

3

Living Spaces of Ethnic Groups and their Relationship with the Ecological Environment in Assam, India

Haruhisa Asada

Nara Women's University, India



© 2024 Haruhisa Asada

<https://doi.org/10.26493/978-961-293-399-9.77-102>

Introduction

Northeast India, which lies between South Asia and Southeast Asia, is a crossroads of cultures. The region is far from the political centres of either region, and until the mid-nineteenth century, population density was extremely low. While the other northeastern Indian states are characterized by rugged mountains or high plateaus, much of Assam consists of highly productive, low-lying alluvial land ideal for agriculture. Due to the fertile soils along the Brahmaputra River and abundant rainfall from the southwest monsoon, rice has traditionally been grown in Assam. Throughout history, people from all over the region have settled in the area in search of arable land. Early inhabitants included the Bodos from the Himalayas, who came here before the birth of Christ, and the Ahoms from Yunnan Province in southern China, who settled here in the thirteenth century. For centuries, other indigenous ethnic groups have maintained their unique customs, languages, livelihoods, and religions.

When considering modern Assamese society, one cannot ignore the influence of the British colonies. Today's problems in Assam, many of which have to do with land and resources, have their origins in the colonial period (Saikia 2011, 13). In the pre-colonial period, Assam had a low population to land ratio (Guite 2019, 13). For example, in 1853, the population of Assam was 1,059,513 and the total cultivated area was 1,575 square miles out of 30,241 square miles. The population is ethnically diverse and scat-

Murayama, S., Ž. Lazarević, and A. Panjek, eds. 2024. *Changing Living Spaces: Subsistence and Sustenance in Eurasian Economies from Early Modern Times to the Present*. Koper: University of Primorska Press.

tered over vast plains. Therefore, securing a population to cultivate the vast land has always been a challenge to effective state building.

British colonial rule in Assam began in the mid-nineteenth century. During the colonial period, the British administration brought various ethnic groups from different parts of the Indian subcontinent to work in the sparsely populated wastelands of Assam. The newcomers included Bengalis, Nepalis, and other tribes who arrived in the late nineteenth century. Given the growing need for revenue during this period, the colonial administration expressed a desire to promote jute cultivation in the rich alluvial areas of the Brahmaputra Valley (Saikia 2011, 326–7). Since local farmers lacked sufficient skills and motivation for jute cultivation, the Assam administration argued that the best available alternative was to bring in farmers from East Bengal. In addition, Bengali jute mills put pressure on East Bengali farmers to grow jute in the Brahmaputra Valley. The majority of these newcomers were Muslim peasants.

Rapid reclamation by Muslim peasants was initially welcomed by Assamese Hindu elites (Saikia 2016, 87). In the following decades, the wealthy Assamese farmers, merchants, and absentee landowners derived enormous profits from the settlement of the immigrant peasants. However, this situation did not last long. Assamese nationalists, legislators, and the press disapproved of the immigration of Muslim peasants and their rapid reclamation, fearing that the land of the native Assamese would be seized by them. While revenue officials in Assam claimed that no surplus land was available for new settlements, the Assam Muslim League Ministry decided in 1943 to open surplus reserves to immigrant peasants under a scheme called the ‘Grow More Food’ campaign.

Until the mid-twentieth century, when the state’s population began to grow significantly, there were fewer problems between Hindus and Muslims or different ethnic groups in the region. However, in the late twentieth century, as population density increased in the Brahmaputra floodplain and cultivable land became scarce, social problems such as conflicts between different ethnic groups and political movements for autonomy by ethnic minorities began to emerge. The state-wide anti-Muslim immigration movement in the early 1980s (Baruah 1999; Dutta 2012) and the Bodoland movement that violently demanded the independent state of the Bodo tribes in the 1990s are two notable examples (Basumatary 2012; Saikia 2015).

