Dwindling Forests and Sacred Groves as Conservation Measures in North-East India

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Abstract: Forests are complex and efficient terrestrial ecosystems that play a vital role in purifying the air, maintaining the fertility of the soil, providing habitats for animals, watershed protection, storehouse of biological diversity and mitigation of climate change besides providing food, fuel, shelter and livelihood to the local people. The northeastern region of India ranks among the world's 34th biodiversity hotspots and has a total forest cover of 7.98 per cent or 1, 69, 521 sq. km of our country's geographical area and 64.66 per cent of the total forest area of northeast India. However, due to the growing agrarian population pressure; extraction of natural resources such as forests, oil, coal and natural gas and its subsequent impact on land; coupled with heavy influx of immigrants from the neighbouring countries such as Bangladesh, Nepal and other eastern Indian states, has resulted in depletion of remaining forests, riverine tracts and grasslands into open forests. The highest open forests among notheastern states have been reported in Manipur (57.02 per cent), closely followed by Assam (54 per cent) and Nagaland (53.30 per cent) while the lowest has been recorded in Sikkim (20.59 per cent). Northeast India is known for worshipping nature in the form of sacred groves since time immemorial, it becomes relevant to regenerate and renew these lost forests using in situ conservation measures such as harnessing of forests through indigenous knowledge system such as sacred groves. In Arunachal Pradesh (101), Manipur (365), Sikkim (56), Meghalaya (125) and Assam (29 Dikhos, Thans & 65 Satras) and other northeastern states numerous major and minor sacred groves have been reported so far. However, due to social transformation and cultural changes among the local people, changing climate and pressure of the marginalised population onto the remaining forest land has threatened the very existence of these pristine patches of forests. Involving the local communities especially the youth to actively participate in situ conservation, empowering the youths and institutions, managing the demographic changes can be crucial to the conservation of these relict biodiversity enriched reservoirs.

Key words: Forests, open forests, in situ conservation, sacred groves

INTRODUCTION

Out of the total geographical area, India has around 80.9 million hectares (21.7 percent) of forests according to 2021 India State of Forest Report' and occupies the 10th place with highest forest cover in the world. In India area-wise, Madhya Pradesh (94,689 sq.km) has the highest forest cover in the country followed by Arunachal Pradesh (66,431 sq.km), Maharashtra (61,579 sq.km), Chhattisgarh (59,772 sq.km), Odisha (52,472 sq.km) while Punjab (3058 sq.km) and Haryana (1559 sq.km) has the lowest forest cover. However, in terms of forest cover as expressed in percentage of total geographical area, the top five states are from northeast India comprising of Mizoram, Arunachal Pradesh, Meghalaya, Manipur and Nagaland. Among them, Mizoram (84.53%, Arunachal Pradesh (79.33%) and Meghalaya (76.00%) have more than 75 percent forest cover (*Forest Survey of Northeast India, 2021*).

Northeast region of India is predominantly mountainous with approximately 70-80 percent mountains, 10-15 percent significant plateau regions and 10-15 percent crucial plains that support both agriculture and indigenous and migrated settlements. Arunachal Pradesh and Sikkim is part of Eastern Himalayas; Nagaland and Manipur are predominantly hilly and Mizoram is mostly mountainous with steep ridges and valleys. The Khasi, Jaintia and Garo Hills form a significant part of Meghalaya plateau, the Karbi Anglong and Dima Hasao Hills, plateaus of Assam, central and northern plateau of Tripura are some plateaus of the northeast. However, the Brahmaputra and Barak plains of Assam, western alluvial plain of Tripura, Imphal valley of Manipur and small plain areas along foothills of Meghalaya hold vast majority of the population and agricultural activities in the region.

Due to the ever increasing pressure of population on the environment caused by illegal immigration from neighbouring countries and absence of flat arable land in most of the hill states of northeast India, characterized by narrow and steep valleys, agriculture is primarily on the terraced slopes. The limited areas in the river valleys are intensively cultivated. As such due to the shifting cultivation (Jhum), illegal logging, habitat destruction, timber

extraction, agricultural expansion to meet the needs of the growing population, infrastructure development, mining activities, encroached settlements and illegal immigration from Bangladesh, Nepal and Myanmar have resulted in excessive depletion of forest areas of northeast India. The effects of the forest depletion are never ending ranging from biodiversity loss, climate change leading to warming temperature and change in rainfall patterns, shifting of river channels causing flood, soil erosion and degradation, pollution of water resources etc.

