door to show their socio-economic status. Moreover in Angami areas outsiders are not allowed to touch their granary.

b) Maize

Maize after harvest are tied in a bunch and hung in the open air usually away from fire i.e., dry and airy place. But in **Angami** areas they hung in the kitchen for eating and sowing (seed) purposes. In this way, they can be kept long till the next season.

c) Naga dal and other cereals.

After harvesting, these are stored in a light container usually made out of bamboo. These are stored in the container and are made use throughout the year.

iii. **Conservation of vegetables**.

a. Bamboo shoot

Bamboo shoots after collection from the forest can be preserved in different ways.

i. *Liquid form*: Bamboo shoots are crushed and made into paste. After that they are wrapped lightly in a banana leaf and a stone is placed over it so that by its pressure/weight, the juice present in the bamboo are drained well and collected in a container placed below it. The juice is stored in a bottle or big bamboo in an air tight condition. It is used in making different dishes.

ii. *Solid form:* The remaining solid form i.e. after the juice has been drained properly it is stored again in different container and is kept throughout the year. It is considered as one of the special food item among Ao Naga in particular and also Naga in general.

iii. *Dried form:* The solid form is again dried in the sun properly and stored in container. It is used throughout the year without being spoiled.

b. Yam

i. Yam bulb: After harvested, it is kept in the open cool, dry place so that moisture is removed from the bulb so as that it does not get spoiled.

ii. Yam stem: Stem is cut into pieces and dried properly and kept in a bamboo container.

iii. Yam leaf: Leaves are collected and cut into small pieces, dried and stored in an indigenously made pouch made out of palm leaves.

c. Sweet potatoes: After harvest they are kept in cool, dry place and are utilized throughout the year.

d. Gooseberry: After collection, they are boiled with little salt and dried after which they are stored in a container.

e. Chilley: After harvesting they dry and wrapped with banana leaf and hung inside the chullah and use through out the year.

f. Conservation of cho cho (squash):

Tankhul, Angami and other community of Naga tribes in order to conserve cho cho, dig pit whose length and width depends on the quantity of cho cho to be conserved. The depth is usually ¾ meter. The cho cho is kept covered with earth. By this indigenous method, cho cho remains fresh for 6 months to 1 year.

iv. Conservation of forest/ Ecology/Ecosystem:

Though in olden times, the people were not aware about the conservation of ecology or ecosystems, they did have a sense of how to preserve the forest and ecosystem indirectly. For e.g. the villagers were restricted to cut trees without proper reason, and if they were found guilty of cutting trees they were punished by different means. And that is how they have come to know the importance of conservation of the ecosystem though not in direct manner. Permission has to be sought for fishing and other aquatic products from the local authority. Generally permission is

granted to the groups rather than a single person alone so as that the share is among a larger number of people.

Some indigenous practiese followed in the state

Indigenous knowledge refers to the long matured knowledge, which is unique to a given society. Its importance lies in the facts besides others that they are cost – effective, eco- friendly. The indigenous practice of the people has been mentioned under different themes.

Horticulture:

- **Integrated cash-crop plantations**

The farmers of Koio village under Chukitong block in Wokha district of Nagaland practice a suitable cultivation as an alternative to shifting cultivation for higher return by taking up a few cash crops on the same plot of land as an integrated cash crop plantation. Here the farmers have selected large cardamom as the main crop, and the boundary of the plantation is being done by planting **tung** (*Aleurite montana*) They grow oil seed crop on the boundary. The passion fruit is grown as the fencing crop around the main crop plantation area. The plantation pattern is as indicated below:

Crop : Large cardamom

Planting season: May to July

Spacing : 6'×6' or 5'×5'

Gestation : 4 years

Time of harvest: August to October

Yield : 5 to 12 q/ha

Crop : **Tung** (*Aleurite montana*)

Planting season: March to April

Spacing : 20' to 20'

Gestation : 4 years

Time of harvest: December

Yield : 70 to 100 kg/tree

Crop : Passion fruit (*Passiflora edulis*)

Planting season: April to June

Spacing : 15' to 20'

Gestation : 2 years

Time of harvest: July to September

Yield : 200–300 fruits/tree

The main purpose of this practice is to maximize income and also to reduce the practice of shifting cultivation, which is affecting the soil fertility in Nagaland. Now almost all the farmers have adopted this practice and are in use since the last 20 years.

- **Use of common salt to improve shelf-life of Jahaji banana:**

This practice is followed by the farmers of Nsünyu village in Kohima district of Nagaland. The practice is to improve the shelf-life of **Jahaji** banana and also to get yellow, ripened fruits, which is normally green even if fully ripened. A small hole is made in the main stalk of the matured banana and a little quantity, about a teaspoon full of common salt is poured into the hole. It is then kept in the corner of the house for ripening. The salt gets absorbed and is distributed to every part of the banana and thereby improves the shelf-life.It has a good effect as the shelf-life can be increased to some extent and also the colour of ripened banana can be turned yellow, if so desired. About 50% of the farmers in the village follow this practice and the practice has been in use since 15–20 years.

- **Use of smoke for banana ripening:**

In this practice, the farmers of Chumukedima, Medziphema, Sethikema and Sovima in Dimapur district of Nagaland use smoke for ripening banana especially during winter season. A pit is made so that it can accommodate the matured green bananas. Bananas are kept in the pit. It is then covered by a tin sheet. Only one small hole is left from one side of the pit. At the opening of hole, some dry and green leaves or twigs are burned to push smoke into the pit. When sufficient smoke is produced, the hole is closed by wet soil and tin sheet and the sides are closed with wet soil. Again in the next day, the hole is opened and smoke is produced by burning leaves and twigs. The process is done for 2–3 times. Every time the pit is to be closed with wet soil. The rationale behind this is that smoke in the closed chamber produces heat as well as ethylene gas which is a ripening agent for banana. Within 4–5 days, around 30 bananas get ripened. But care should be taken not to allow the banana to be over ripened, which happens if the pit is not closed properly and not opened after 4–5 days. This practice has a good effect because the taste of banana is not affected unlike the case of calcium carbide. The practice is in use for a long period by about 80% of the farmers. As an alternative method, some farmers, after harvesting fully matured bananas, wrap it in jute bags and keep it over the fume of chulhas (i.e. about 4–5 ft height). Some make a stand over the chulhas. No additional labour is involved, but it takes more time to ripen bananas.

- **Use of Albizia leaves for faster ripening of banana:**

In this practice, for faster and better ripening of bananas, the farmers of Nsünyu, Kontsünyu, Tseminyu and neighbouring villages in Kohima district of Nagaland use *Albizia* leaves locally called **Ameghon**. The practice is that leaves of *Albizia* are collected and kept in an empty carton or wooden box or sack. Then the bunch of banana is chopped off from the main stalk and placed inside. After this, it is wrapped properly and kept for ripening. In about 3–5 days almost all the bananas will be ripened. The colour of the ripened banana is much better than by other methods. This method takes less time for ripening. Different varieties of bananas like Jahaji, local etc. are cultivated. The plant material used is locally available. This practice is used by about 80% of the banana farmers for the past 20–30 years. Alternatively, some farmers wrap banana in jute bag (sack) and keep it above the fire place (smoke treatment) or keep in the wooden box for ripening.

Agronomy:

- **Multiple cropping in jhum field**

The practice of multiple cropping in jhum field is followed by farmers of Wokha district in the state of Nagaland. Jhuming is still popular in this region and in order to get higher production and sustainable farming, multiple cropping systems has been adopted, where 20 to 40 or more items of crops are grown on the same plot of land as intercropping with paddy as the main crop. To demarcate the boundary from the next farmer Job's tears millet is sown around his own plot. Then, maize, sesamum and vegetable and other crops are sown in line as the filter strips whereas colocassia and ginger are also sown in line as contour vegetative hedges in order to conserve soil and water and also help form bunds at certain spacing in rows. The leguminous crops, specially the beans, are grown on every standing staking that are kept purposely at the time of jungle clearing. Harvesting of such crops start right from May and June. And for seed or marketing purposes it will be harvested in December. Some of the cucurbits and the tuber crops are grown as the cover crops wherever necessary and chili is grown only on certain locations. These systems are practiced for higher production and economic return, and as soil-and-water conservation measures. With this practice, the economic return of a given area is increased by at least three times. Most of the farmers have adopted this practice and it is in use for about last 20 years.

