CHAPTER -6

ROLE OF FOREST DWELLERS IN BIODIVERSITY CONSERVATION

Chapter- 6

Role of Forest Dwellers in Biodiversity Conservation

6.1 Introduction

Conservation of biodiversity is a part not only for sustainable development activity but also for the research and policymaking process initiated by world leaders in the United Nations Conference on Environment and Development (Rio-de Janero, Brazil, 1992) as well as Millennium Development Goals of the United Nations (Mahanta, 2013). As mentioned in the Chapter.1, biodiversity has emerged as an issue of global concern; almost all the countries of the world, irrespective of their locational and socio-political characteristics, have now come forward in an organised manner to address the issue relating to biodiversity as there has been increasing threat and pressure on the biosphere (Bhagabati, Kalita, & Baruah, 2006).

As a part of the Biodiversity hotspot zone of Himalayan ranges, Kokrajhar district of Assam is regarded as having rich biological diversity due to its climatic condition, and wide variety in physical features which witness a diversity of ecological habitats such as forests, grasslands, wetlands which harbour and sustain wide-ranging floral and faunal species. Because of its richness in biodiversity, the district of Assam has been identified as a part of the 18th biodiversity hotspot of the world (FSI, 2015).

Despite having the richness of flora and fauna coupled with the most suitable natural conditions for sustainable growth of forestry, Kokrajhar district of Assam has been progressively losing its biodiversity as well as a vast tract of forest due to various reasons such as encroachment into forest land, clear-felling

for agriculture, biotic pressure, illegal logging and other development activities etc.

Thus, conservation of biodiversity in Kokrajhar district is indeed a need of the hour, along with the line of national and international belief that through the community involvements and revival of tradition, art, culture, religious belief of tribal community can some extent help to preserve the sustenance of biodiversity. Thus, it can be done with the help of local self-government with the central government's supervision and the involvement of community-based NGOs.

6.1.1 Objective of the Study

The present chapter's objective is mainly to see the roles and attitudes of forest village dwellers in general and tradition, culture belief of Schedule Tribe community in particular, towards biodiversity conservation of the study area. Since the earlier period, the relationship of tribal and other forest-dwelling communities depends on the forest for their food, shelter, and other essential materials and attached to their sentiments. This symbiotic relationship of man and forest is still prevalent even in the age of science and technology. However, excessive use of forest resource was dwindling not only the vast tracts of forest areas of the district but also other parts of the region.

6.1.2 Method

The primary data of sample household have used for the present study. The nine socio-economic and demographic variables were selected to study the difference in attitude and involvement of forest villages towards biodiversity conservation. These nine variables are namely, age, caste, sex, family size, occupation, literacy, house type, land holding, and fuel wood use for cooking. Out of these nine variables, three variables, namely family size, age of the respondents and total landholdings, were captured in the absolute figure. The responses of respondents of this three-variable were divided into two categories- (i) family size was divided into- less than 5 and more than 5 members of family,

(ii) age of the respondents were divided into- age group of 15 - 59 years and 60 years and above, and (iii) landholding was divided into-less than 15 bigha and more than 15 bighas of land.

Chi-square test is used to check whether the difference in response to attributes related to biodiversity conservation and environment were associated with these nine socio-economic and demographic variables. The same test was also used to check the difference in response to participation, and involvements related to biodiversity conservation were associated with these variables.

The formula for the chi-square test is:

$$\chi^2 = \sum (O_i - E_i)^2 / E_i$$

Where, χ^2 = chi squared, O_i = observed value and E_i = expected value.

Again, to see the roles played by the Schedule Tribe people towards forest conservation, simple descriptive statistical methods have been used here.

6.2 Brief Overview of Forest Degradation in Kokrajhar District:

6.2.1 Forest Degradation & Its Management during the British Colonial Period

In order to know the present scenario of forest degradation, it's imperative to understand in brief the forest management system during British colonial rule.

Assam became the part of British Indian Empire after the Treaty of Yandaboo, signed on February 4, 1826. Since then, Assam was subjected to fulfilling the imperial interests and needs of the British Empire. Prior to the British colonial rule, there was limited use of forest resources in Assam. The people of Assam used the forest only for building houses, making boats and agricultural appliance and for firewood's, and edible leaves, fruits etc. that accounted extremely negligible. The people are free to collect whatever they need except revenue from some forest products like ivory aloes, wood, etc. After Assam was

colonised, every bit of available land was sought to be brought under imperial control for imperial gains (Handique, 2004).

As such, to fulfil the British Empire's requirement, various forests Act and Regulations has been brought and implemented from time to time. The Assam Forest Regulation Act VII of 1891 was one of them. Under this Act, the forest was constituted with three categories; reserved forest, village's forest and un-classed state forest. Through the implementation of this forest Act, more and more forest areas were brought under the reserved forest and alienated people from the forest. Further, the Section 28 of the Assam Regulation 1891, deforestation was permitted with the sanction of the Imperial Government of India. Initially, lands lying fallow or without any commercially productive timber were deforested or disposed of to meet the requirement of the tea companies (Saikia, 2011).

Again, the vast tracts of wasteland were brought under tillage by encouraging people of Nepalese origin to upper Assam, Santhals to colonise in the district of the then undivided Goalpara (presently known as Kokrajhar district) and allow the influx of refugees from East Bengal to moved northwards into Assam. In the twenty years ending 1950, the immigrants from East Bengal (presently known as Bangladesh) had turned some 1.5 million acres of forest into settled agriculture. Therefore, the forest department did not act as a saviour of the forest cover of Assam but indirectly affecting demographic change (Handique, 2004).