Social unrest in the late twentieth century hampered the economic development of the state. Even today, Assam has no significant industry,

and the state's economy is based primarily on subsistence farming. About 75 percent of Assam's 31 million inhabitants are engaged in agriculture and related activities (Government of Assam 2016), which are still carried out with traditional implements. Apart from state subsidies or government loans, the flow of capital into the peasant economy is far below the national average (Saikia 2016, 327). The Green Revolution, the flagship programme of the Indian government in the 1960s and 1970s, has not covered this region. Compared to the agrarian situation in western states such as Punjab and Haryana, where the peasant economy has improved over the decades, the situation in Assam has deteriorated in the twentieth century.

However, studies on the current economic backwardness and agricultural stagnation in Assam attribute the underdevelopment of the agricultural sector to the lack of scientific knowledge among farmers and the traditional socio-economic institutional complex (Das 1984; Phukan 1990). While the security situation in Assam has improved over the years and the state domestic product (SDP) has been steadily increasing since the 2000s, the agricultural sector continues to grow at a snail's pace (Government of Assam 2017).

How did local farmers in a multi-ethnic society in the Brahmaputra Valley sustain themselves through subsistence agriculture? How can the peasant economy be sustained without the capital input of the public sector? These are the research questions posed in this study. The background of the state's economic problems is examined in this chapter from the perspective of the ecological environment. The unique environment of the Brahmaputra floodplain could help local people sustain subsistence agriculture without using modern technologies such as groundwater irrigation or high-yielding varieties (HYV). In this context, it is important to focus on the relationship between ethnic groups in the region and the local environment in which they live. Ethnic groups originating from different homelands have different cultural backgrounds and diverse knowledge and skills regarding the use of natural resources for their livelihoods. Here, the author examines the living spaces of different ethnic groups in the Brahmaputra Valley, the geographic patterns of their living spaces, and their everyday practices related to local resources. The characteristics of peasant agriculture in the multi-ethnic society of Assam are discussed using micro-observations from different regions of the state.

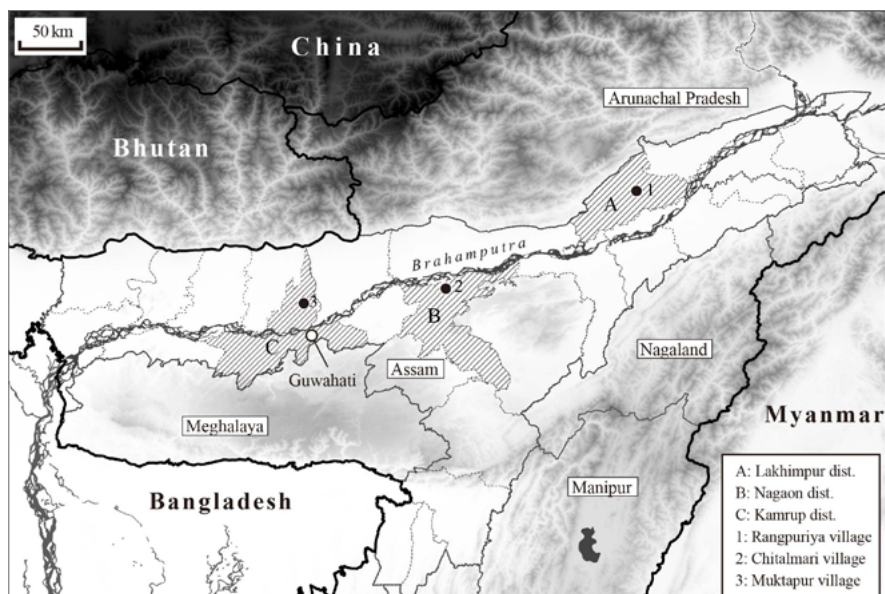


Figure 1 Study Area

Study Area

The Brahmaputra Valley, lying between the eastern Himalayas to the north and the Meghalaya Plateau to the south, covers an area of 56,339 km², which is 72 percent of the total area of Assam (Gopalkrishnan 2000, 31). It is about 750 km in length from east to west and about 80 km in width from north to south. It is an alluvial area with an elevation of 30 m in Dhubri in the west and 130 m in Tinsukia in the east.