- **Use of straw for higher productivity of rhizomatous crops in Nagaland:**

In this practice, the farmers of Molvom, Khaibong and Medziphema villages in Dimapur district of Nagaland use straw for higher productivity of rhizomatous crops. The purpose of this method is to get higher germination rate and healthy growth of the crop. The practice is that, after ploughing the field, several furrows are made in the field. The soil dug out from the furrows is kept along the line. The furrows are then filled up with dried straws (paddy straw, grass straw etc). The seeds of rhizomatous crops such as ginger and turmeric are then sown over the straw. After sowing, the straw is covered by soil. This method of planting has been observed to be highly successful in achieving higher germination rate particularly in ginger and turmeric, which are grown extensively in this region. in fact, some of the ginger and turmeric producers have attracted exporters. In this practice there is higher germination rate because the seeds get proper environment in the form of moisture, temperature and humidity. Straw also provides enough space for the seeds to grow and expand. Straw is converted into organic manure at a later stage. This practice has a satisfactory result with about 40% of the farmers following it for the last 15 years. The material used for this practice is cheap and locally available, but not in plenty and this is the reason why all the farmers cannot adopt this practice.

- **Use of ash in terraced fields:**

The farmers of Porba village and surrounding areas in Phek district of Nagaland mainly go for terrace field system of cultivation as water in this region is sufficient enough and they have adopted the use of ash in their fields, which prevents paddy from dying of unknown etiology after transplanting. In some fields, paddy does not grow well after transplanting and becomes yellowish, dies after a few days. But the farmers manage this problem by application of ash in the paddy field after about 2 weeks of transplanting. The reason could be neutralization of acidic nature of the soil in the field by ash. This practice has a very good effect, up to the extent of 70%. Around 80% of the farmers have been practicing this method for the past 20–25 years.

- **Zabo system of rice cultivation:**

It is indigenous method of water harvesting used by the farmers in Nagaland (Phek District). Zabo means impounding of water. It is an excellent system of rain water harvesting. It is generally

practiced in holdings of 2.0 to 2.5 ha. The catchment area is under permanent vegetation. Water body is 0.2 ha area pond of 1.5 to 2.5 m depth (shallow) located below the catchment area with a suitable silt trap. The bottom and sides of the pond are rammed and compacted to reduce seepage losses. The water so stored is let into the rice fields located in the lower elements of the slope. This area would be 0.2 to 0.8 ha (Nagaland).

- **Nutrient management practices of North-Eastern Hill:**

Though, the North Eastern Region of India is endowed with rich natural resources, the faulty agricultural practices followed in the region have caused their fast depletion. Shifting cultivation has resulted in large-scale land and environmental degradation in the region. However, there exists some unique, ecofriendly and reasonably productive indigenous farming systems which have remained sustainable for centuries. These farming systems have in -built soil fertility management and soil and water conservation components. In **Zabo** system, followed in Phek district of Nagaland, the irrigation water from the main water collection tank is passed through animal yard and it carries all dung and urine of the animals to the field below the slope. Besides, farmers add succulent branches and leaves of trees in the field for enhancing soil fertility; Alder (*Alnus nepalensi*s) land use system is followed in Kohima district of Nagaland. More than 200 years old trees of alder, a non-leguminous atmospheric N_2 fixing tree, can be seen in the area. The branches of the trees are spread in the field and left for decomposition or burnt. The **Apatani** farmers of Arunachal Pradesh make use of farm and household wastes, tree leaves and forest litter for maintaining soil fertility. The rain water from hills, used for irrigation, also brings forest humus to the valley and lower slopes. The 'Wet Rice cultivation' or **Panikheti** farming system make use of tree leaves, cattle dung, pig and poultry droppings and farm wastes for improving soil fertility. Nutrient management in narrow valleys entirely depends on humus from the adjoining hills and semi-decomposed forest litter. The soil in the narrow valleys is generally brownish-black in colour due to high content of humus (North-Eastern Hill Region).

Agroforestry:

- **Alder tree-based farming system in Nagaland**

The **Jhumia** of Khonoma village under Kohima district of Nagaland plant alder trees in the jhum cycle area and traditional agricultural crops basically with the idea that their root nodules improve soil fertility by fixing atmospheric nitrogen. It also increases crop yield and reduces soil erosion, besides providing shades to plantation crops like coffee at lower altitude and cardamom at higher altitude. Normally, a **Jhumia** cultivates the field for 2 years within a 9 years span, but the alder-based system allows two harvests in every 4 to 5 years. The system involves pollarding of alder trees in two phase i.e. (i) Initial pollarding and (ii) cyclical/subsequent pollarding. This practice has been in use since about 100 years by the whole community.

- **Agro-biodiversity in shifting cultivation (jhum)**

Jhuming is a common practice followed by the farmers of Nagaland, especially in the high altitude areas. The farmers, however, have started maintaining agro-biodiversity in jhum fields by sowing agricultural crops amidst naturally regenerated plants preserved in jhum cycle. The practice of maintaining the agro-biodiversity has been an important factor in sustaining village life through a wide range of food, medicine, fiber and fuel crops over many decades now. The agro-diversity depends on different altitudinal zones, consisting of cold, warm and sub-tropical regions. The crops used are mainly rice or maize, followed by soybean, millets etc., specially cultivated in the terraces. On the contour bunds, short-duration crops like beans and mustard are grown, followed by biennial root crops such as ginger, which also serves as vegetative barrier for soil conservation.

Boundaries are demarcated through the cultivation of creeper crops like cucumber, pumpkin etc. Almost all the crops grown in the field are also found near the household. Due to such agricultural bio-diversity practiced by the farming community in Nagaland, the villagers are almost self-dependent. The only item they look forward to have from outside source is salt. The main advantage of the practice is that the ecosystem is maintained and preserved, besides ensuring availability of food; fuel etc., including medicinal plants for immediate local use. Local varieties of paddy, maize, soybean, millets, root crops, mustard and wide range of vegetables besides timber like teak, hollock, **titachap** and alder in specific areas. Almost all the farmers in higher altitude have been practicing this since 50–60 years. Fields in rows at a distance of 10–20 feet (row to row), depending on the degree of the slope. Proper support of the laid log/bamboo is ensured to last for at least three years, as the farmers go up to third year. Thus, the soil erosion and speed of the run-off water are checked and moisture is conserved in the soil. This practice results in increased crop yield. The entire farming community of this region has been following this practice since time immemorial with certain modifications like planting colocasia, ginger, chilies etc. on the bund to strengthen the bund and serve as additional barrier as also to get additional harvest.

Animal Sciences:

- **Use of different indigenous methods to treat animal diseases:**

The farmers of Porba and surrounding villages in Phek district of Nagaland have adopted the use of different plants and other products as medicines to treat their animals as described below:

Burns and scalds: For curing burn injury, even in human, a particular honey called **yiecho dzu/rupo dzu** (local name) is applied, whereby healing takes place very rapidly. If the burn is severe, skin of fresh frog is peeled off and pasted over the burn for 3–4 days. It has been found that both the methods are very effective.

Maggotted wound: Fresh leaves of **tenichiede** (*Ficus dirta*) is fed to animal for 2–3 times. The maggots come out automatically within 12 hours.

Indigestion: Tsemhushi seed (local name) is powdered and mixed proportionately with water and fed orally. Animals get relieves quickly.

Greenish-white diarrhoea in poultry: **Gatta** (local grass) root is crushed and mixed with poultry ration for 2 days. It controls the problem quickly.

Canine distemper: Dried fish and seed of **Tsemhushi** (local tree) in the ratio of 1: 2 is mixed with proportionate quantity of water and fed to the affected dog twice a day. The practice has been found to be very effective.

Water leech infestation: Tobacco-leaf extract and **tetsishi** (local plant) are pushed into the nostril of the animal for the control of water leech, and this practice is also found to be very effective.

Weak and listlessness: Kuvishurho leaf (local tree), when fed in sufficient quantity, the animals regain normal health soon.

First aid: A moss, which is called **tenha** (local name), is made into a paste or chewed a little and applied over the cut wound. Bleeding stops very rapidly.

Temiekhubou is also found to be very effective for controlling bleeding.

Tsurho/temvutsuthu leaf extract is widely used for control of bleeding. It is also called iodine by the local people. The practices have been adopted by all the farmers since about 50 years back. As an alternate method, they approach veterinary doctors.

Water management:

- **Technique of rain water harvesting:**

The villagers of Kikrüma village in Phek district of Nagaland have adopted a method of harvesting rain-water mainly for irrigation of paddy fields and also for use as a source of drinking water. The system is to harvest water in water harvesting ponds constructed locally and tapping run-off rain water through contour trenches. The method is simple but it is very effective. The technique involves construction of a channel parallel to the slope. Stones are also carefully laid at the bed of the channel to prevent gully erosion. Several parallel gradual sloping contour trenches are made in series on both sides of the channel. These trenches collect run-off water from the catchments areas and drain it into the channel that leads the water to the target field. During planting season of rice, the water collected in the pond is gradually released by cutting open a small section of the bund. It has been recorded that a pond of 3×2×2 m size can irrigate terrace to yield 600 kg rice. This practice has received wide publicity since many areas covered under the system are by the side of highways. The system has been followed by all the villagers for the past 150 years.