As discussed in Chapter 4, the forest areas of the present Kachugaon and Haltugaon and Parbahjora forest division of Kokrajhar district (earlier part of undivided Goalpara district) was rich in hard *Sal* and other valuable trees. So, the management of this province is an important part of the British Forest Policy in views generating revenue from *Sal* and other forest products. The imperial forest department earned a huge amount of revenue by supplying a large quantity of *Sal* log for construction of railway sleeper, log bricks for railway track and railway

bridges etc. As a result, a large quantity of natural *Sal* forest has been felled and degraded during the British Imperial period in the district.

Therefore, to continue an uninterrupted supply chain of *Sa*l and other valuable timbers product from natural Sal forest for revenue, the imperial forest department of erstwhile Goalpara division implemented the following forest policy for extraction and at the same time conservation of Sal forest in this division.

6.2.1. 1 The Rides and Parallel

Forest fire is a unique and universal problem for a long time around the world. In India, there was no regulated control over forest fires during pre-colonial times, and rarely attempt was made to seek relief against them. To protect the forest from fire, the imperial Forest Department of India adopted conventional fire protection in Assam along with the Indian provinces in 1873 (Saikia, 2011). The Forest department employed the firewatchers', digging of fire lines in parallel and ridge of the forest. However, after several decades of experiment on fire protection measures, it came to conclude that it has a negative effect on *Sal* tree's natural regeneration of the moist forest of Kachugaon and Haltugaon forest division of the then undivided Goalpara district. But, it was helpful for the dry forest of the other parts of the country. As a result, fire protection in Goalpara district was abandoned in 1915-16 (Stebbing, 1982). Later, these fire lines and ridge are used as patrolling forest roads of the forest department and other important forest villages' roads.

6.2.1.2 Introduction of Beggar System

In order to manage the acute shortage of labourers for forestry works, the forest department was introduced first forest village in the reserve forest of the then undivided Goalpara division (presently Kachugaon forest division). In these villages, each and every family were given 12 bighas of patta land and revenue were fixed at a concessional rate. Every adult forest villager was required to

render 20 days of manual labour annually in return for ordinary wages. This system is known as the beggar system, which was introduced during the British period (Saikia, 2011).

The beggar system still exists in this division, and it is not abandoned yet, but now a day's forest villagers have to pay land revenue in lieu of beggaries to the forest department. Their land system is neither saleable nor mortgageable. Since the establishment of forest villages during the pre and post-independence period, there were altogether 499 governments recognise forest villages in Assam, which was waiting for conversion of forest land to revenue land from the government.

Now, the forest villagers have got relief after the implementation of the Forest Dwelling Act of 2006. But, till now, villagers are waiting for the land patta from the concerned authority.

6.2.1.3 Establishment of Tramway at Kachugaon Forest Division

In order to exploit the forest resources from the far-flung areas of the province, the construction of a tramline had started in 1901-1902 with a very modest millage of 2½, which was later extended to a total of 31 ½ miles approximately by 1939. The forest tramline's connection to the trunk line was between the Kachugaon forest range and the Fakiragram Station of the Eastern Bengal Railway (Handique, 2004, Hillaly, 2016). The main reasons for the construction of the Tramway line were the extraction of high-quality Sal log for railway sleepers, high and profitable demand from the construction of Eastern–Bengal Railway trunk line and Gangatic Railways network, for rapid transportation of timber from Kachugaon forest division to Fakiragram railway station, labour and water transportation for plantation work undertaken inside the forest, timber harvesting from forest etc. Though the forest tramline was exclusively built to serve the imperial interest of the forest department, it also indirectly served as a development of the transport system in the area.

The full-fledged operation of the Tramway in the Kachugaon forest division is operationalised during the post-Independence also for labour and water transportation for plantation work undertaken inside the forest, timber harvesting from forest etc. However, the normal functioning of the forest tramway was disrupted and dismantled during the Bodoland movement lead by the All Bodo Student Union (ABSU) in the region in the 1980s. Further, it is dismantled during the Bodo and Adivasi riots of 1996s.

Thus, the genesis of forest degradation has been witnessed from the British imperial policy towards the forest of Assam in general and present days Kokrajhar district in particular. It led to the marked change in the area and composition of both flora and fauna of the forest of Assam as well as Kokrajhar district. This is because, conservation of biodiversity was not taken seriously during the British rule, as their main motive is to earn only revenue from the forest resources.

6.2.2 Present Scenario of Deforestation in Kokrajhar District

Forest degradation/deforestation is continued even after the post-independence of India. For exploitation and forest management are concerned, the Government of India still follows the British forest Policy. As mentioned in Chapter 1, forest villages' creation was abandoned in 1931 by the British Empire in India. However, due to the lack of a strict forest policy in India, it has continued until the introduction of the Forest Conservation Act of 1980. Prior to the 1980s, large areas of forest land had been cleared and allotted to landless people of the local community. But, after the enactment of the law, diversion of forest land to human settlement is not permitted. However, forest land has been continuously cleared and occupied illegally with the hope that they will get the allotment of the occupied land in future. It is estimated that at present more than 30 per cent of forest land is under the vicious grip of encroachers (Council, Profile on Forest and Wildlife of Bodoland Territorial Council, n.d.). As mentioned in chapter 3, there

are 499 officially allotted forest villages in Assam; out of that, 145 forest villages were in the Kokrajhar district.

The officially allotted land to forest villages prior to the Forest Conservation Act of 1980 of Kokrajhar district is given in the following table no. 6.1.