The valley can be divided into three zones – the floodplain, the middle plain and the foothills – according to the different ecological conditions, which vary according to the distance from the main stream of the river. The floodplain is seasonally inundated by the Brahmaputra and its tributaries, including their sandbanks. The middle lowland zone is far from the main stream, has a low risk of flooding, and is therefore suitable for agriculture. The foothill zone is the transitional area between the valley and the hills of Bhutan. It consists of coarse sediments, which makes it difficult to obtain surface water.

This chapter examines the living spaces of different ethnic groups and their adaptation to the local ecological environment in three regions of the valley: the Lakhimpur district in the east, the Nagaon district in the central region, and the Kamrup district in the west (figure 1). In Lakhimpur

district, the proportion of Muslim immigrants from East Bengal, or present-day Bangladesh, is relatively low, while it is higher in Nagaon district and Kamrup district. Each district is inhabited by many ethnic groups: indigenous and immigrant, tribal and nontribal, and Hindu and Muslim. Some villages are inhabited by a single group, while others are inhabited by multiple groups. In the latter villages, the dominant group was identified to make distribution maps.

Primary data were collected through an oral survey and field observations conducted in three districts between 2008 and 2019 to identify the dominant groups in the villages and their livelihood patterns. The 2011 Census Village Directory was also used as a secondary source to analyse the location and structure of villages in the region (Asada 2013). This database contains information on characteristics such as code, name, area, number of households, population, facilities, and land use.

Ecological Environment and Living Spaces of Different Ethnic Groups

Location of Villages by Ethnic Group in the Lakhimpur District

First, information on the predominant ethnic groups from 981 villages in Lakhimpur district was obtained from the oral survey. The number of villages by ethnic group was as follows: mixed groups (mainly the Asamiyas) in 348 villages (35 percent); the Mishings, 235 (24 percent); the Ahoms, 145 (15 percent); the Ex-Tea labour tribe, 64 (7 percent); the Bengalis, 43 (4 percent); the Kacharis, 41 (4 percent); the Nepalis, 23 (2 percent); and others 82 (8 percent). Although the number of villages with mixed groups is the largest, most groups live separately from other groups and are clustered in specific areas within the district. The location of these villages provides information about the settlement pattern of ethnic groups (figure 2a). A comparison between their location and the ecological classification map (figure 2b) helped clarify the relationship between ethnicity and ecological environment. For example, the villages of the Nepali and Ex-Tea labour tribe are located near the piedmont zone bordering Arunachal Pradesh, while the villages of the Mishing and Kachari are located in the floodplains and river islands of the Brahmaputra and its tributary Subansiri. The Ahom and Bengali villages are not located in these ecological zones, but mostly in the lowland zone near national highways and towns.