Entomology:

- **Maize seed treatment with soot to control insect infestation:**

In this practice the farmers of Porba village under Phek district of Nagaland use soot, the black carbon deposit from kitchen, as seed treatment for maize. This soot is collected and crushed into powder form, which is then mixed with maize seed at sowing. This method prevents the seed from being eaten up by a particular ant. Thus, the germination rate of seeds is greatly enhanced. It has the efficacy up to the extent of about 70%. The practice is in use for the past 20–25 years by about 70% of the farmers.

- **Use of dead frog/crab to control bug in paddy**:

The farmers of Khonoma village in Kohima district of Nagaland have adopted a method by use of dead frog or crab to control gandhi bug infestation in paddy. This insect infestation is very common in all the varieties of paddy, but has been found to be significantly higher in early, maturing varieties. The practice is to put dead frogs and crabs in a bamboo stick equivalent to the length of the paddy, since gandhi bug attack is more prominent during milking stage. Several dead frogs/crabs are put in the field depending on the size of the plot. The gandhi bugs are attracted towards the dead frog/crabs and feed on them thereby saving the paddy crop. Each dead frog/crab by and large can attract around 20 Gandhi bugs. Attraction of bugs to the carcasses of frogs/crabs might be due to the smell of the carcass. This practice is in use for the past 20–25 years by about 100 out of 150 farm families.

- **Chopping off the paddy at nursery stage to control infestation thrips:**

To protect the paddy from the damage caused by leaf-tips thrips as well as to control lodging problem, the farmers of Medziphema, Socünoma, Kukidolong, Jharnapani etc. have adopted the method of chopping off the paddy at nursery stage. Thrips infestation has been observed to be a common problem in almost all the paddy-growing areas of Nagaland. This insect generally attacks the paddy from the tips, sucking its moisture/water content, which results in subsequent drying up

of the paddy. The general practice developed is that the tip of the paddy is chopped off which discourages the insect to have its initial attack. Lodging problem is minimized, as initial tilting of the paddy stem is avoided by the practice. This technique has been developed by the farmers over the years which have been found to have a good effect up to the extent of 40%. Almost 100% of the farmers are practicing this for decades.

- **Use of datura stems and leaves to control stem borer infestation in paddy:**

The farmers of Razüphema, Zubza etc. under Dimapur and Kohima districts respectively of Nagaland have devised their own means to control stemborer infestation by using datura stem and leaves in the paddy field. Stem borer infestation in paddy is very common in Nagaland. The indigenous tribal people of the state are normally not very keen to apply chemical insecticides/ pesticides, mainly due to its cost factor as well as attitude of the people to grow paddy mostly under organic farming system. The practice is to spread datura leaves and stems (cut pieces) in the paddy field particularly on observing the stem borer attack. The water in the field is then blocked through bunds so that the dhatura stems and leaves spread and get decomposed. These decomposed leaves and stems get circulated throughout the field, which acts as a repellent to the stem borer, thereby saving paddy from severe damages. The smell as well as the bitterness of datura leaves could be the reason to distract the stemborer pest from approaching the area. The practice has been in use since time immemorial, but about 40% of the total farmers only use it due to non-availability of dhatura plant. Alternatively, the farmers drain out water from the paddy field when the infestation occurs, and it is allowed to dry up after which fresh water is pumped in again.

- **Technique of indigenous dye:**

In the ancient times when readymade yarn/threads were not available for making different designs of cloths, the people of Nsunyu village, under Tsemingu block in Kohima districts of Nagaland, used indigenous plants for dying yarns threads into varieties of colours. Different plants are used for dying to get different colours.

Black dye: A particular plant called **nushunphangha** (*Strobilanthes flaccidifolius*) is planted near the house or garden and is use for black colour of shawl/clothes and dresses.

Process of dyeing: The leaves are plucked from the plants and boiled along with the yarn in a big earthen pot for 2 to 3 hours. The yarn is then takenout and dried in the sunshine. The process is repeated till the yarn is turned into completely black.

Red dye: There are two plants whose roots are used for red colour, called **allawi**, which means red yarn. The shrub called **achaque** is a creeping plant with sticky stem and leaves, which grows mostly in the bank of river and swam areas. Another plant called **akughon**, which grows in any area, is also used in combination with achaque for dyeing white yarn into red. The combination of these two roots is the best ingredient for red colour dyeing of yarn.

Process of dyeing: The roots are cut into pieces and put into the big earthen pot and boiled along with the yarn or fur for several hours and yarn is taken out and replaced with its fresh roots and the same process of boiling with yarn/fur is repeated, and is dried in sun. Again, it will be sucked in the wooden vessel and fermented for 2 to 3 days. Then it is taken out from the vessel, contents are boiled and liquid of plants and dried it again.

3. Yellow dye: Roots of **khentsu** and **ahicho** are used for yellow dye. Process of dyeing is the same as that of black and red dye. The plant materials used for dyeing are locally available from nearby and in the jungle. Almost all the people in the village have been using this method. Due to

the laborious work and availability of readymade yarns of different colours in the market, the use of this practice has almost stopped.

- **Use of ash for control of pest infestation in Cucurbitaceae family:**

The farmers of Chumukedima, Sethikema, Bade, Sovima etc. under Dimapur district of Nagaland use ash for control of pest infestation in vegetable crops belonging to Cucurbitaceas family (bottle gourd, cucumber etc). In this practice, ash is dusted over the leaf in the early morning before the dew-drops over the leaf are dried up. The ash thus gets stuck on the leaf and prevents the insect pest to have direct access to the leaf. The dusted ash also acts as a repellent for the insects. Thus the proper growth of the plant is achieved without much damages caused as these insects normally start their attack through the leaf. This practice has a very good effect and is reported to have been able to control the insect infestation up to 50%. Deep ploughing is also another method to kill the insects and pests in the soil as well as to provide exposure of the soil to the sun. All the farmers growing these vegetables, which roughly constitute about 30% of the village population, follows this practice. This practice has been in use since time immemorial with no major modifications.

- **Use of *Eupatorium rugosum* as pest repellent in rice field:**

The farmers of Medziphema area use *Eupatorium rugorum* plant as pest repellent in their paddy fields. Whenever there is an attack of pest in their fields, fresh branches of this plant are erected in the field keeping a distance of about 5-6 feet. The plant has a strong odour. This odour is believed to act as a repellent to the pests.

Fishery:

- **Fish farming in terraced fields:**

Farmers of Porba village in Phek district, practice a method of fish farming in terraced fields. As they depend mainly on rain water for cultivation of paddy, rearing of fishes become difficult in dry winter season. Therefore, they have developed a particular system of rearing fishes by digging a square pit of about 6 feet with a depth of 5-6 feet in their terraced fields. Fishes remain in these pits during dry season when the water in the terrace field gets dried up. The farmers harvest the fish from these pits as and when required.

Indigenous plants used for curing different ailments of human being:

- **Use of nma-nma roots as anti-emetic:**

Nma-nma is a weed which is available mainly during summer season. The people of Nsungu village in Kohima district of Nagaland use the roots of the plants, when one suffers from vomiting as an anti-emetic. One to two pieces of about 2 inches in length of this plant is crushed and mixed with a 1-2 spoonful of the extract is taken orally.

- **Use of otana jar (cheriberi) root for diarrhea:**

Otana jar (*Achyranthus aspera*) is a weed, which is available in plenty. The Nepali farmers use the extract from root of this weed to control diarrhoea. A small piece of the root of about 2-3 inches is crushed and mixed with water. The extract is taken orally to control diarrhea.

- **Use of aak pada for sprain and dislocation:**

Aak pada (*Calotropis gigantean*) is a shrub, which is available in plenty. The plant has milky juice. This milky juice used for massaging to relieve pain in sprains and dislocations. The juice is applied over the affected area, massaged and bandaged. Some times the leaves are also heated and placed over the affected area after the application of the juice. In Assam, the juice is used to subside any flammatory condition of the skin.

- **Use of ratbiche (golden shower) for curing dysentery:**

Ratbiche (*Cassia fistula*) fruit is used for curing dysentery. When the fruits get mature and dry, the inside, which has two layers between seeds, becomes black and sticky. The upper layer is thicker than the lower layer. For the treatment of dysentery, about 3-4 pieces of this layer is dissolved in a little quantity of lukewarm water and taken orally. If the stool is mucous type, then the lower layer is used as in the same way as above. This is a very popular medicine used by Nepalese.