Unfortunately, the highest open forests today is found in Mizoram (67.05 percent), Manipur (57.02 percent), Assam (54.05 percent) and Nagaland (53.3 percent) while the lowest is found in Sikkim (20.59 percent) among the northeastern states. Further, from 2019 to 2021, all the northeastern states of India have experienced decrease in forest cover with highest being in Nagaland (-1.88 percent) followed by Manipur (-1.48 percent) and Mizoram (-1.03 percent). It is for this reason that in-situ conservation measures are given more importance where the living species can be protected and preserved in their natural habitats and ecosystems. Among all the in-situ conservation measures such as National parks, wildlife sanctuaries, Natural reserves and biosphere reserves, sacred groves are considered today to be one of the most important ways through which the interested local religious tribal communities can preserve and protect the endemic plants and animals through the use of indigenous knowledge system that have been passed on from generation to generations.

Northeastern region of India has been considered as one of the biodiversity hot spots of the world. As such the region has always been rich in endemic flora, fauna and numerous medicinal plants. However today, due to the growing population pressure, influence of other religions such as Christianity on tribal culture, in-situ conservation measures are slowly dying. Although there are hundreds of sacred groves in majority of the states of Northeast India such as Arunachal Pradesh (101), Manipur (365), Sikkim (56), Meghalaya (125) and Assam (29 Dikhos, Thans & 65 Satras) yet the conditions of sacred groves are deteriorating and numbers are decreasing in states such as Mizoram, Tripura and Nagaland. As such an attempt is made to study *'Dwindling Forests and Sacred Groves as Conservation Measures in North-East India'* and suggest some measures for its revival for a better world tomorrow.

AIMS AND OBJECTIVES

i) To find out the present status and condition of forests in Northeast India;

ii) To study the distribution of sacred groves present state wise in different parts of Northeast India; and

iii) To suggests measures to protect and conserve the different groves that represent relict biodiversity of that particular society.

1.1 Materials and Methods:

Secondary Data: Northeast India being very rich in biodiversity has been selected for the study. The data collected is from secondary sources such as articles, books, journals, newspapers, internet, Forest statistics etc. Some M. Phil and Ph. D dissertations were also studied to build a priori knowledge of the research work.

Methodology: The data are then processed and analysed using simple statistical techniques and tables are prepared. A map has also been prepared with the information collected from various sources on the presence of different sacred groves present in various parts of Northeast India.

Results and Discussion: Results are mostly analysed using simple statistical techniques. The results and discussions of the study are explained through the following points:

1. Depletion of forest in Northeast India:

Though Northeast India have highest percentage of forest with respect to total geographical area of the state viz, Mizoram (84.53 percent), Arunachal Pradesh (79.33 percent), Meghalaya (76.00 percent), Manipur (74.34 percent), Nagaland (73.9 percent), Tripura (73.64 percent), Sikkim (47.08 percent) and Assam (36.09 percent) which are all above the national average, yet there is an increasing depletion of forest cover observed in terms of quality as well as numbers. It has been observed that there has been a continuous decrease in forest cover since 2019 to 2021 in all the states of Northeast India with highest observed in Nagaland (-1.88 percent), followed by Manipur (-1.48 percent), Mizoram (-1.03 percent), Meghalaya (-0.43 percent), Arunachal Pradesh (-0.39 percent), Tripura (-0.05 percent), Assam (-0.05 percent) and Sikkim (-0.03 percent) (Table 1). There

is an increasing deforestation in this region due to the limited or unavailability of flatlands, growing population pressure for more agricultural land, modern infrastructures, social transformation, urbanization, development projects and amenities in the name of development.