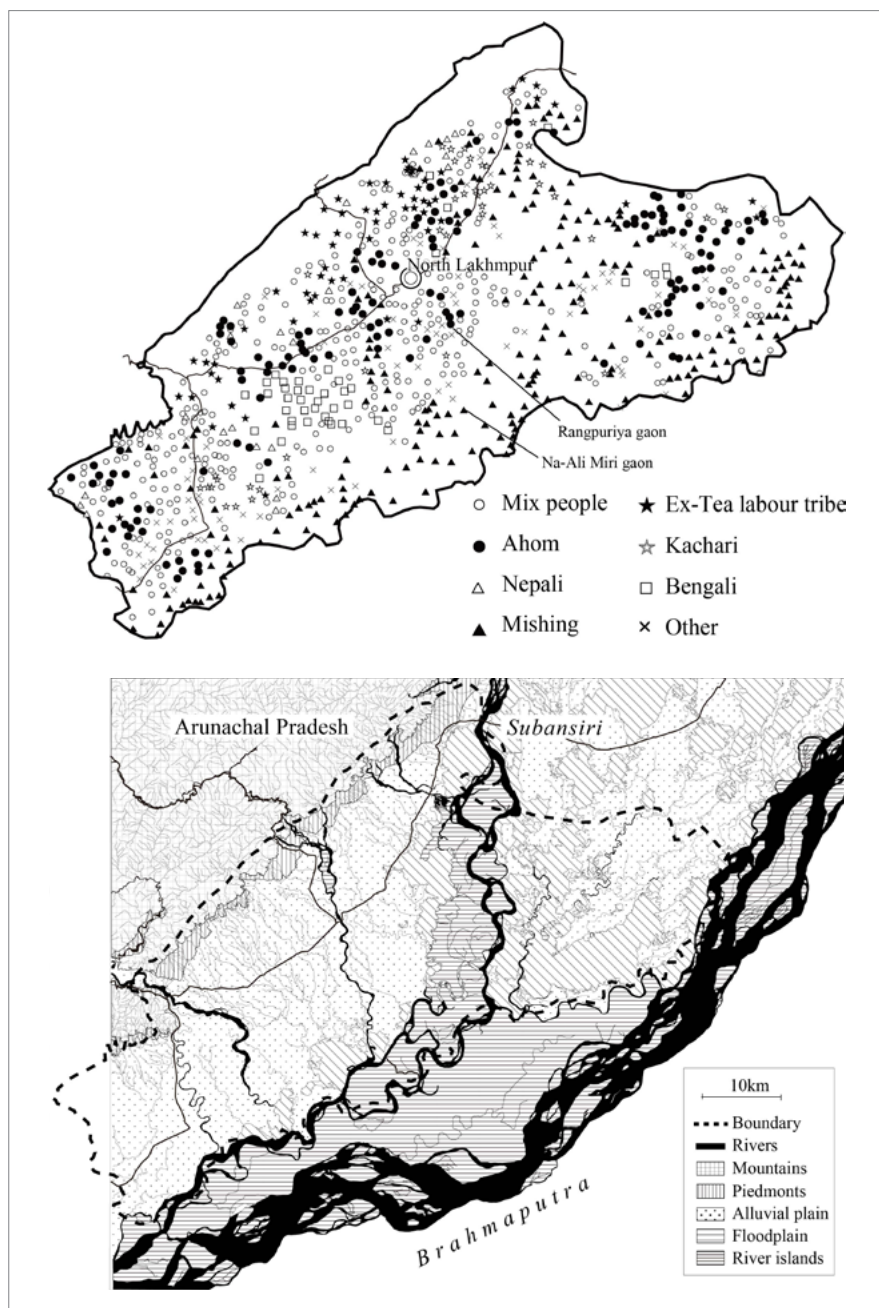


Figure 2 Living Spaces of Different Communities in Lakhimpur District

Notes a) village location by ethnic groups; b) classification of ecological environment

In considering the current settlement patterns of each ethnic group, it is important to note the historical background of their migration. Until the eighteenth century, the district was sparsely populated with the Asamiyas from western Assam and the Mishings from the hills in Arunachal Pradesh. The Asamiyas lived in the plains, while the Mishings lived near the rivers. In the nineteenth century, the Ahom migrated from the southern bank of the Brahmaputra and established villages in the plains. At the same time, the tribe of Ex-Tea labour came to work in the tea gardens established by the British in the piedmont area. Finally, in the twentieth century, immigrants from Nepal and Bangladesh migrated to the region (Gopalkrishnan 2000, 257–76). There was little unoccupied land left for those who later migrated to the district.

Interaction Between the Ahoms and Mishings

The ethnic groups in the study area live in different ecological environments and have different livelihoods that allow them to interact with other groups through the exchange of agricultural products and labour services. Here, the Ahoms and the Mishings are taken as an example and



Figure 3 Mishing Woman Working in the Ahom Village

the interaction between them is examined based on the author's field observations.

The Ahoms and the Mishings have different livelihood patterns. This difference has led to the Mishings working in Ahom villages, where transplanted rice (known locally as *sali* rice) is the main monsoon crop (Asada 2011). The main agricultural working season is from May to August, when ploughing and transplanting are done, and from October to November, when rice is harvested. In contrast, broadcast rice (known locally as *ahu* and *bao* rice) is the main crop in Mishing village. The peak season of agricultural activities here is from January to March, when ploughing and harvesting (e.g. mustard) is done, and in June, when *ahu* rice is harvested. Mishing women come to the Ahom village to do agricultural work for daily wages in July-August and October-November during the low season in their own village (figure 3).