- **Cure of cough by using peach leaves:**

The **Nishi** tribe of Arunachal Pradesh use peach leaves for cough treatment. In this treatment, a few clean pieces of peach leaves are crushed between palms and it is taken orally as such. This cures cough in human being effectively.

- **Use of teiseny-u leaves to ripen boil:**

A shrub called **teiseny-u** or **akashi i**s used ror ripening boil (abscess) in human being. Leaves are heated in flame and placed over affected area and kept overnight. This quickens ripening of boil.

- **Use of gatheru leaves to control high blood pressure:**

Gatheru/ **nonzawen**/ **remrem** (*Hottuynia cordata*) is a shrub and a commonly available vegetative. The leaves are boiled and taken along with the soup. This controls high blood pressure.

- **Use of bhakhimolo seed for treatment of dysentery:**

The seeds of **bhakhimolo** (*Ehus semialata*) are pound and mixed with water and salt. The preparation is taken orally to cure dysentery in human being, which is found to be very effective.

Biodiversity

Nagaland is very rich in bio-diversity, both flora and fauna. Even today some pockets of forests are covered with gigantic trees, where sun-rays can not penetrate. Due to reckless and uncontrolled cutting of trees for timber, firewood, continued Jhum cultivation and annual fire in vast tracts of land, forests got degraded and barren, which accelerated diminishing of the most of the original characteristics of the forests.

Though geographically being a small state, Nagaland has several types of forests, mainly because the state is mostly tropical, and the altitudes range from a few hundred meters to about four thousand meters. The major types of forests found in the state, as per the classification of Champion & Seth, are as follows.

1. Northern Tropical Wet Evergreen Forests
2. Northern Tropical Semi- Evergreen Forests
3. Northern Sub- Tropical Broad Leave Wet Hill Forests

4. Northern Sub-Tropical Pine Forests
5. Northern Montana Wet Temperate Forests &
6. Temperate Forests

Flora:

Coniferous: *Pinus khasyia* (Indigenous), *Pinus caribiae* (Exotic),*Pinus petula* and *Cryptomeria japonica* (Exotic)

Broad Leaved: *Lagerstromia specios*a (Ajhar), *Tectona grandis* (Teak), *Mangifera indica* (Am), *Alnus nepalensis* (Alder), *Morus laevigata* (Bola), *Tetrameles nudiflora* (Bhelu), *Trewia nudiflora* (Bhelkar), *Betula alnoides* (Betula), *Canarium resiniferum* (Dhuna), *Gmelina arborea* (Gomari), *Cinnamomum cecicodaphne* (Gonsoroi), *Nyssa javanica* (Gahorisopa), *Terminalia myriocarpa* (Hollock), *Adina eligocephala* (Haldisopa),*Cedrela toona* (Jatipoma), *Podocarpus* nerifolia (Jinari), Altingia exelsa (Jutuli), Duabanga grandiflora(Khokon), Albizzia procera (Koroi), Anthocephalus *kadamba* (Kadam), *Shorea assamica* (Mekai), *Endospermum chinensis* (Phulgomari), / *Melia azadirach* (Ghoora-Neem), *Stereospermum chelonoides* (Paroli), *Magnolia spp.* (Sopas), *Cassia fistula* (Sonaru), *Bombax ceiba* (Semal), *Ficus nervosa* (Robar), *Spondias axillaries* (Hog plum), *Michelia champaca* (Titasopa), *Bischofia javanica* (Uriam), *Juglans regia* (Walnut), *Mansonia dipikai* (Badam), *Phoebe goalparensis* (Bonsom), *Dipterocarpus macrocarpus* (Hollang), *Terminalia chebula* (Hilika), *Schima wallichii* (Gogra), *Mesua ferrea* (Nahar), *Albizzia lebbeck* (Siris), *Quercus Spp.* (Oaks), *Artocarpus chaplasha* (Sam), *Chukrasia tabularis* (Bogipoma), *Terminilia bellerica* (Bahera). *Hovenia dulcis* (Coral tree), *Acrocarpus fraxinifolius* (Mandani), *Bucklandia populnea* (Pipli), *Pseudostreblus indicus* (Tsüngkoh) World tallest Rhododendron tree, which is recorded in the Guineese Book, has been found in Japfu Mountain of Kohima district.

Medicinal Plants. Panax pseudo-gensing (Gensing), *Taxus baccata* (Yew), *Aquilaria agallocha* (Agar),*Solanum khasianum*, *Ocimum sanctum* (Tulsi), *Aegle marmelos* (Bel), *Rauvolfia serpentina* (Sarpgandha), *Elaeocarpus ganitrus* (Rudraksha), *Dioscorea deltoides* (Kath Aloo), *Emblica officinalis* (Amla), *Swertia chirata* (Chirata), *Rubia cordifolia*, *Oroxylum indicum*, *Clerodendrum colebrookianum*, *Passiflora edulis*

Bamboo :

There are 22 species of bamboos available in the state. The important spp are:

1. *Sinarundinaria griffithiana* (Munro) Chao & Renv.

   Arundinaria griffithiana (Munro) Saramati
2. *Sinarundinaria elegans* (Kurz) Chao & Renv.

   Arundinaria elegans (Kurz) Puliebadze, near Kohima.
3. Sinarundinaria rolloana (Gamble) Chao & Renv.

   Arundinaria rolloana (Gamble) Japfü Range, Kohima.
4. *Sinarundinaria nagalandiana* Naithani Niriyo Peak, Wokha.
5. *Chimonobambusa callosa* (Munro) Nakai

   Arundinaria callosa (Munro) Puliebadze above Kohima and Mao.
6. *Neomicrocalamus prainii* (Gamble) Keng f.

   Arundinaria prainii (Gamble) Puliebadze, Japfü Range.

7. *Bambusa balcooa* Roxb. Wokha
8. *Bambusa tulda* Roxb. Kohima, Jaluki
9. *Bambusa palliada* Munro Wokha, Kohima and Zeliang village
10. *Dendrocalamus hookeri* Munro Kohima, Wokha
11. *Dendrocalamus hamiltonii* Nees et Arn ex Munro
12. *Dendrocalamus giganteus* Munro Kohima, Mao.
13. *Dendrocalamus calostachys* (Kurz) Kurz
14. *Schizostachyum polymorphum* (Munro) Majumdar
    Pseudostachyum polymorphum Munro) Longsachu near Wokha
15. *Schizostachyum dullooa* (Gamble) Majumdar
    Teinostachyum dullooa Gamble) Yikum near Wokha
16. *Schizostachyum fuchsianum* (Gamble) Majumdar
    Cephalostachyum fuchsianum Gamble) Kohima, Zulhama-Kilomi
17. *Melocanna baccifera* (Roxb.) Kurz. (M. bambusoides Trin.) Jaluki

Canes:

18. *Calamus rotang*
19. *Calamus flagellum*
20. *Calamus erectus*
21. *Calamus gracilis*
22. *Calamus floribundus*

Orchids:

Nagaland has about 354 spp. out of 1250 spp. of orchids found in India. Most of the Orchids here are epiphytes or lithophytes. A few terrestrial orchids are also found in the state.

Sl.no	**Name**	**Sl.no**	**Name**
1	*Acampa papillosa*	42	*Bulbophyllum umbellatum*
2	*Acampa rigida*	43	*Bulbophyllum uniflorum*
3	*Acampa wightiana*	44	*Bulbophyllum viridiforum*
4	*Acanthephippium striatum*	45	*Bulbophyllum wallichi*
5	*Acanthephippium sylhetense*	46	*Calanthe alismifolia*
6	*Aerides crassifolium*	47	*Calanthe alpina*
7	*Aerides fieldingii*	48	*Calanthe angusta*