The quality of forest is also on the decrease due to illigal encroachments, shortening of the jhuming cycle and ever increasing pressure on the forest resources by anthropogenic activities

Table 1: Forest cover of Northeast India, 2021

Sl. No.	States	Geographical Area	Total Forest Area	Total Forest Area (in percent)	Percentage change since 2019
1	Arunachal Pradesh	83.743	66,431	79.33	-0.39%
2	Assam	78,438	28,312	36.09	-0.05%
3	Manipur	22,327	16,598	74.34	-1.48%
4	Meghalaya	22,720	17,046	76.00	-0.43%
5	Mizoram	21,081	17,820	84.53	-1.03%
6	Nagaland	22,429	17,046	73.9	-1.88%
7	Sikkim	7,096	3,341	47.08	-0.03%
8	Tripura	10,486	7,722	73.64	-0.05%

Source: Forest Survey of Northeast India, 2021

such as collection of firewood and other materials, grazing activities, occassional human induced fires, road and highway constructions and expansion to name a few *(Devi and Baidya, 2024)*. As such, the proportion of very dense forest to the total geographical area is found to be highest in Sikkim (32.98%), Arunachal Pradesh (31.70 %), Assam (10.66%), Nagaland (10.38%), Tripura (8.38 %) and Manipur (5.55%). While the condition of dense forest is very poor in Mizoram (0.88%), and Meghalaya (3.29%) against the national average of (2.70%).

Table 2: Types of Forest Cover in Northeast States of India, 2021

Sl. No.	States	Very Dense	Moderately Dense	Open Forest
1	Arunachal Pradesh	21,058 (31.70%)	30,176 (45.25)	15,197 (22.88%)
2	Assam	3,017 (10.66%)	9,991 (35.29%)	15,304 (54.05%)
3	Manipur	905 (5.55%)	6,228 (37.52%)	9,465 (57.02%)
4	Meghalaya	560 (3.29%)	9,160 (53.74%)	7,326 (42.98%)
5	Mizoram	1,57 (0.88%)	5,715 (32.07%)	11,948 (67.05%)
6	Nagaland	1,272 (10.38%)	4,449 (36.32%)	6,530 (53.30%)
7	Sikkim	1,102 (32.98%)	1,551 (46.42%)	688 (20.59%)
8	Tripura	647 (8.38%)	5,212 (67.50%)	1,863 (24.13%)
	INDIA	99,779 (2.70%)	306,890 (43.34%)	307,120 (43.36%)

Source: Forest Survey of Northeast India, 2021

Further, the proportion of open forests is increasing in all of Northeast India with highest being in Mizoram (67.05%), Manipur (57.02%), Assam (54.05%) and Nagaland (53.30%) which are above the national average of (43.36%). While the lowest open forests were found in Sikkim (20.59%), Tripura (24.13%) and Meghalaya (42.98%) which are below the national average. The proportion of moderate dense forest is found to be highest in Tripura (67.50%), Sikkim (46.42%), Meghalaya (53.74%) and Arunachal Pradesh (45.25%) which are above the national average of 43.34%. These forests can still be saved through conservation measures and policies (Table 2).

2. Sacred Groves in Northeast India- Community based in situ conservation

In situ conservation means the conservation of ecosystems and natural habitats and the maintenance and recovery of viable populations of species in their natural surroundings and habitats (*Offord, 2017*). Sacred groves are one of the most primitive remnant reservoirs of relict biodiversity of some extensive

forests that have been preserved by the indigenous ethnic communities for centuries based on traditional, cultural and religious beliefs. They have gained prominence recently due to the important role played as a means of community conservation practices that are very important for the conservation of the environment. *UNESCO (1996) defined Sacred Groves as an area of "natural" vegetation preserved through local taboos and sanctions that entail spiritual and ecological values.* These groves provide the indigenous local people with water, food, shelter, medicines, firewood etc.