Table No.6.1

Officially allotted land for forest villagers (in hectares)

Forest Division	Area
Kachugaon Division	16476.99 ha
Haltugaon Division:	3346.21 ha
Parbathjora Division	750.49 ha
Total	20573.69 (205.74 sq.km)

Source: Working plan Office (Forest), Kokrajhar division, 2012.

From table no 6.1, it is observed that out of the total geographical area of 3269 sq km, only 1144 sq. km. is officially recorded as total forest area in the district as in 2011, out of that forest villages occupy only 205.74 sq km, i.e. 17.98 per cent of the recorded forest.

6.2.2.1 Encroachment of Reserve Forest in Kokrajhar District

The main reasons for the decrease of the forest cover of the Kokrajhar district of Assam are mainly due to encroachment in forest land for expansion of agriculture and residential purpose, illegal logging, and biotic pressure. Besides the officially allotted land to forest villages, until the Forest Conservation Act of 1980, Kokrajhar district has also experienced encroachment of the vast tract of its forest area.

From the following table 6.2, it is observed that altogether 183.56 sq. km of forest areas have encroached in the three forest division of Kokrajhar district,

which is accounted for 16 per cent of the total forest areas of the district with its boundary in 2011. In terms of division, the Haltugaon forest division recorded the highest encroachment with 154.4 sq. km of its forest areas, which is 13.49 per cent of the district's total forest areas, followed by the Kachugaon division with 2.11 per cent. The forest division wise encroachment of forest land in Kokrajhar district is given in table no. 6.2.

Table No. 6.2

Division wise encroachment of forest land in Kokrajhar district (as in 2012)

Name of Forest Division	Name of Reserve forest		Area of Encroachment (in sq. km.)
Kachugaon Division	1	Ripu-Reserve forest	21.72
	2	Kachugaon Reserve Forest	0.90
	3	Elashijhar Reserve Forest	1.54
Haltugaon Division	4	Chirang Reserve forest	150.00
	5	Manas Reserve Forest (pt)	1.00
	6	Bental Reserve Forest (Pt.)	0.60
	7	Nandegiri Reserve Forest	0.10
	8	Satbendi Reserve Forest	2.70
Parbathjora Division	9	Guma Reserve forest	5.00
		Total	183.56

Source: Working plan Office (Forest), Kokrajhar division, 2012.

According to forest officials, encroachment is mainly from the dependents of officially allotted forest villages predate of the 1980s and non -forest villages. Among these, encroachment from non-forest villages is the highest as against the forest dwellers in the district due to lack of strict legal action on encroachers.

6.2.2.2 Assessment made by the Forest Survey of India (FSI)

The assessment of India's forest cover is done with the Forest Survey of India (FSI) since its inception in 1981 and was reorganised in 1986. Forest Survey

of India captures the forest cover of the country on the basis of satellite data in the series of biennial assessments since 1987. However, the details of the district-wise assessment of forest cover of Assam were not available until the ISFR of 1999.

As discussed on page no.15 of Chapter 1, it is clear that the Indian State Forest Report (ISFR) started its assessment on district wise forest cover in 1991, but an independent figure on forest cover of Kokrajhar district was not available until the SFR of 1999. Therefore, to see the present change of forest cover of the Kokrjhar district, the Indian State Forest Report (ISFR) from 1999 to 2017 was adopted.

The district's forest cover based on SFR's assessment from 1999 to 2017 is given in the following table no.6.3.

Table No.6.3
Change of forest cover in Kokrajhar district, from 1999 to 2017 (in sq.km.)

Assessment Year	Geographical area	Total Forest Area	Biennial Change (sq. km)
1999	3538	1630	-
2001	3538	1364	-266
2003	3538	1183	-181
2005	3296	1183	0
2007*	3296	1173	-10
2009	3296	1163	-10
2011	3296	1144	-19
2013	3296	1120	-24
2015	3296	1107	-13
2017	3296	1158	51
		Total	-472

Source: Census India, 2001, 2011 & SFR 1999 to 2017

Notes: (1) Due to the reorganisation of the district, the geographical area of Kokrajhar district has declined to 3296 sq. km in 2005.

(2) 2007* represent interpolated data of SFR.

As per the Indian State Forest Report (ISFR), from the period of 1999 to 2017, overall 472 sq .km (29 %) out of total forest cover has been changed /lost in Kokrajhar district. Out of that, 266 sq. km of forest-covered has changed/ lost in 2001 and followed by 181 sq. km in 2003, due to illegal encroachment in forest areas in the district. From table 6.3, it is also observed that forest cover has changed continuously, ranging from 10 sq. km to 266 sq. km due to encroachment in forest land for agriculture, biotic pressure and other development activities. The positive change of forest cover was seen in 2017 due to the afforestation programme launched in the district.

From the unpublished official data of the Working plan of forest division of Kokrjhar district (Table 6.2) and ISFR of the Kokrajhar district from 1999 to 2017 (table 6.3), it is observed that vast tract of forest-covered of the district have been changed due to diverse reasons such as encroachment of forest land for human settlement and agricultural activities, illegal felling of *Sal* and other valuable trees, and conversion of forest land to non-forest activities etc.

Thus, forest areas' loss and degradation affected the forest ecosystem, loss of habitations for wild animals, and loss of various known and unknown species of flora and fauna from the study areas. As a result of that the man-elephant conflict has risen; other small species have become extinct, receding water levels, changing the environment, and changing ecosystems. Along with these, the traditional way of dependence on forest resources, like- medicinal herbs, collection of firewood's, collection of honey and wild edible green leaves, has become costlier than before due to the factors mentioned above.