Because most of their villages are near towns, the Ahoms have more opportunities to earn off-farm income than the Mishings. Nowadays, more and more Ahom villagers work in towns, so they have less time to engage in agricultural activities on their own farms. In addition, during the transplanting or harvesting seasons, it is difficult to find wage labourers for agricultural activities, so they rely on agricultural labour from other villages. Mishing people have fewer opportunities to find work in towns, and most villagers still practice traditional farming with low productivity. They therefore go to work in Ahom villages to earn cash income needed for their children's education and daily expenses.

The difference in land use between the villages of the two groups also plays an important role in their interaction. In the Ahom village, which is located in the middle lowland zone, a back swamp is used as a rice field. There is little land available for cow herding on the natural dams, so the cows have to move to the roads even during the rainy season. Therefore, some Ahom villagers keep their cows in Mishing villages, where sufficient land and pasture is available near the river bank or rice fields after harvesting *ahu* rice (figure 4). Those who take care of the cows in Mishing village receive milk and newborn calves in return. The milk produced in Mishing village is sold in the market of a nearby town. When the cows are able to provide sufficient draft power to plough the fields or are large enough to be sold at the market, they return to their owners in Ahom villages.

In return for caring for their cows, the Ahom sometimes care for the children of the Mishings. Primary and secondary schools in riverine areas such as Mishing villages are often closed during the rainy season be-



Figure 4 Cows Kept on the Riverbank of the Mishing Village

cause the water floods them and they are difficult to access. As a result, schools in the Mishing village cannot always provide a satisfactory education. Therefore, some Mishing children go to schools in and around Ahom villages to receive a better education. However, when living with a family in Ahom villages, Mishing children are required to help in the household and in agriculture. They remain in Ahom villages for several years until they complete secondary or post-secondary education.

Such interactions between the Ahoms and the Mishings are not observed in all households. However, the few Ahom and Mishing families that do interact in this way have developed close relationships with each other over many years. Such personal networks between different ethnic groups enable different types of cooperation in the multi-ethnic society of the Brahmaputra Valley.

Livelihood and Land Use Pattern of Muslim Immigrants

Living Spaces by Ethnic Groups in Nagaon District

Nagaon is one of the districts with a higher proportion of Muslim residents in Assam, which according to the 2011 census is 1.56 million (about

55 percent of the district's total population of 2.82 million). In the older Nagaon district, which includes the present Morigaon district, the number of Muslims was 12,578 (4.8 percent of the total population) in 1901 and increased to 359,519 (40.5 percent) by 1951 (Barooah 1978). Previous studies indicate that Muslims who migrated to Assam initially settled in the floodplains where no indigenous Hindus had previously lived (Bhagabati and Das 1992). Therefore, this section identifies the geographical pattern of Muslim settlements in the district.

Information on the residents of each village in the northern part of the district (Nagaon, Rupahi, and Dhing Revenue Circle) was obtained through interviews with residents and from the 2001 Census Village Directory and Administrative Atlas. Of the 520 revenue villages in the three revenue districts, information on the predominant resident community was obtained from 499 villages. One hundred and ninety-two villages are dominated by Muslims (including both immigrant and Assamese Muslims), followed by 146 villages with indigenous Hindus (Assamese Hindus, hereinafter Asamiyas), 12 villages with Karbi, 8 villages with Bengali Hindus, 8 villages with Ex-Tea tribes, 7 villages with Larun (Tiwa), 7 villages with Kachari, 4 villages with Bodo, 2 villages with Nepali, and 2 villages with Sikhs. There were 110 villages with multiple ethnic groups living together, and the main ethnic group could not be determined during the survey.

From the distribution map summarizing the results of the survey, it can be seen that the villages dominated by the Asamiyas are distributed from the national highway near the town of Nagaon to the foothills on the southern side, while the villages dominated by the Muslims are distributed between the national highway and the banks of the Brahmaputra (figure 5a). The distribution pattern also agrees well with the boundaries of the ecological environment (figure 5b). That is, the Muslim immigrants settle mainly in the areas affected by the seasonal floods, while the Asamiyas live in the central lowland zone in the south, which is not affected by the floods of the main stream. There are villages of Ex-Tea tribes, Karbi and mixed ethnic groups near the hills in the southern part of the study area. Villages of other Scheduled Tribes (e.g. Bodo, Lalung, Kachari) are scattered between the Asamiyas and Muslim residential areas.