In Northeast India sacred groves are known by different names such as *Lyago, Ranthii, Thans* in Arunachal Pradesh; *Madaicos, Dikhos, Thans, Sattras* in Assam; *Gamkhap and Mauhak* in Manipur; *Law Lyntang, Law Lyngdoh, Law Niam* in Meghalaya; *Ngawpui* in Mizoram; *Gompa Reserve Forests* and *Devi Thans* in Sikkim to name a few. These groves are patches of forests land or natural vegetation known for its rich biodiversity and unique cultural heritage, and their sizes might range from a few hundred meters to many hectares. These groves, revered by local communities for centuries, serve as unique repositories of biodiversity and cultural heritage. Northeast India, officially the North Eastern Region, is the easternmost region of India representing both a geographic and political administrative division of the country. It comprises eight states—Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura, and the "brother" state of Sikkim.

Sacred groves are tracts of virgin forest that are communally protected and are usually dedicated to local deities or ancestral spirits. Northeast India is the easternmost region of India comprising of eight states namely Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Tripura and Sikkim. The sacred groves are found across almost all the states of Northeast India. Northeast India, known for its rich biodiversity and unique cultural heritage, hosts numerous sacred groves that play a vital role in conservation.

3. Statewise Distribution of Sacred Groves in Northeast India

a) Arunachal Pradesh- The state extends between $91^0$30' -$97^0$30' E longitude and $26^0$28' - $29^0$30' N latitude in the Eastern Himalayas with a geographical area of 83, 743 sq.km. The region is one of the most important biodiversity hotspots of the world with more than 500 species of avifauna and over 5000 species of flowering plants. Most of the people in the state worships nature, sun and moon as their deities and hence sacred groves are a part of their cultural and traditional beliefs. However, very few studies have been conducted and recorded due to the rugged mountainous terrain, characterized by high altitudes ranging from 800m to 7000m above mean sea level and less exposure of the areas to the modern society. Vegetation is primarily tropical mixed and broadleaf evergreen forests to alpine meadow and is dominated by Pinnus cornata, Taxus baccata, Cephalo taxus, rhododendron, ferns, wallichiana etc (*Dutta et al,2017*).

Though the state is very rich in biodiversity and has very deep cultural beliefs in sacred grove, yet very limited numbers of references are available. *Khan, 2007* recorded 101 sacred groves in Arunachal Pradesh. While districtwise Malhotra et. al have identified 58 Gompa forest and *Barbhuiya et. al* have mentioned 63 sacred groves attached to the Buddhist monasteries which are looked after by the Lama and Monpa tribes of Tawang and West Kameng districts. However, districts such as Lower Subansiri, Upper Subansiri, Papum Pare and West Siang also are reported to have numerous sacred groves but are not well documented. Most of the people in Arunachal Pradesh worships nature, sun and moon as their deities. So, a state with 26 major tribes and 110 ethnic groups have different mechanisms of biodiversity conversation, such that some patches of forest and mountains are considered to be holy and sacred ground. Some important sacred groves maintained by each clan of the villages are such as Lyago sacred groves of Lower Subansiri district; Malinithan, Akashi Ganga and Samten Yongcha Mechuka Gompa sacred grove in West Siang district; Menga Mandir and Potrang sacred grove in Upper Subansiri district; Sidhartha Vihar, Kyong Theravada Gompa and Lali Anna sacred grove in Papum pare district.

The Apatani tribe maintains 8 sacred groves called 'ranthii' in Ziro valley in lower subansiri district. These groves are mostly used as platforms for performing rituals during the Myoko festival by worshipping sacred tree 'Prunus persica' or peach tree during its flowering season in the last of February or the onset of March *(Dutta et al 2017)*. A total of 71 sacred groves have been recorded in Lower Subansiri district (Murtem and Chaudhury, 2014) locally known as *Ranthii, Lyago* or *Thans*. Tawang and West Kameng districts also have maintained

around 63 sacred groves in and around the different Buddhist monasteries which are locally known as 'Gompa Forests Reserve' (GFA). Banyan, Pipal, Ashoka, Bela and Harada are most commonly found plant species in the forests. Famous sacred groves that are frequently visited by tourists such as Malini Than, Akashi Ganga and Mechuka have been recorded in West Siang District which are frequently been visited by tourists. Menga and Portrang sacred grove in Upper Subansiri districts and 3 famous sacred groves like Siddhartha vihar, Kyong Theravada Buddhist Gompa and Lali Anne sacred grove in Papumpare district are some of the famous groves of the region *(Murtem and Chaudhury, 2014)*.