6.3 Communities Role and Initiatives for Biodiversity Conservation

The community role in biodiversity conservation is an indispensable part of any of the success of conservation policy because it is ultimately the perception

and attitudes of the local community who reside within or near forest areas and depend on the forest for their livelihood that will make a difference on biodiversity conservation (Mahanta, 2013).

In the present study, the community roles on biodiversity conservation are grouped into three heads:

i. Community perception and attitude towards biodiversity conservation.
ii. Traditional culture, religions and belief of tribal population on biodiversity conservation, and
iii. Initiative by NGOs and Local Government towards biodiversity conservation.

6.3.1 Community perception and attitude towards Biodiversity Conservation

6.3.1.1. Individual responses towards environmental and biodiversity conservation

Biodiversity conservation is not only important for the sustainable use of natural resources but also research and policy for management of it. The present study of the perception and attitudes of forest dwellers towards biodiversity conservation is important for the assessment for the implementation of different conservation policy of the government.

In the present study on biodiversity conservation, it is found that 79.72 per cent of respondents felt that environmental issues were important, 6.57 per cent of respondents perceived that environmental issues were not important and the remaining 13.69 per cent of respondents were indifferent to it (Table 6.4). Again, on the issue of biodiversity loss, 62.19 per cent respondents felt that it was important, 5.75 per cent respondent expressed biodiversity lost were not important, and 32.05 per cent respondents were indifferent. Lastly, in the conservation of biodiversity, 69.86 per cent of respondents agree that it was important, 24.10 per cent of respondents were indifferent and negligible parentage

of respondents were regarded it as not important for conservation. Therefore, it was clear from (Table 6.4) that the majority of respondents had a positive attitude towards the environment and biodiversity conservation.

Table No. 6.4

Individual responses towards environmental and biodiversity conservation (in percentage)

	Environmental Issue /problems	Biodiversity Loss	Conservation of Biodiversity at any cost
Important	291 (79.72)	227(62.19)	255(69.86)
Not important	24 (6.57)	21 (5.75)	22 (6.02)
Indifferent	50 (13.69)	117 (32.05)	88(24.10)

Source: Compiled from primary data

In terms of division wise, 82.76 per cent of respondents of Kachugaon, 79.10 per cent of Parbathjora and 73.68 per cent of Haltugaon forest division were regarded environmental issues as important (table 6.5). About 12 per cent to 15 per cent of respondents is indifferent, and 4 per cent to 10 per cent of respondents is not considered this issue as important. Similarly, the issue of biodiversity loss was important for 64.53 per cent of respondents of Kachugaon, 55.22 per cent of Parbathjora and 62.11 per cent of the Haltugaon forest division, respectively. Again, about 32 per cent respondent of three forest division is indifferent and only negligible percentage is expressed that loss of biodiversity is not important for them. Lastly, in terms of conservation of biodiversity at any cost, 71.92 per cent of the Kachugaon forest division, 68.65 of the Parbathjora forest division and 66.32 per cent of Halutgaon forest division's respondent were considered important. However, about 23 to 25 per cent of the three forest divisions are indifferent, and 4 to 8 per cent were considered the conservation of biodiversity is not important.

Thus from division wise comparison, it clear that 74 to 80 percent respondents regards environmental issues or problems is important, for biodiversity loss 55 to 65 percent respondents regards biodiversity loss is

important, and about 66 to 72 percent respondents regards the importance of conservation of biodiversity at any cost.

Table No.6.5

Division-wise individual responses towards environmental and biodiversity conservation (in percentage)

Forest Division	Importance class	Environmental Issue/problems	Biodiversity loss	Conservation of Biodiversity at any cost
Kachugaon FD	Importance	168 (82.76)	131 (64.53)	146 (71.92)
	Not importance	9 (4.43)	8 (3.94)	10(4.92)
	Indifferent	26 (12.81)	64 (31.52)	47(23.15)
Parbathjhora FD	Importance	53 (79.10)	37 (55.22)	46(68.65)
	Not importance	5 (7.46)	8 (11.94)	4(5.97)
	Indifferent	9 (13.43)	22 (32.83)	17(25.37)
Haltugaon FD	Importance	70 (73.68)	59 (62.11)	63(66.32)
	Not importance	10 (10.52)	5 (5.26)	8 (8.42)
	Indifferent	15 (15.78)	31 (32.63)	24 (25.26)

Source: Compiled from primary data

From Chi-Square Test Results of the individual response of biodiversity conservation (Table 6.6), it is observed that occupation, age, landholding, caste, family size, sex, literacy and house type of respondents were not significantly associated with attitude towards environmental issue or problems. Fuel wood is the only variable that has a positive and significant association with attitude toward environmental issues. Similarly, the occupation, landholding, caste and house type were significantly associated with attitude toward biodiversity loss. However, age, family size, sex, literacy and fuel wood were not significantly associated with attitude towards biodiversity loss. In the case of conservation of biodiversity, occupation, age, landholding, family size, sex, literacy, house type and fuel wood were not significantly associated with attitude towards conservation

of biodiversity. However, the caste system is the only attribute having a positive and significant association with attitudes towards biodiversity conservation.