8	*Aerides multiflorum*	49	*Calanthe biloba*
9	*Aerides odoratum*	50	*Calanthe brevicornu*
10	*Anoectochilus crispus*	51	*Calanthe chloroleuca*
11	*Anoectochilus elwesil*	52	*Calanthe clavate*
12	*Anoectochilus grandiflorus*	53	*Calanthe densiflora*
13	*Anoectochilus griffithi*	54	*Calanthe foestermannii*
14	*Anoectochilus roxburghii*	55	*Calanthe gracilis*
15	*Anthogonium gracile*	56	*Calantheherbacea*
16	*Aphyllorchis montana*	57	*Calanthe manni*
17	*Aphyllorchis prainii*	58	*Calanthe musuca*
18	*Appendicula cornuata*	59	*Calanthe plantaginea*
19	*Arachis bilinguis*	60	*Calanthe puberula*
20	*Arachis cathcartii*	61	*Calanthe tricarinata*
21	*Arundina graminifolia*	62	*Calanthe triplicata*
22	*Ascocentrum ampullaceum*	63	*Calanthe vaginata*
23	*Ascocentrum curvifolium*	64	*Calanthe vestita*
24	*Ascocentrum micranthum*	65	*Calanthe whiteana*
25	*Ascocentrum miniatum*	66	*Cephalanthera ongifolia*
26	*Brachycorythis obcordata*	67	*Ceratostylis himalaica*
27	*Bulbophyllum aculiflorum*	68	*Ceratostylis teres*
28	*Bulbophyllum affine*	69	*Cheirostylis griffithii*
29	*Bulbophyllum andersonii*	70	*Cheirostylis pusilla*
30	*Bulbophyllum careyanum*	71	*Cleisocentron trichromum*
31	*Bulbophyllum caudatum*	72	*Cleisostoma aspersum*
32	*Bulbophyllum cylindraceum*	73	*Cleisostoma filliforme*
33	*Bulbophyllum dyeranum*	74	*Cleisostoma simondii*

34	*Bulbophyllum elatum*	75	*Cleisostoma striatum*
35	*Bulbophyllum eulepharum*	76	*Cleisostoma subulatum*
36	*Bulbophyllum gambeiel*	77	*Cleisostoma racemiferum*
37	*Bulbophyllum guttulatum*	78	*Coelogyne barbata*
38	*Bulbophyllum gymnopus*	79	*Coelogyne corymbosa*
39	*Bulbophyllum helenae*	80	*Coelogyne cristata*
40	*Bulbophyllum hirtum*	81	*Coelogyne flaccida*
41	*Bulbophyllum hymenanthum*	82	*Coelogyne fuscescens*
Sl.no	**Name**	**Sl.no**	**Name**
83	*Bulbophyllum leopardinum*	127	*Coelogyne griffithi*
84	*Bulbophyllum leptanthum*	128	*Coelogyne hitendrae*
85	*Bulbophyllum odoratissimum*	129	*Coelogyne longipes*
86	*Bulbophyllum ornatissimum*	130	*Coelogyne micrantha*
87	*Bulbophyllum pencillium*	131	*Coelogyne nitida*
88	*Bulbophyllum piluliferum*	132	*Coelogyne occuitata*
89	*Bulbophyllum polyrhizum*	133	*Coelogyne ovalis*
90	*Bulbophyllum reptans*	134	*Coelogyne prolifera*
91	*Bulbophyllum rigidum*	135	*Coelogyne punctulata*
92	*Bulbophyllum rothschildianum*	136	*Coelogyne raizada*
93	*Bulbophyllum roxburghii*	137	*Coelogyne rigida*
94	*Bulbophyllum secundum*	138	*Coelogyne schultesii*
95	*Bulbophyllum striatum*	139	*Coelogyne stricta*
96	*Coelogyne viscosa*	140	*Dendrobium williamsonii*
97	*Corymborkis veratrifolia*	141	*Diplomeria hirsuta*
98	*Cremastra wallichiana*	142	*Diplomeria pulchelia*
99	*Cryptochilus lutea*	143	*Diplomeria championi*

100	*Cryptochilus sanguineus*	144	*Epigeneium amplum*
101	*Cymbidium aloifolium*	145	*Epigeneium fuscescens*
102	*Cymbidium cochleare*	146	*Epigeneium rotundatum*
103	*Cymbidium devonianum*	147	*Eria acevata*
104	*Cymbidium elegans*	148	*Eria alba*
105	*Cymbidium ensifolium*	149	*Eria amica*
106	*Cymbidium eburneum*	150	*Eria bambusifolia*
107	*Cymbidium iridioidea*	151	*Eria biflora*
108	*Cymbidium lancifolium*	152	*Eria bractesces*
109	*Cymbidium longifolium*	153	*Eria coronaria*
110	*Cymbidium lowianum*	154	*Eria dasyphylla*
111	*Cymbidium macrorhizon*	155	*Eria excavata*
112	*Cymbidium mastersii*	156	*Eria graminifolia*
113	*Cymbidium pendulum*	157	*Eria muscicola*
114	*Cymbidium tigrinum*	158	*Eria paniculata*
115	*Cymbidium tracyanum*	159	*Eria pannea*
116	*Dendrobium acinaciforme*	160	*Eria spicata*
117	*Dendrobium anceps*	161	*Eria stricta*
118	*Dendrobium aphyllum*	162	*Eria vittata*
119	*Dendrobium bensoniae*	163	*Eulophia bicallosa*
120	*Dendrobium bicameratum*	164	*Eulophia graminea*
121	*Dendrobium candidum*	165	*Eulophia nuda*
1222	*Dendrobium chrysanthum*	166	*Flickingeria fimbriata*
123	*Dendrobium chrystoxum*	167	*Flickingeria fugax*
124	*Dendrobium crepidatum*	168	*Galeola falconeri*
125	*Dendrobium densiflorum*	169	*Galeola lindleyana*

126	*Dendrobium denudans*	170	*Gastrochilus acutifolium*
Sl.no	**Name**	**Sl.no**	**Name**
171	*Dendrobium devonianum*	215	*Gastrochilus calceolaris*
172	*Dendrobium eriaeflorum*	216	*Gastrochilus distichus*
173	*Dendrobium falconeri*	217	*Gastrochilus inconspicuum*
174	*Dendrobium farmeri*	218	*Gastrochilus pseudodisticus*
175	*Dendrobiumfimbriatum*	219	*Geodorum densiflorum*
176	*Dendrobium formosum*	220	*Goodyera foliosa*
177	*Dendrobium gibsonil*	221	*Goodyera fusca*
178	*Dendrobium heterocarpum*	222	*Goodyera hispida*
179	*Dendrobium hookerianum*	223	*Goodyera procera*
180	*Dendrobium infundibulam*	224	*Goodyera repens*
181	*Dendrobium jenkinsii*	225	*Goodyera schiechtendaliana*
182	*Dendrobium lindleyi*	226	*Goodyera secundiflora*
183	*Dendrobium longicornu*	227	*Goodyera viridiflora*
184	*Dendrobium moschatum*	228	*Habennaria acuifera*
185	*Dendrobium nobile*	229	*Habennaria dentate*
186	*Dendrobium ochreatum*	230	*Habennaria ensifolia*
187	*Dendrobium porphyrochilum*	231	*Habennaria furcifera*
188	*Dendrobium primulinum*	232	*Habennaria intermedia*
189	*Dendrobium pulchellum*	233	*Habennaria malleifera*
190	*Dendrobium stuposum*	234	*Habennaria pactinata*
191	*Dendrobium terminate*	235	*Habennaria stenopetala*
192	*Dendrobium thysiflorum*	236	*Herminium lanceum*
193	*Dendrobium transparens*	237	*Herminium macrophyllum*
194	*Dendrobium wardianum*	238	*Herminium monorchis*

195	*Hetaeria rubens*	239	*Oberonia recurva*
196	*Hygrochilus parishii*	240	*Oreochis foliosa*
197	*Kingidium deliciosum*	241	*Ornithochilus difformis*
198	*Kingidium taenialis*	242	*Otochilus alba*
199	*Liparis assamica*	243	*Otochilus fusca*
200	*Liparis bistriate*	244	*Otochilus lancilabius*
201	*Liparis biturberculata*	245	*Pachystoma senile*
202	*Liparis bootanensis*	246	*Panasia unifllora*
203	*Liparis caespitosa*	247	*Paphiopedilum hirsutissimum*
204	*Liparis cordifolia*	248	*Papiopedilum insigne*
205	*Liparis delicatula*	249	*Paplionanthe longicornu*
206	*Liparis distans*	250	*Paplionanthe teres*
207	*Liparis longipes*	251	*Pecteilis gigantea*
208	*Liparis nervosa*	252	*Pecteilis susannae*
209	*Liparis odorata*	253	*Pelanthanthera insectifera*
210	*Liparis pardoxa*	254	*Perisrtylus affinis*
211	*Liparis petiolata*	255	*Perisrtylus chloranthus*
212	*Liparis plantaginea*	256	*Perisrtylus constictus*
213	*Liparis platyrachis*	257	*Perisrtylus densus*
214	*Liparis pulchella*	258	*Perisrtylus falla*
Sl.no	**Name**	**Sl.no**	**Name**
259	*Liparis resupina*	303	*Perisrtylus goodyeroides*
260	*Liparis viridiflora*	304	*Perisrtylus mannii*
261	*Luisia inconspicua*	305	*Perisrtylus prainii*
262	*Luisia prachystachys*	306	*Phalus flabus*
263	*Luisia prachystachys*	307	*Phalus longipes*