b. Assam- Assam is located in 22°19' to 28°16' North Latitude and 89°42' to 96°30' East Longitude. The state is very rich culturally, and various ethnic communities have been residing in the state since time immemorial. Several of this ethnic tribes have blended the conservation of biodiversity and cultural heritage through the practice of preserving the sacred groves. Though, total forest area of Assam is only 36 percent, the lowest forest cover in the entire Northeast India, yet some patches of forest land have been preserved for generations by protecting the sacred groves. Though many of the groves have not been documented, yet it has been found that there are 12 sacred groves called Madaicos in Dima Hasao hills and 17 numbers of sacred groves are maintained by the Karbi tribes in Mikir hills of Karbi Anglong *(Medhi and Borthakur, 2012)*. The neo-Vaishnavites also have around 65 Sattras (monasteries) in different parts of Assam, where many species of trees, plants, birds etc are preserved in its vicinity. Important famous Sattras are located in Majuli, Barpeta, Nagaon and Dhubri district. The Tai Ahom community preserves a sacred grove in Dehing Patkai wildlife sanctuary.

c. Manipur- The state of Manipur lies between $23^0$83' -$97^0$30' N latitude and $93^0$03' E- 94^0 78' E longitude in the southeastern Himalayas with a geographical area of 22,327 sq.km. Around 365 sacred groves have been recorded so far in Manipur. These groves are mostly distributed in Imphal East, Imphal West, Thoubal and Bishnupur districts of the state (Devi et al, 2005). The notable sacred groves are in Bishnupur area (22), Imphal East (38), Imphal West (98), Thoubal (8), (*Khumbongmayum, 2005*). Integral to the Meitei community, Umang Lai Sacred Groves are associated with the worship of local deities known as Umang Lai. The Zeliangrong tribes maintain sacred groves as part of their ancestral worship practices. These groves are essential for preserving the cultural identity and spiritual practices of the Zeliangrong people.

Table 3: Sacred Groves, their status and geographical distribution in Northeast India

States	Total Groves	Locally known as	Districts
1. Assam	29 thans and Dikhos/ madaicos 65 sattras	Thans Dikhos/ Madaicos Sattras	12 Dikhos in Dima Hasao district 17 sacred groves in Karbi Anglong More than 50 thaans of Bodos, Ahoms and other ethnic groups 65 major sattras spread across all Assam. Important ones are located in Majuli, Barpeta, Nagaon and Dhubri district
2. Arunachal Pradesh	101 sacred groves	Lyago, thans	62 Gompa sacred groves in Tawang and west kameng 8 groves in Lower Subansiri 2 groves in Upper Subansiri 3 in Papumpare district
3. Manipur	365	Gamkhap, Mauhak	Majority of the sacred groves are found in four districts of Bishnupur (22), Imphal East, Imphal West, Thoubal
4. Meghalaya	125	Law Lyntang Law Lyngdoh Law Niam	East Garo Hills, East Khasi Hills, Jaintia Hills, Ri-Bhoi West Garo Hills and West Khasi Hills.
5. Mizoram	Not documented	Ngawpui Village Forest Reserves	Each Mizo village has its own sacred grove, bamboo forest reserve etc.

6. Nagaland	Not documented	Community Conserved Areas (CCA)	Pauna Range Conservation Community (24 villages) Nanga Greener Zone Committee (14 villages) Dzuleke Conserved Area Ntangki National Park
7. Tripura	Not Documented	Community Conservation measures	Hathai Kotor Sacred Grove Nutan Bazar Sacred Grove Community conservation measures by the tribal communities in villages of Unakoti district, Tripura
8. Sikkim	56	Gumpa Forest Reserve (GFR) Devi Than	Sacred Groves are found in all 4 districts