Table No.6.6

X^2 Tests Result of the individual response of biodiversity conservation

Variable	Environmental issues/problems	Biodiversity loss	Conservation of biodiversity
	X^2 value (P value)	X^2 value (P value)	X^2 value (P value)
Occupation	7.344 (.291)	16.719 (.000)***	10.787 (.095)
Age	2.765 (.251)	.208 (.901)	1.188 (.552)
Land holding	4.509 (.105)	11.022 (.004) ***	4.219 (.121)
Caste	10.676 (.221)	25.892 (.000)***	72.399 (.000)***
Family size	11.394 (.935)	23.449 (.267)	.12.477 (.899)
Sex	2.653 (.265)	0.402 (.818)	1.745 (.418)
Literacy	3.091 (.213)	0.116 (.944)	0.152 (.927)
House type	3.884 (.143)	9.721 (.008)**	1.453 (.484)
Fuel wood	43.057 (.034)**	30.059 (.360)	32.139 (.269)

Source: Compiled from primary data

Note: Symbol ***means 1 % level of significance, ** means 5 % level of significance, and * means 10 % level of significance

6.3.1.2 Individuals participation towards environmental and biodiversity conservation

From table 6.7, it is observed that 54 per cent of respondents agree that they are aware of the awareness programmes on biodiversity conservation, 19.5 per cent of respondents were not aware of the awareness programme on biodiversity conservation, and the remaining 26.6 per cent respondents were never interested towards awareness programme on biodiversity conservation. Similarly, 28.2 per cent of respondents were connected with social organisation, institutions,

and NGOs towards biodiversity conservation, 58 per cent of the respondents had no connection with social organisation towards the conservation of biodiversity, and 13.7 per cent were never associated with social organisation. In terms of community conservation on biodiversity, 47 per cent of respondent agree that they were directly or indirectly related to community conservation of biodiversity, 41 per cent of respondent were not involved in community conservation, and negligible parentage of respondents was never interested in community conservation work. Therefore, it was clear from (Table 6.7) that more than 50 per cent of respondents were aware of the awareness programme on biodiversity conservation, 47 per cent of respondents involved in the community conservation programme, and only 28 per cent of respondents are connected with social organisation towards biodiversity conservation.

Table No.6.7

Individuals participation towards environmental and biodiversity conservation (in percentage)

	Awareness programme on Biodiversity	Connected with Social organisation for conservation	Involvement with community conservation
Yes	54.0	28.2	47.7
No	19.5	58.1	41.1
Do not know	26.6	13.7	11.2

Source: Compiled from primary data

In terms of division wise, 54.19 per cent of respondents of Kachugaon, 59.70 per cent of Parbathjora and 49.47 of Haltugaon forest divisions accepted that they have participated in awareness programme of biodiversity conservation (Table 6.8). About 20.68 per cent of respondents of Kachugaon and 17 per cent of each of Parbathjora and Haltugaon forest divisions have never participated, and about 25 to 32 per cent of individuals do not know about the awareness programme. In terms of connection with social organisation, only 24.14 per cent

of Kachugaon, 34.32 per cent of Parbathjora and 33.68 per cent of the Haltugaon forest division have participated in the conservation programme. About 60.09 per cent of Kachugaon, 56.72 per cent of Parbathjora and 54.74 per cent of Haltugaon forest division were not connected with any of the social organisations, and about 8 per cent to 15 per cent do not know of social organisation. Again, in case of involvement with community conservation of biodiversity, 44.33 per cent, 49.25 per cent and 53.68 per cent respondents of Kachugaon, Parbathjora and Haltugaon forest division were involved in community conservation. However, about 41.87 per cent, 41.71 per cent and 53.68 per cent of respondents of Kachugaon, Parbathjora and Haltugaon forest division were not involved in community conservation, and only about 7 to 13 per cent do not know about community conservation. The individual's participation in awareness programme conservation, connection with social organisation, and community conservation of three forest division are sown in Table 6.8.

Table No.6.8
Division–wise individuals participation towards environmental and biodiversity conservation (in percentage)

Forest Division	Response	Participation in the biodiversity awareness programme	Connection with Social organisation for Biodiversity conservation	Involvement with community Conservation
Kachugaon FD	Yes	110 (54.19)	49(24.14)	90(44.33)
	No	42(20.68)	122(60.09)	85(41.87)
	Do not know	51(25.12)	32(15.76)	28(13.79)
Parbathjhora FD	Yes	40(59.70)	23(34.32)	33(49.25)
	No	12(17.91)	38(56.72)	28(41.71)
	Do not know	15(22.39)	6(8.95)	6(8.96)
Haltugaon FD	Yes	47(49.47)	32(33.68)	51(53.68)
	No	17(17.89)	52(54.74)	37(38.95)
	Do not know	31(32.63)	11(11.58)	7(7.37)

Source: Compiled from primary data

From Chi-Square Test results of individual participation towards environmental and biodiversity conservation **(**Table 6.9), it is observed that occupation, age, family size, sex, literacy and house type and fuel wood were not significantly associated with awareness programme, social organisations and involvement with community participation in biodiversity conservation. However, both the landholding and caste system of respondents were positively significant associated with individual participation in awareness programmes, connection with social organisations, and community involvement for biodiversity conservation.

Table No.6.9

X^2 Tests result of individual's participation towards environmental and biodiversity conservation

Variables	Awareness programme on Biodiversity		Connected with Social organization for conservation		Involvement with community conservation	
	X^2 value	(P value)	X^2 value	(P value)	X^2 value	(P value)
Occupation	4.482	(.612)	2.754	(.839)	4.242	(.644)
Age	1.277	(.528)	0.175	(.916)	1.779	(.411)
Land holding	9.228	(.010)**	6.361	(.042)**	16.365	(.000)***
Caste	31.865	(.000)***	25.321	(.001)***	30.888	(.000)***
Family size	22.997	(.289)	15.271	(.761)	20.898	(.403)
Sex	1.634	(.442)	2.919	(.232)	2.022	(.364)
Literacy	2.631	(.268)	1.803	(.406)	4.471	(.107)
House type	2.321	(.313)	0.632	(.729)	0.561	(.755)
Fuel wood	32.329	(.265)	37.853	(.101)	31.284	(.305)

Source: Compiled from primary data.