264	*Luisia teritifolia*	308	*Phalus mishmensis*
265	*Luisia trichorhiza*	309	*Phalus tankervilliae*
266	*Luisia zeylanica*	310	*Pholidota articulate*
267	*Malaxis acuminata*	311	*Pholidota calceolate*
268	*Malaxis biaurita*	312	*Pholidota convallariae*
269	*Malaxis cylindroatachya*	313	*Pholidota grifithii*
270	*Malaxis josephiana*	314	*Pholidota imbricate*
271	*Malaxis khasiana*	315	*Pholidota imbricate*
272	*Malaxis latifolia*	316	*Pholidota imbrcata*
273	*Micropera mannii*	317	*Pholidota protacta*
274	*Micropera rostrata*	318	*Pholidota rubra*
275	*Monomera barbata*	319	*Phreatia elegans*
276	*Neogyne gardneriana*	320	*Platanthera arcuata*
277	*Neotianthe secundiflora*	321	*Platanthera stenantha*
278	*Neottia listeroides*	322	*Pleione hookeriana*
279	*Nephelaphyllum cordifolium*	323	*Pleione humilis*
280	*Nervilia aragoana*	324	*Pleione maculata*
281	*Nervilia prainiana*	325	*Pleione praecox*
282	*Oberonia acaulis*	326	*Poneoorchis chusua*
283	*Oberonia clarkel*	327	*Pteroceras suaveolens*
284	*Oberonia ensiformis*	328	*Renanthera imschootiana*
285	*Oberonia griffithiana*	329	*Rhynchostylis retuasa*
286	*Oberonia iridifolia*	330	*Robiquetia succisa*
287	*Oberonia longilabris*	331	*Satyrium napalense*
288	*Oberonia mannii*	332	*Schoenorchis gemmata*
289	*Oberonia micrantha*	333	*Smitinandia micrantha*

290	*Oberonia obcordata*	334	*Spathoglottis ixioides*
291	*Oberonia orbicularis*	335	*Spathoglottis plicata*
292	*Oberonia pachyrachis*	336	*Spathoglottis pubescens*
293	*Oberonia pyrulifera*	337	*Spiranthes sinense*
294	*Sunipia bicolor*	338	*Uncifera obtusifolia*
295	*Sunipia candida*	339	*Vanda alpina*
296	*Thelasis longlifolia*	340	*Vanda bicolor*
297	*Taeniophyllum khasianum*	341	*Vanda coerulea*
298	*Thunia alba*	342	*Vanda cristata*
299	*Thunia marshlliana*	343	*Vanda pumila*
300	*Tropidia curculigoides*	344	*Vanda tesselata*
301	*Tylostyles discolor*	345	*Vanda testacea*
302	*Uncifera acuminata*	346	*Vanda undulata*
Sl.no	**Name**		
347	*Vandopsis vandarum*		
348	*Yoania prainii*		
349	*Zeuxine abbreviata*		
350	*Zeuxine flava*		
351	*Zeuxine goodyeroides*		
352	*Zeuxine gracilis*		
353	*Zeuxine nervosa*		
354	*Zeuxine strateumatica*		

Fauna

A.Mammals

Common Name	**Scientific Name**
1. Asian Elephant	*Elephas maximus*

2. Gaur (Indian Bison)	*Bos gaurus*
3. Jackal	*Canis aurius*
4. Tiger	*Panthera tigris*
5. Sambar	*Cervus unicolor*
6. Leopard	*Panthera pardus*
7. Barking Deer	*Muntaiqus muntijak*
8. Wild boar.	*Sus scrofa*
9. Sloth Bear	*Elursus arsinus*
10. Serow	*Capricornis sumatraensis*
11. Hoolock	*Hylobatus hoolock*
12. Common Langur	*Presbytis antillus*
13. Macaque	*Macaca spp.*
14. Leopard Cat.	*Filis bengalensis*
15. Himalayan Squirrel	*Callosciuras pygerythru*
16. Pangolin.	*Manis crasicaudata*
17. Civet.	*Vivirra Spp.*
18. Wolf	*Canis auririus*
19. Fruit bat	*Cynoptirus sphinx*
20. Porcupine	*Hystrix indica*
21. Hispis hare	*Caprogus hispisdus*
22. Slow Loris	*Nycticebus causeang*
23. Otter	*Lutra lutra*
24. Wild Dog	*Cuon alpinus*
25. Orange billed Himalyan Squirrel	*Cirrus unicolor*
26. Mangoose	*Herpester spp.*
27. Musk Deer.	*Moschus moschiferous*
28. Binturong	*Arctictis binturong*
29. Jungle cat	*Filis chaus*
30. Mole rat	*Bandicota bengalensis*
31. Indian hare	*Lypus nigricolis*
32. Martin	*Martis spp.*
33. House Mouse	*Mus musculus*
34. Field Mouse	*Mus booduga*
35. Goral	*Nemarahidus goral*
36. Clouded Leopard	*Niofolis nibulosa*
37. Palm Civet	*Paguna larvata*

38. Wood cat	*Rattus blaufardi*
39. House cat	*Rattus rattus*
40. Fulvous fruit bat	*Tousettus leschinuitas*
41. Indian fox	*Vulpis bengalensin*

B.Reptiles:

Common Name	
Monitor lizard	*Varanus prasinus*
Tortoise	*Geochelone elegans*
Python (reticulate)	*Python reticulatus*
King cobra	*Ophiophagus hannah*
Common krait	*Bungarus caeruleus*
Banded krait	*Bungarus multicintus*
Viper	*Vipera russelli formosensis*
Common cobra	*Naja naja*

C. Birds

Common Name	**Scientific Name**
Greyheaded fishing eagle	*Ichuophaga nana*
Crested serpent eagle	*Pilernia cleala*
Bearded vulture	*Gypactus barbatus*
Forest eagle owl	*Bubo nipalensis*
Collared pigmy owlet	*Tus bakkameena*
Collared scope owl	*Laucidium brodei*
Tragopan	*Tragopan blythii*
Kaleej Pheasants	*Lophura leucemelona*
Common hill patridge	*Arboraphila forqueola*
Common pheasants	*Entropus simensia*
Red Jungle fowl	*Gallus gallus*
Peacock pheasants	*Polyplectron bicalcaratum*
Pintailed green pigeons	*Treron apicauda*
Rutous turtle dove	*Streptopolia orientalia*
Marrnbacked imperial pigeon	*Ducula badia*
Emarald dove	*Chalcophapa indica*
Himalayan Jungle nightjar	*Caprimulgus indicus*
Indian roller	*Coracias bengalensis*

Chestnut threaded bee-eater	*Morapa leschanaulti*
Bluethreated barbet	*Mengalaima lineata*
Great barbet	*Megalaima virens*
Great pied hornbill	*Buceros bicornis*
Rufousnecked hornbill	*Aceros nipalensis*
Goldenbacked throated woodepecker	*Dimopium shorii*
Darjeeling pied woodpecker	*Picoides darjellensis*
Redaered by woodpecker	*Lythipicus pyrrhotis*
Bluenapped pitta	*Pitta nepanlensis*
Mrs. Gould's sunbird	*Aethopyga gapldinale*
Nepal Yellow backed sunbird	*Aethopyga nipalensis*
Black breasted sunbird	*Aethopyga saturata*
Firetailed yellow backed sunbird	*Aethopyga ignicauda*
Longtailed broadbill	*Serilophus lunatus*
Red drumped swallow	*Hirundedaurice*
Tyflers swallow	*Hirunderustice tyleri*
Balcknapped ariole	*Oriolus chinesis*
Himalayan tree pie	*Dendrocitta formosee*
Bronzed drongo	*Dicrurus aeneus*
Large brown thrush	*Zoothera menticola*
Lesser racket-tailed drongo	*Dicrurus renifer*
Large racket tailed drongo	*Dicrurus paradiseau*
Black drongo	*Dicrurus adaimilis*
Grey drongo	*Dicrurus leucephaecus*
Clouded Leopard	*Niofolis nibulosa*

The endangered species both flora and fauna in Nagaland and measures taken by the Government to protect them and prevent extinction. The local population being are intricately involved with the forests for their sustenance, be it agriculture, timber, small, timber, day to day use items or medicinal plants etc. These forest products are also their main source of economy. Therefore, when the main stay of the people is dependent on forest, destruction of forests is imminent and thereby endangering many valuable species. Due to the primitive method/ practice of cultivation (i.e slash burning) the rich Biodiversity of the state is dwindling year by year. Most of species, both flora and fauna, appears to be endangered due to heavy biotic pressure/ interference and reckless deforestation. Their details are as follows.