Source:

d. Meghalaya- Bordered on the East and North by Assam, on the west and south by Bangladesh, Meghalaya lies between 25^0 2' N to 26^0 7' N latitude and 89^0 49' E to 92^0 50' E longitude in India with a geographical area of 22,429 sq.km. The Meghalaya plateau is mostly characterized by mountainous terrain (60m to 1961 m average sea level) with some rolling grasslands interspersed by rivers, breathtaking waterfalls and serene valleys. As such, Meghalaya is gifted with many sacred virgin forests preserved by the ethnic tribes for thousands of generations. More than 125 sacred groves have been documented so far which are locally known as Law Lyntang, Law Lyngdoh and Law Niam. Some of the largest area under sacred groves are found in Meghalaya with 50 sacred groves in East Khasi hills, 21 sacred groves in West Khasi hills, 15 sacred groves in Jaintia hills, 8 sacred groves each in East Garo hills and West Garo hills while 3 sacred groves are found in Ri Bhoi district *(Tiwari, 1999)*.

Mawphlang Sacred Grove, Meghalaya

Poisonous plant, Mawphlang Sacred Grove

Mawphlang sacred grove is one of the most well preserved groves of Meghalaya. These groves are well-preserved, maintained and strictly prohibited grove that serves as a cultural site and a biodiversity hotspot, home to various endemic species of plants and animals. The Jaintia tribe in Nartiang preserves a sacred grove associated with their deities and ancestors. The Garo tribe maintains sacred groves in the Balpakram area, which are significant for their cultural and spiritual practices and serve as important biodiversity reserves.

f) Mizoram- Mizoram is situated in the 21^0 58' N to 24^0 31' N latitude and 92^0 15' E to 93^0 29' E longitude with a total area of 21, 087 sq.kms in Lushai hills sharing borders with Myanmar in the East and South and Bangladesh in the west. Mizoram has 84.53 percent or 17,820 sq.km total forest area which is highest in Northeast India. Some important trees found in Mizoram are Dipterocarpus turbinatus, Artocarpus Chaplasa, Terminalia myriocarpa, bamboos such as Melocana bambusoides, Bambusa tulda, Michelia champaca, Pinus keseya,

Rhododendron arboretum etc. The sacred groves in Mizoram locally known as Ngawpui are found in the form of village forest reserves. Some village forest sacred groves are such as Lengte village reserve, keitum village VLA reserve forest etc. *Reiek Tlang* is a sacred grove in Mizoram, well preserved by the Lushei tribe. The grove serves not only as a cultural site but also as a biodiversity hotspot and tourist destination for nature lovers as it preserves various endemic plants and animal species. The Dampa Tiger Reserve and sanctuary also has a sacred grove that is maintained by Mizo community. This grove is a best example of traditional modern beliefs preserved through modern conservation efforts. It serves as a habitat for the endangered Hoolock Gibbon and numerous bird species. Several groves in the Lunglei district are also preserved by local tribes. This grove is protected by traditional beliefs and modern conservation efforts.

e) Nagaland- Nagaland is located in 25^0 6' N to 27^0 4' N latitude and 93^0 20' E to 95^0 15' E longitude with a total area of 16, 579 sq.kms. It is a mountainous state with rich luxurious forests, rolling hills and mountains, enchanting valleys and swift flowing rivers. It is situated in the extreme northeast of India bounded by Arunachal Pradesh in the north, Assam in the west, Manipur in south and Myanmar in the east. Sacred groves were deeply rooted in the spiritual beliefs of the Naga people for hundreds of generations.

Pauna range

Dzuleka

However, due to the growing influence of Christian religion to the greater majority of population, the traditional beliefs of the people are taking a backstage. Regardless, some ancient sacred groves are still preserved by both the government as well as the people of some communities such as the Longkhum, Khezakeno sacred groves, Dzuleka conserved area and Intanki national park. Further, some groups of village communities together conserve some forests together such as the Pauna range conservation community comprising of 24 villages, Nanga greener zone committee consisting of 14 villages to name a few. Sacred groves in Nagaland host a variety of plant species such as Ficus spp., Castanopsis spp., and Quercus spp., and animal species including the Hoolock Gibbon, Blyth's tragopan and the Indian hornbill.