Note: Symbol *** means 1 % level of significance, ** means 5 % level of significance, and * means 10 % level of significance.

From the above result (table 6.6 & 6.9) and discussion, it is clear that fuel wood has a significant association with an individual's attitude toward environmental issues and the rest of the variables have no significant association. Similarly, the occupation, landholding, caste and house type were found to be significantly associated with biodiversity loss, and caste system is the only attribute having the positive and significant association with attitudes towards conservation of biodiversity at any cost.

However, both the landholding and caste system of respondents were positive and significantly associated with individual participation in awareness programme, connection with social organisations, and involvement with community conservation for biodiversity, and the rest of the variables have no significant association.

6.3.2 Tribal Tradition and Forest Conservation

The Conservation of the forest is an integral part of biodiversity conservation. Forest is the home of the diversity of species, flora and fauna and the source of all living beings. The anthropogenic disturbance on the forest is not only affecting species, flora and fauna but also affecting the old age dependence on forest for their livelihood of tribal and marginal communities. Traditionally, the forest dwellers in general and tribal community in particular seemed to have a culture that kept a balance between human and ecological needs.

Therefore, we need to know the factor that helps the forest dwellers in the past to keep a balance between ecological and human needs. To understand this, we interviewed the respondents individually and in the group about their religion and social custom, tradition, belief, values and myths. Thus, the detailed discussion on history, festivals, and precautions taken to preserve the forests are important to understand the tribal's attitudes toward preserving forest (Fernandes, Menon, & Viegas, 1988).

As stated in Chapter 4, the Kokrajhar district is predominantly inhabited by Bodo, an aboriginal tribal community of Assam, since time immemorial. The other general communities residing in the districts are Koch Rajbongshi, Santhal, Oraon, Bengali, Muslim, Assamese, Bihari, Nepali and Schedule Caste etc. Amongst them, Santhal and Oraon were brought by the British East India Company as a labourer from the overpopulated portion of Bengal and Bihar during the British colonial rule in Assam (Hillaly, 2016). Like other parts of Assam, the forest village of Kokrajhar district was set up since the Assam Forest Regulation of 1891. As mentioned in Chapter 1, the first Forest Village (FV) of Assam was established at Kachugaon reserve forest under the then Goalpara (presently Kokrajhar) district in 1901. The forest villages were extended to other parts of the State also, and by 1937, 120 forest villages were established within the reserve forest of Kokrajhar district (Handique, 2004). At present, there are 499 officially recognised forest villages in Assam, out of which 145 forest villages were in Kokrajhar district, which was established/ created during the British period, while many were, of course, after the Independence also. In terms of population, more than 57 per cent population is inhabited by the Schedule Tribe (ST) community including Bodo, Rava, Garo and Hajong, followed by 42 per cent of the General or Other category, i.e., Santal, Oraon, Nepali, Rajbongshi, and less than 1 per cent Scheduled Caste category of people are residing in the forest villages of Kokrajhar district (Population Census, 2011).

The rich tradition, art and culture, religion, belief, values and myths and the age-old practice of herbal medicines of wild plants evolve around the values of forest and biodiversity conservation of the Bodo community. Thus, the present section of the study highlighted the symbiotic relationship between forest and forest-dwelling Bodo communities and their role in biodiversity conservation. For these, information on traditional art and culture, religion, beliefs, values and myths in conservation biodiversity were collected through questionnaire as mentioned in Chapter 3. The traditional art, culture, religion beliefs, values and myths of Bodo communities on biodiversity conservation is given in table no.6.10.

Table No.6.10

Tribal tradition and biodiversity conservation (in percent)

	Question	Yes	No	Do not Know
1	Will the tradition of rotational group work "Saori Janai' of Bodo communities help for the conservation of biodiversity?	80	15	05
2	Do you think that the traditional "Bathou" religion of the Bodo community is preserving the plants?	90	10	0
3	Is 'Garjashali' the place of community worship of Bodo community preserved the sacred grove of trees?	95	05	0
4	Is the surname "Mwchahary" of the Bodo community signifying the race of Tiger?	80	0	20
5	Do you rely on/believe in traditional medicine?	70	30	0
6	Is "Rongjali Bwisagu" of Bodos New Year Celebration have a tradition of " Ghwka Gwkwi Janai" collection of wild leaves, herbs, and plants of different taste by all households?	100	0	0
7	If yes, how they collect them? a. By Self	60		
	b. By group	30		
	c. Purchase from the local market	10		
8	Do you believe that Bodo women are traditionally preserving the art of nature through weaving?	90	10	0
9	Do you think that the Traditional dance of Bodo tribes reflects the relationship with mother nature?	80	0	20

Source: Compiled from primary data.

Traditionally, Bodo as a community has a great and valuable community bonding, feeling and sentiments in all aspects. The Bodo community is predominantly dependent on agriculture. For the benefit of each and every

individual in the villages, they have the tradition of *Sauri Janai* (group work) in their agricultural and other activities such as tilling on agricultural land, rice sawing, digging irrigation for water supply, clearing grasses from jute field, cutting the paddy from the paddy field, fetching the firewood and collecting pole for building house from forest etc. The rotational basis of work within the group members of the community for varieties of work is called *Sauri Janai* in Bodo word. The group work is based on trust, and a simple arrangement of food and beverages are offered during the work. This group work may be amongst the intra-village community or inter village's communities. But, this tradition is gradually disappearing in recent years due to various reasons such as the use of mechanical ways of production, higher labour wage rate, etc. Table 6.8 shows that 80 per cent of people believe *the Sauri Janai* tradition of the Bodo community can be used for the conservation of biodiversity; out of these, 15 per cent do not believe in it, and 5 per cent of respondents have no idea about it.