Flora:

Dipterocarpous macrocarpous (Hollong), *Shorea assamica* (Makai), *Rodhodendron Spp., Mesua ferra* (Nahar), are rare and endangered spp. *Panax gensing* (Gensing) is found only in Tuensang

district at higher altitude. It is endangered. *Aquilaria agallocha* (Agar) is also an endangered species.

Rare and Endangered species of Orchids available in Nagaland are as follows,

Thunia spp, *Arundinaria graminifolia* (Bamboo orchid), Renenthera (Red vanda), Rhynchostylis (fox tail), Pleoni, Phauis (ground orchid) 2 spp, *Paphiopedilum spp*, *Cymbidium tigrinum spp*.

The Govt. is taking measures for propagation conservation and protection of these spp. through different afforestation schemes.

Fauna:

The largest Asian mammal, Elephant is endangered spp. The other endangered spps are *Melurses ursinus* (Sloth Bear), *Prionodon pardicolor* (Spotted linsang, Tiger-civet), *Panthera tigris* (Tiger), *Macaca assamensis* (Tailed Pig). The Gaur, or Indian Bison in habitats in Intangki National Park and Fakim Wildlife Sanctuary and other hilly areas is facing extinction from Nagaland The different Horn bills and Tortoise are also endangered.

APPENDIX- I

THE INDIGENOUS METHOD OF PRESERVATION OF VARIOUS FOOD PRODUCTS:

Sl. No	English name	Local name			By products (how they consume)	Preservation
		Vishwemie (Southern Angami)	Tenydie			
1	a)Pumpkin	Lumshe	Rumo	Summer winter	Boiled sabji	Normally they use to keep ripened one
	b)Bitter pumpkin	Lumshe	Rumo	Summer winter		
2	a)Tomato	Benganii	Benginiio	Summer winter	Put in sabji, chutni	Normally
	b)Local tomato	Sobengyanü	Sobenganü	Winter		
3	a)Brinjal	Khadishe	Khadishe	Summer	Making sabji	Normally
	b)Small local brinjal (bitter)	Khikshwshe	Khikshwshe	Summer		
4	a)Chilly	Thushe	Chusi	Summer winter	Put in sabji, chutni	Dry
	b)Big chilly	Raja Thüshe	Raja chusi	Summer winter	Put in sabji, chutni	Dry
5	Radish	Mela	Mula	Winter	Boiled sabji,fry	Normally
6	Bottol guard	Okhu	Okhu	Winter	Boiled sabji,fry	Normally
7	Bamboo shoot	Ose	Kese	Winter	Boiled with meat and dal	Keep normally with water
	a)Big shoot	Orase	Kese	Winter		
	b)Small shoot	Onguse	Kese	Winter		
8	a)French bean	Orhupi	Rhutsü	March–October	Green one as boiled sabji and seed as dal	Dry
	b)Flat bean	Tosoti	Tosoti	Winter		
	c)Round bean	Otishu	Otishu	Summer		
9	Sweet potato	Mokrihu	Dzvomoü	Summer	Boiled,take as sabji	Normally

10	Mushroom	Apopi		Summer June	Put eith chicken,dry fish	Dry
11	Ladies finger	Vindi	Bindi	Summer	Boiled sabji	Normally
12	a). Arun stem	Ovidhola		Winter	Boiled	Dry
	b). Arun tuber	Ovidzu		Winter	Boiled	Dry
13	a)Banana flower	Rhatsu Khwenu	Tefee phü	Febuary - March	Making pickle	Normally
	b)Banna stem	Okhe		All season	Chatni with dry fish	Normally
14.	a)Onion	Pyaj	Piazhu	Summer	Mixed with chatni,sabji	Normally
	b) Small onion	Khuva	Khuve	Winter	Mixed with chatni,sabji	Normally
15	Garlic	Chamize		Winter	Mixed with chatni,sabji	Dry
16	Ginger	Ovu	Kevü	Summer	Add with sabji	Dry
17	Cauli flower	Kobi	Phulkobi	Winter	Boilled and make sabji	Normally
LEAFY VEGETABLES (GAJO)						
1	Coriander	Nha Dhania	Dhania	July to Nov.	Put to make Gulho (local portridge)	Normally
2.	Mustard leaf	Wakra		Winter	Boil	Drying
3.	Cabbage	Kobi	Kobi	Winter & local kobi in whole year	Boil & fry	Drying
4.	Squash leaf	Squasnü	Squasnü	Winter	Boiled or fry	Dry
5.	Fern	Tsukhowa	Tsukhowa	Winter	Boiled or fry	Normally/Dry
6.	Mint	Pudina	Pudina	Summer/Winter	For making chutney	Normally
FRUITS (She)						
1.	Grapes	Khubeshi	Khube	Summer	Juice/Wine	Normally
2.	Bell	Bellshi	Bellshi	Winter	Juice/Wine	Normally
3.	Plum	Plumshe	Plom	Summer	Juice/Wine	Normally
4.	Pear	Naspati		Summer	Juice/Wine	Normally
5.	Gooseberry	Khetu	Khulushi	Summer	Juice/Wine	Normally
6.	Naga apple	Kiphunshe	Ciepho	Winter	Juice/Wine	Normally
7.	Wild fig	Kiphurhe	Chiede	Winter	Juice/Wine	Normally
8.	Cherry	Tivishe	Kezie	Winter	Juice/Wine	Normally
9.	Banana	Okhukeshe	Thayie	Throughout the ye	Juice/Wine	Normally
10	Guava	Muduram	Muduram	Winter upto Nov.	Juice/Wine	Normally
11	a) Orange (small)	Zohushe kechuvü	Huomou	Winter upto Nov.	Juice/Wine	Normally
	b) Orange (big)	Zohushe Keyovü	Zohushe Keyovü		Juice/Wine	Normally
12	Sugarcane	Okhrecho	Okhrecho	Summer/Winter	Juice/Wine	Normally
MEAT ITEMS(Thu)						
1.	Pork	Ovothu	Thevotsü	Whole year	Put in boil, make chutney	Smoked dry
2.	Beef	Othothu	Mithu tsü	Whole year	Put in boil, make chutney	Smoked dry
3.	Chicken	Ovuthu	Thevü tsü	Whole year	Put in boil, make chutney	Smoked dry
4.	Duck	Hasthu	Hastsü	Whole year	Put in boil, make chutney	Smoked dry
5.	Cat	Nyarethu	Nyarethu	Whole year	Put in boil, make chutney	Smoked dry
6.	Dog	Ohithu	Thejü tsü	Whole year		Smoked dry
7.	Bird(More than 30 variety)	Orathu	Pera tsü	June to August (Migratory birds)	Roast	Smoked dry

8.	Grasshopper	Kokhore	Kokhore	Winter	Taking out the head and intestine, fry the rest	
9.	Grasshopper with long neck	Komure	Komure	Winter		
10.	Frog	a) Kolnu	Kolnu	Throughout the year but mainly consume in winter season	Fry, roasted	Smoked dry
		b)Kobwa	Kobwa			
		c)Koto Kosha	Koto Kosha			
11.	Snail	Kona	Nula	October-November	Fry, Boiled	Smoked dry
FISH ITEMS(Okhru)						
1.	Fish	Okhru	Kho	Throughout the year	Fry, Boiled	Dry/Smoked

APPENDIX-II

AGRICULTURAL OPERATIONS THROUGHOUT THE YEAR:												
	Months											
Agricultural	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug	Sep	Oct	Nov.	Dec
1. Paddy	Digging of seed bed	Spreading of seeds over the seed bed	Cleaning of seed bed		Cleaning of seed bed	Transplantation field		Cleaning of the field		Harvesting		
2. Maize			Plantation				Harvest			Harvesting		
3.Potato												
a)Tekru alu		Plantation			Harvest							
b)Ketsa alu			Plantation				Harvest					
4.Pumpkin			Plantation							Harvesting		
5.Chilli				Transplantation field.								
6.Beans												
a)Oti						Harvest						
b)Orku		Plantation									Harvest	
c)Tosoti											Harvest	
d)Dal										Harvest		
7.Cabbage	Harvest					Plantation					Harvest	
8.Mustard	Harvest					Plantation					Harvest	
9.Onion				Plantation			Harvest					
10.Cucumber				Plantation		Harvest						

FLOW CHART OF RICE BEER (ZOTHU) PREPARATION:-

Ingredients:-Sticky rice, water, millet powder, paddy powder.