The ecological environment of Muslim-dominated areas was originally unsuitable for human settlement. No large embankments were built in Assam during the British colonial period, but after independence, construction of embankments along major rivers began in 1954, and by 1978

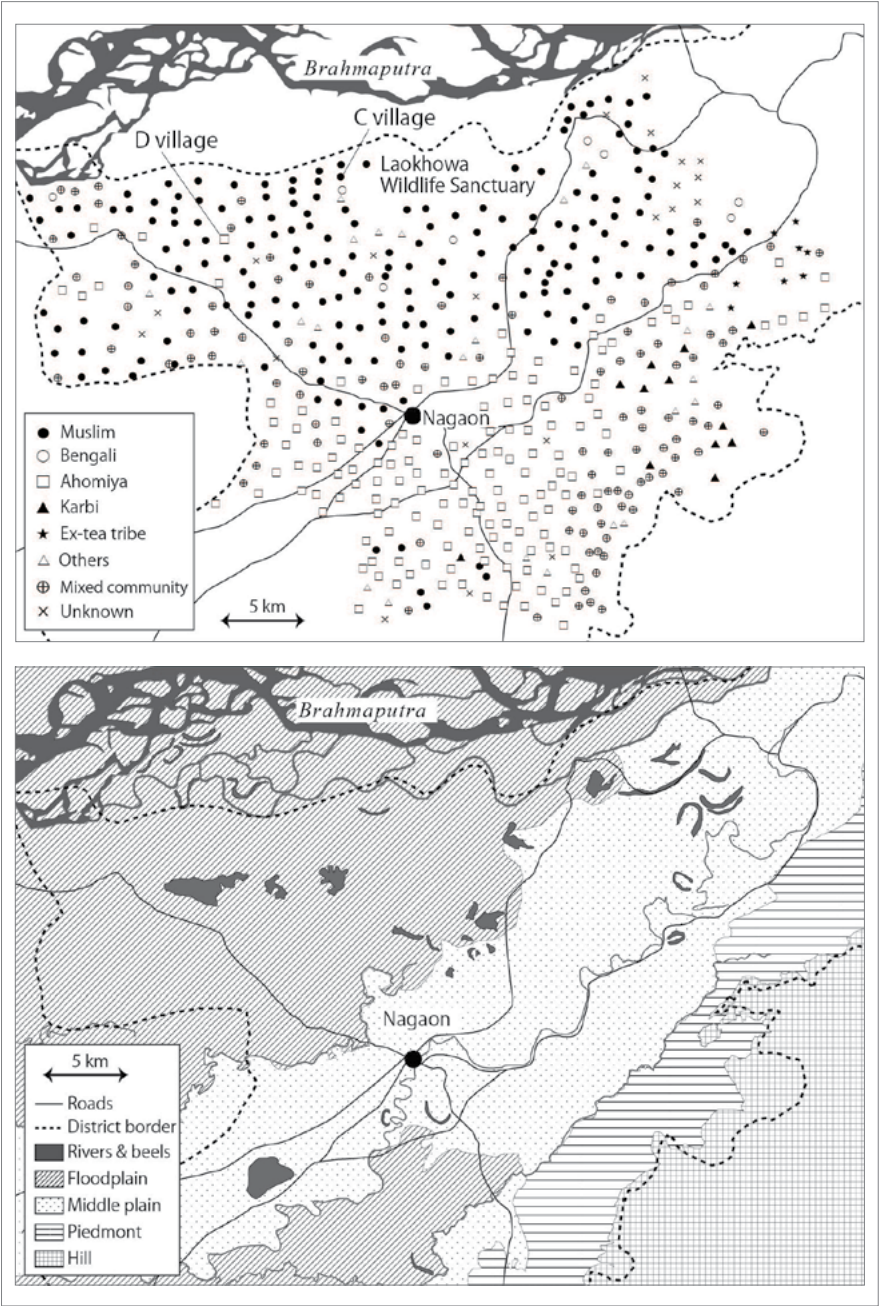


Figure 5 Living Spaces of Different Communities in Nagaon District

Notes a) village locations by ethnic groups; b) classification of ecological environment

embankments totalling 4,000 km had been completed (Kar 2014, 16). In Nagaon district, it was difficult to live in the floodplains near the main stream of the Brahmaputra, where water entered during the rainy season, but around 1960 an embankment was built along the main stream, making it easier to control the river water. It is likely that Muslim immigrants settled in the floodplains where few people previously lived.