From time immemorial, the Bodo community has been practising an ancient form of Hinduism that is term as '*Bathou*'. This religion is primarily worshipped the *Bwrai Bathou* (Lord Shiva), which is represented through the plant "*Sijou*' (Euphorbia splendens) that is always planted in the north-east courtyard of the Bodo household. The very word *Bathou* is the suffix of "*Ba*", which means comprising of five elements such as earth, water, fire, air and universe, and "*thou*" means deep insight. During the ritual of the Bathou religion, people use natural fibbers for fire and plants such as *Sijou, Tulsi, Dubri gangsw*, *Engkhwr* (in Bodo), and Banana leaves and plant. From table 6.10, it is observed that 100 per cent of respondents believe that *the Bathou* religion is preserving *Sijou* plants from immemorial time.

Garjashali is the open worship place of the Bodo community. Annually, the village community performs the Garja puja for the wellbeing of the village. This worship of villages is performed outside the house and usually at sacred grove of trees or bamboos, often to be seen some fifteen or twenty yards from the villages (Endle, 1911). From table 6.10, it is observed that 95 per cent of

respondents believe that the sacred grove of the forest is preserved through *Garjhasali* of the Bodo community. Rest does not believe in it.

Bodo community has vast knowledge in respect of acquiring and gathering traditional herbal medicine out of wild plants for healing and curing of various ailments, and they are culturally and socially intertwined with the forest around them. In terms of traditional medicine, 70 per cent of respondents believe and rely on the traditional form of medicine, and 30 per cent does not believe in it (table 6.10). Therefore, it is clear that most forest-dwelling Bodo communities still rely on the traditional form of healing and curing of various types of diseases. However, medicinal plants' availability has been noticed as declining due to change in forest cover in the study area.

The deep-rooted interrelationships between nature and wildlife with the Bodo communities are understood from each individual's surname. The surname " *Mwchahary*" of the Bodo community is related to *'Mwsa*' in the Bodo language, which means Tiger. During the death of Tiger or information received through the different source of death of Tiger, *Mwchahary* titleholder of Bodo community has to perform some ritual for purification. Traditionally they believe that the wild Tiger is their race. Table 6.10 shows that 80 per cent of people have knowledge of this tradition, but presently this practice is not seen in most of the villages. Again, 20 per cent of respondents do not know about this tradition.

During the last day of Cho*itra*[1] (April 14), traditionally Bodo Community observed as *Sankranti*, the day before the Celebration of New Year (April 15 to April 22) or *Rongjali Bwisagu* in local Bodo word. During the day of Sankranti, each and every households of the Bodo community traditionally collect all sorts of edible leaf, herb and stump of plants and medicinal values of different taste from the forest. On the same day, each household cook the leaf, herb and stump of plants collected by them properly and serve amongst the family members and offer to other community members to eat. This practice is done once in every

[1] Choitra is the last month of the year of the Assamese and Bengali Calendar.

ending day of the year (April 14), which is popularly known as Gwkha *Gwkhwi Janai* in Bodo word. Traditionally Bodo Community believes that this will purify the body and mind infected by disease during the preceding year. From table 6.10, it is observed that 100 per cent of the respondent accepted that the wild leaf, herbs and stumps and medicinal values are used at least once a year by each and every households of the Bodo community. The communities collect the edible wild herbs in three ways- through the group form, individual form, and purchase from the local market.

Apart from that, Bodo women are expert in weaving, spinning of threat, rearing *eri* and *muga* and recreation of the art of nature in their traditional clothes such as *Dokhona.*[2]*, Aronnai*[3]*, Jwmgra*[4]*, Gamsa*[5] . Table 6.10 shows that 90 per cent of respondents believe that Bodo women are preserving the traditional art of nature through their weaving of clothes, and only 10 per cent of respondents do not believe in it.

The Bodo dance such as *Bagurumba, Bardwi Shikla, Daoshri Delai, Kofri Sinai* and other dance form reflects the relation with Mother Nature of Bodo community. Thus, the rich and flourishing traditional art, culture and belief of the Bodo community help to preserve and use sustainable natural resources.

However, in spite of all this traditional knowledge, art and culture, religious belief, values and myths that kept a balance between human and ecological needs, now witnessing the continuous erosion of traditional knowledge in medicine and declining the traditional values of forest conservation have noticed amongst the Bodo community. Again, in the course of time, the influences of other religion among the Bodo community have eroded the deep-rooted

[2] Dokhona is the traditional dress that is design, weaves and wears by Bodo women.
[3] Aronnai is a small Scarf used by both men and women. It is also a sign of Bodo tradition and used to felicitate guests with honour as a gift.
[4] Jwmgra (Scarf) is used by Bodo women to cover up the upper portion of the body.
[5] Gamsa is the traditional attire of Bodo male.

traditional and religious belief on the conservation of plants and animals from the community.

Thus, for the conservation of forest and biodiversity of forest division of Kokrajhar district, forest management should include the tribal people as partners in management, protection, and development of forest as well as to provide employment opportunity to people living in and around forests through the revival of traditional art and culture, beliefs among the community.

6.3.3 Government Initiatives for Biodiversity Conservation

In order to manage and control the rampant encroachment in the forest lands all over the country, the Government of India enacted the Forest (Conservation) Act in 1980. According to this Act, the forest villages established after the 1980s is regarded as illegal by-laws and is liable to be evicted by the concerned forest department from the forest areas. Again, forest land cannot be used for non-forest activities without prior approval from the central government. The government of Assam has implemented this Act, but the encroachment in forest land is not abated yet.