Cooked rice (sticky) + boiled+millet powder+ ½ cup of paddy powder (for 2kg of rice)

↓

Kept in earthen pot or any container for 48 hours (Depended on the preference of concentration)

↓

Add 3ltrs of water

↓

Wait till froth is formed

↓

Rice beer

FLOW CHART OF LOCAL WINE PREPARATION

Ingredients: Fruits, Water, Citric Acid (For Long-term Preservation)

Ripen fruits

↓

Repealing of fruits

↓

Smashed flesh of fruits+water (3times of flesh) + sugar (equal amount of fruit)

↓

Kept in a jar 7 days or more (depending on the preference of concentration)

↓

Wine

APPENDIX-III

List of indigenous materials, which are used for various purposes:

1. It is known as **Othopi** and is used in every household as decorative material. It is placed on the wall of the front room or in front of the gate even in traditional wooden gate and stone also. In some areas scimitar of horns of Mithun can be noticed on gate. This notifies the bravery and valor of the **Angamis** (Ph.15)

A Typical Angami House with cow's (**Othopi**) and mithun's head for showing bravery and socio- economic status.

Cow's Head placed on a Rengma House

Cow's Head (**Othopi**) on Traditional Gate

Ph.15 : Cow's and mithun,s head (**Othopi**) placed on the wall of house or traditional gate.

2. **Khoru** : It is used for carrying firewood. It is made of bamboo and is used mainly by the Men.
3. **Granary- Okhi** (Ph.16) is used for storing paddy after harvest. It is made of bamboo & double wall.

Traditional Granary (**Okhi**) and covering of granary (oha).

Granary (**Okhi**) with paddy is presenting as property from parents todaughter.

Ph.16: Granary (**Okhi**) and covering of the granary (**oha**)

Ph.17: **Opi** and **oma** for milling

Ph.18: **Pani lao**

4. It is known as **Oha** (Ph.16) which is used for covering **Okhi** (Grannary). It is made of bamboo. It is different shape of **Oha** for carrying vegetables and it is made of bamboo.
5. **Opi** (Ph.17) is used for dehusking and milling of paddy and other crops. It is made of wood.
6. It is called as **Oma** and is used for the same purpose as **Opi** (Ph.17).
7. It is a dried bottlegourd (**Pani Lao**-Ph.18) and used as a drinking of rice beer.
8. It is known as **Ochinako**, which is used for keeping items such as spoon, knife, spatula etc.
9. These are called **Okho** (Ph.19), which are used, as rice dish. It is traditional type and made of wood.

Ph.19: Naga food in their traditional dish (okho)

10. It is called as **Lickey** and is mainly used for storing water, and also as a container during rice beer preparation. It is made of mud & clay.
11. It is called as **Liku** used for the same purpose as **Lickey** but it is made of metal.
12. It is called as **Orha** (Ph.20), which is used as crop container, which is made of bamboo.

Ph.20: Bamboo crafts (orha, khatoi, lithu) used for carrying, drying and storing.

13. **Bakha**, which is used as sitting stool, made of wood. (Traditional type)
14. **Dula** which is used for threshing of paddy. It is made of bamboo.
15. **Oba**, which is made wood, which is used for sitting purpose.
16. **Esho,** made of wood and used for keeping different types of Dao.
17. **Khatoi** is bamboo container used for keeping and carrying fish, snail, frog, aquatic living things from field (Ph.20).
18. It is called as **Oso** which is used for drying crops, used as drying tray.
19. **Lithu** (Ph.20), used for cleaning of crops and vegetables.
20. **Lahero**, used for seiving and winnowing or cleaning of crops.
21. Bamboo net structure in triangle shape used for sieving and draining of rice beer distillation.
22. **Habaso**, made of wooden plank with bamboo handle, and drying mat (**opa**) which are used for spreading and piling of paddy during drying in sunlight (Ph.21)

Ph.21: Drying mat (**opa**) and decorated wooden plank (**habaso**)

23. **Khoro** (Ph.22) it is used for carrying firewood made of bamboo, net structure.
24. **Khoiho** (Ph.22) it is used for carrying any kind of crops made of bamboo, no gap in between bamboo srtipes.
25. **Khor** (Ph.22) it is used for carrying vegetables made of bamboo, net structure.

Fig-22: Bamboo Basket (Khoro, Khohoi, khor) used for transportation of vegetables and crops.

26. **Khole** (Ph.23) is used as gift items for marriage and also used as same item after death of women on her coffin as a symbol of women & it is made of bamboo.
27. **Khopi** (Ph.23) is used as a gift during marriage ceremony, for carrying grains andutensils during party and is made of cane.
28. **Khose** (Ph.23) is used for carrying grains and it is made of bamboo

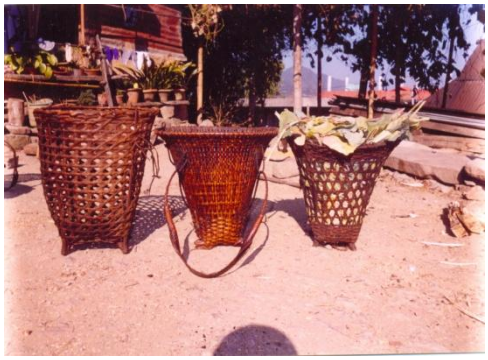

Fig-23: Bamboo Basket (**Khole**, **Khopi**, **Khose**)

Ph.24: Different types of **Naga dao**

29. Different types of Naga daos (**Yiewe**, **Yiezi** etc.)(Ph.24) used for different purposes
30. Different types of naga spades (Ph.25-Aati, Odhu etc) used according to nature of work and topography of the land

Ph.25: Different types of Naga spades

31. Weeder (Ph.26): **Owe** is used for weeding fork is made of iron and handle is made of bamboo/wood.
32. Leveler/puddler (Ph.26): **Mikosorwe** is used for leveling and it is made of wood
33. Threshing sticks (**Dula** Ph.26): Bamboo and wooden sticks are used for threshing purposes

Ph.26: Weeder (**owe**), puddler (**Mikosor**), stick (**Dula**)

Ph.27: Indigenous Sickle (Zekwenu) threshing

34. Indigineous Sickle (Ph.27): Indigenous sickle/Naga sickle (Zekwenu) used for harvesting.
34. Watering system (Ph.29): Used decorated bamboo as pipe to distribute water during party

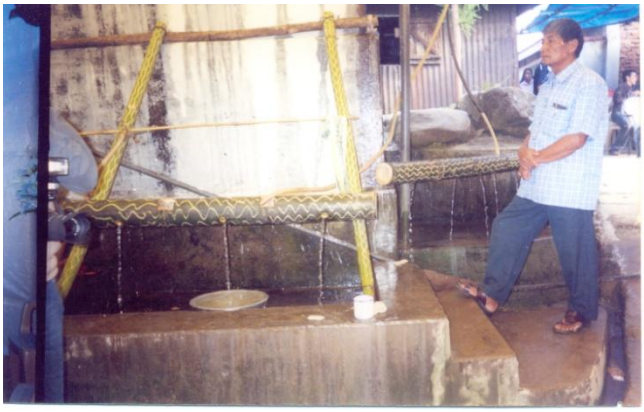

Fig-29: Traditional watering system of Angami.

Reference:

Bareh,H.M, 2001.Encylclopaedia of North-East India Volome VI

Kakati,L.N;Ao,Bendang and Doulo,V, 2006. Indigenous Knowledge of Zootherapeutic Use of Vertebrate Origin by the Ao Tribe of Nagaland. J.Hum.Ecol., 19(3):163-167

Flavier, J.M. et al. (1995)"The regional program for the promotion of indigenous knowledge in Asia", pp. 479-487 in Warren, D.M., L.J. Slikkerveer and D. Brokensha (eds) The cultural dimension of development: Indigenous knowledge systems. London: Intermediate Technology Publications.

Oduol, W. (1995) "Adaptive Responses to Modern Technology: Kitui Farmers in the Semiarid Regions of Eastern Kenya in Technology Policy and Practice in Africa edited by O. M. Ogbu, B. O. Oyeyinka, and H. M. Mlawa, IDRC, Ottawa 1995

Warren, D. M. 1989. "Linking Scientific and Indigenous Agricultural Systems." pp. 153-170, In J. L. Compton, (ed.), The Transformation of International Agricultural Research and Development. Boulder: Lynne Rienner Publishers.

Warren, D. M. 1990. "Indigenous Knowledge Systems and Development." Background paper for Seminar Series on Sociology and Natural Resource Management. The World Bank, Washington, D.C. December 3, 1990.

World Bank, (1997) "Knowledge and Skills for the Information Age, The First Meeting of the Mediterranean Development Forum"; Mediterranean Development Forum,