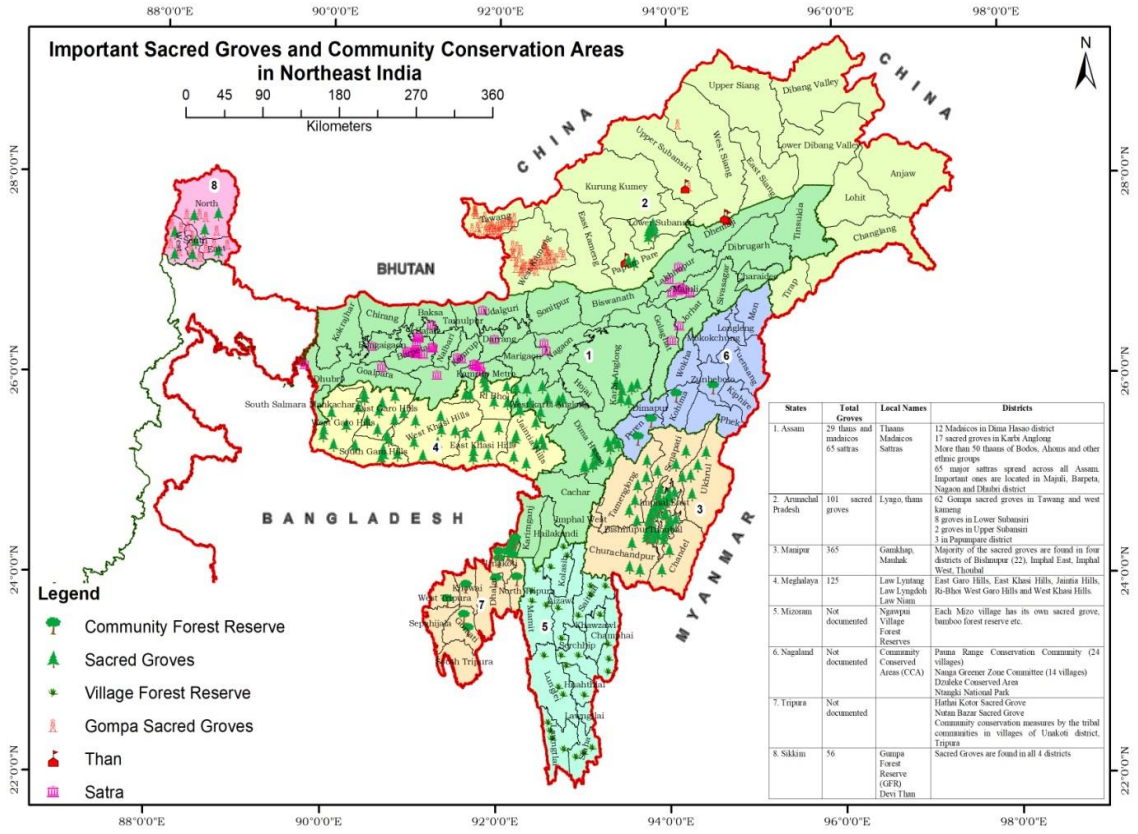

Fig. 1

g) Tripura- Tripura is located approximately in between 22^0 56' N to 24^0 32' N latitude and 91^0 0' E to 92^0 20' E longitude with a total geographical area of 10, 486 sq.kms. The tribal communities in Tripura make about approximately 31 percent of the state's total population in Tripura. The major tribes include Tripuris, Mogs, Reangs, Chakmas and others, some of whom perform traditional rites and rituals in the sacred groves. Some examples of community conserved sacred groves in Tripura are such as Unnikoti, Hathai Kotor, Nutan bazaar sacred groves, Raimangal sacred grove, Hadiakhang and Radhakrishna sacred grove etc. Sacred groves in Tripura host a variety of plant species such as Ficus bengalensis, Schima wallichii, and Artocarpus chaplasha, and animal species including the Phayre's leaf monkey, hoolock gibbon, and various bird species like the green imperial pigeon. The Hathai Kotor sacred groves are maintained by the Jamatia tribes and it serves as a cultural site and biodiversity hotspots with home to various endemic species of plants and animals. While the Halam tribe of nutan bazaar preserves sacred groves that serves as habitat for the endemic hoolock gibbon and numerous species of birds.

h) Sikkim- Sikkim is a small Himalayan state located at 27^0 5' N to 20^0 9' N latitudes and 87^0 59' E to 88^0 56' E longitude with an area of 7,096 sq.km. Wedged in between the Himalayan kingdom of Nepal in the west and Bhutan in the East, it is bounded by Darjeeling District of West Bengal in south and some part of Tibetan plateau in the North. Sacred groves in Sikkim are an important aspect of the cultural and ecological landscape. These groves are revered by local community. Most of the sacred groves in Sikkim are used for performing rituals, offering prayers and celebrating festicals by various communities, such as Lepcha, Bhutia and Nepali indigenous groups.