Like other parts of the country, the government of Assam also introduced the Joint Forest Management (JFM) in 1999 to support the forest fringe communities through improved natural resources management with community participation. The Kokrajhar district is also implementing the JFM by forming different village level joint forest management committees. There are 28 Forest Development Agency (FDA) working with 550 Joint Forest Management Committees in Assam. Out of these, 3 FDA agencies are working with 70 Joint Forest Management Committees in the Kokrajhar district during 2005-2006. At the same period, Forest Development Agencies spent Rs. 149 lakhs for reforestation programme in the district (Department of Environment and Forest, Govt. of Assam). However, in spite of the huge expenditure for the afforestation programme of the government, the success of the Joint forest management is not in the line of expectation in the Kokrajhar district. The lack of people's

participation and absence of community land was cited as the reasons added to the failure of JFM in the study area.

To ensure the progressive, sustainable development of the forest of Assam, and to meet the twin objective of environmental stability and ecological balance together with the improved livelihood support system for her people, the Assam Forest Policy 2004 was adopted. The policy is to make and promote efforts for protection, conservation and management of biodiversity through maintenance of the critical ecosystem, including the ecological sensitive areas (ESA), Heritage site, Biosphere Reserves, Medicinal Plants Conservation area, Gene Conservation Centre etc.

The Scheduled Tribe and Other Traditional Forest Dwellers (Recognition of Forest Right) Act of 2006, briefly known as the FRA 2006, passed by the parliament of India, had enacted the historic legislation for the restoration of traditional rights of forest-dwelling communities and at the same time, it tries to secure the forest conservation through their involvement. The process of implementation of FRA 2006 is still going on in Assam and particularly in the Kokrajhar district.

6.3.4 Community-based organisation or NGOs initiative for conservation

Community conservation involving the community in the forest-dwelling community is very important for the preservation of biodiversity. The use of traditional knowledge to protect the birds and their habitats threaten by activities like timber extraction, forest clearance and infrastructural development in Sigchung Bugun Village Reserve Management Committee (Arunachal Pradesh), and community ban on logging, hunting and fishing and trapping in the Lemsachenlok organisation (Nagaland) have begged the 2018 Indian Biodiversity Awards (IBA) in recognition for conservation of wild species (Ghosh, 2018).

These two organisations have shown that the partnership between the forest department and members of indigenous communities is key to conservation.

Similarly, the forest Department of Western Assam Circle, Kokrajhar, had got a new lease of life after the formation of Bodoland Territorial Area Development Council (BTAD), popularly known as BTC, in 2003. The illegal logging, encroachment in forest land, clear-felling for agriculture during the 1980s political movement lead by the All Bodo Students Union (ABSU), followed by the Bodo-Santal riot in the 1990s, lead to the loss of vast area of forest in Kokrjhar district. In spite of the formation of the Bodoland Territorial Council in 2003, the forest department was not in control of the Reserve forests and rampant illegal logging and smuggling was still occurred at a significant level. So, to manage this, the Ministry of Forest and Environment, Tourism BTC, created the first paid community forest protection force to protect the Kachugaon and Haltugaon Reserve forest. This stimulated the formation of other community protection forces with 19 community-based organisation (CBOs) composing the Unified Forest Conservation Network (UFCN) (Horwich et al., 2010). At present, there were 614 volunteers of the surrounding villages of Manas Biosphere Reserve of BTC, working with the forest department.

Volunteers patrol day and nights with forest staff in a group of 8-10 unarmed men and confiscate logs, tools vehicle used in illegal activities. In 2006, the Bodoland Forest Protection Force confiscated: 823 logs,81 buffalos carts,110 water buffalos, 2 vehicles, 340 bicycles, 267 axes, 89 handcarts, 32 hand saws, 32 ploughs, 11 local made rifles, eight bows, 20 arrows, one horse cart, 41 tyre tubes, and three truckloads of woods. The value of these materials was more than US dollar 100,000. Confiscated materials were turnover to the Assam Forest department for sale, except the buffalos and vehicles, which was released after a fine was paid. The impact of these reduces the illegal logging in the reserve forest in 2007, but there were some problems (Horwich et al., 2010).

The forest canopy was increased, and illegal encroachments on forest land declined. As a result, the total Indian golden langur population has increased from 1500 to 5600, elephant and tigers and others population may be increasing. The combined efforts of government, NGOs and Community based organisations (CBOs) catalyst by the Golden Langur Conservation Project (GLCP) resulted in the lifting of the "in danger" listing of UNESCO on the Manas Biosphere (Horwich et al., 2010).

6.4 Conclusion

The above studies' findings support the hypothesis that there is an adverse impact on biodiversity conservation due to anthropogenic pressure on the forest. However, the forest-dwelling communities of the study area have a positive perception and attitude towards biodiversity conservation. Most of the forest dwellers have concerned about the degradation of forest due to illegal encroachment in forest lands for agriculture and human settlement, illegal logging and development activities. As a result, 472 sq. km. of forest land were encroached/ lost from 1999 to 2017 as per ISFR. This led to the loss of habitat of wild animals, loss of biodiversity and also affecting the livelihood of indigenous forest-dwelling communities. The age-old symbiotic relationship of tribal and forest-dwelling communities with the forest has eroded and undermined their traditional knowledge, belief, art and culture of forest conservation and sustainable use of resources.

Therefore, the conservation of forest and biodiversity of forest division of Kokrajhar district, the policy of forest management should include the tribal people as partners in management, protection, regeneration and development of the forest as well as to provide gainful employment through the revival of traditional art, culture and beliefs among the community.