Around 56 Gompa Forest Reserve (GFR) has been recorded in Sikkim. These forest reserves are associated with Tibetan monasteries and hence, play a very significant role in the conservation of biodiversity as well as the preservation of cultural heritage and practices. Sikkim also is known to have numerous Devithans. Devithans are shrines of local deities having a sacred grove or forest dedicated to it. These shrines hold spiritual significance for the local communities and are central to various rituals, offerings and religious festivals. In this forests any human activities such as cutting/felling of trees,

building houses or agricultural activities etc is prohibited absolutely.

4. Measures to protect and conserve sacred groves by communities in Northeast India:

The sacred groves are forest areas that are preserved by the indigenous communities due to their spiritual, cultural and ecological significance. Some of the traditional and modern measures that can be employed to protect and conserve these groves are:

(i) Reviving and Reawakening Cultural and Religious beliefs: The age-old religion beliefs with ecological significance can be received among the people that act as a powerful deterrent against exploitation. Rituals, festivals and ceremonies related to the groves can be reinforced to strengthen the community's connection to nature.

(ii) Traditional Governance System: a) Customary Laws: Recognizing and reinforcing customary laws such as prohibition of cutting trees, hunting and other forms of exploitation within the groves. Breaking the rules will entail strict punishment set by the communities.

b) Community Enforcement- Local councils headed by village elders may monitor and enforce protection measures to ensure preservation of sacred groves.

(iii) Sustainable use and Conservation practices: a) Selective Resource Use: In some economically weaker societies, some limited and controlled resource use can be permitted such as collecting medicinal plants, fallen twigs and branches for firewood etc but under strict vigilance so that ecosystem remain intact.

b) Fire management- Traditional fire management techniques can be followed to prevent forest fires and maintain ecological balance.

(iv) Transmission of Knowledge: a) Oral tradition- Through stories, folk songs and folk drama etc the knowledge and importance of sacred groves can be passed on from generation to generation to respect, protect and conserve them.

b) Educational awareness- Indigenous communities can also promote awareness within and beyond their communities about the importance of preserving and conserving the forests.

(v) Integration with modern conservation efforts: The indigenous communities can collaborate with government agencies and NGOs to formalize protection through legal recognition, environment education initiatives and biodiversity conservation programmes. Efforts can also be made for the sacred groves to be recognized as heritage sites.

(vi) Demarcation of proper boundary line: Proper boundary markers such as specific totems, stones, boundary walls etc., is very essential to save it from encroachers and poachers.

(vii) Ecological Restoration and Reforestation: In some regions of Northeast India such as Nagaland, communities themselves actively engage in reforestation and ecological restoration by planting trees to revive the degraded sacred groves and restore biodiversity.

CONCLUSION

Though North-East India is known for its rich biodiversity and forest cover, yet with the continuing expansion of urbanization, there is a change in the landuse and landcover due to the growing population pressure, growing plantation agriculture like tea, rubber, palm tree, etc leading to mass depletion of forest resources. Restoring and protecting sacred groves in Northeast India by the communities can be one of the ways through which the forests can be revived and replenished with its rich biodiversity indigenously. Preserving these groves requires recognizing their importance, understanding the traditional knowledge associated with them, and addressing contemporary threats through integrated conservation strategies. Strengthening the protection of scared groves can significantly contribute to biodiversity conservation, environmental protection

and the well-being of indigenous communities. Through a combination of community participation, traditional governance, spiritual reverence, sustainable practices coupled with modern conservation methods, the indigenous people of Northeast India can effectively protect and conserve their sacred groves.

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