Livelihood Activities of Muslim Immigrants

The field survey was conducted in Chitalmari village (hereinafter village C), one of the villages dominated by Muslim immigrants in the Brahmaputra floodplain. In village C, the hydrological environment outside and inside the embankment is very different, and the livelihood activities of the villagers also differ accordingly.

The area outside the embankment is completely inundated by the flooding of the main stream during the rainy season (June–September). The water depth reaches up to 2–3 m in some places, making agricultural activities impossible. During this time, some villagers catch wild fish with nets, but this is not an efficient method and not very profitable. When the rainy season ends and the water level drops, vegetable cultivation such as chili and mustard begins in October, followed by *boro* rice cultivation in December. Since river water drains completely during the dry season, groundwater is pumped up from tube wells to irrigate the cultivated areas.

The agricultural landscape inside the embankment is completely different. As long as the embankment does not collapse, no river water can flow into this area. However, during the rainy season, most of the land is flooded, except for the roads and the homesteads that were created in the uplands of the village due to the rise in groundwater level and rainfall. It is impossible to plant rice inside the embankment during the rainy season. Since the hydrological environment can be controlled to some extent even during the rainy season, jute is grown in the higher areas instead, and other cultivated areas are used as ponds for fish farming. In the dry season, *boro* rice is grown on all cultivated land.

In the village studied, a cropping pattern combining *boro* rice during the dry season and fish farming during the rainy season is common. Fish farming begins in April. The purchased fish fry are thrown into a pond on homestead land and raised until they reach a certain size. After that, when the water accumulates in the cultivated areas, the fish are released there. The farmed fish species are common carp (*Cyprinus carpo*), silver

carp (*Hypophthalmichthys molitrix*), grass carp (*Ctenopharyngodon idella*), Bafu (*Catla catla*), Rou (*Labeo rohita*), Kuhi (*Labeo gonius*), Bagu (*Labeo bata*), Magur (*Clarias batrachus*), Chital (*Notopterus chitala*), and others. During the rainy season, fish are bred in flooded croplands by feeding mustard pomace and rice husks and adding vitamins. In November, when the water level of the cultivated areas drops, the fish are caught with nets and offered for sale in weekly (*hat*) and permanent markets in the surrounding towns. The cultivation period of *boro* rice and fish partly overlaps, which causes problems for farmers because they cannot start cultivating *boro* rice when the fish in the same cultivation field are already fully grown. In the cultivated areas, *boro* rice ploughing is started in November, and transplanting is done from January to February of the following year. *Boro* rice harvesting takes place in May and June, but the period overlaps with the input of fish fry.

The farmers in the study village have solved this problem by vertical land use. They dig a portion of the cultivated field about 8 feet deep to store water during the dry season. Fish fry are released in April before the rainy season begins. At this time, *boro* rice is still planted on the other side of the cropland before harvest (figure 6). During the rainy season, the groundwater level rises as rainfall accumulates, flooding the entire cultivation area and allowing a large area to be used for fish farming. When the rainy season ends in October and the water level begins to drop, it is time to harvest the adult fish. The fish harvest lasts until January of the following year. At this point, the water has only accumulated in the lowest part dug into the cultivated land, and on the opposite side, where the water has completely dried, preparations for the next *boro* rice crop can begin. In addition, it is also used as a seedbed for *boro* rice.

This technique of digging up part of the cultivated land to both raise fish and grow *boro* rice has several advantages. One is that the topsoil of the rice field is cultivated and puddled for planting rice seedlings, which facilitates the supply of inorganic nutrients from the soil into the water when the water level rises during the rainy season. This becomes a good nutrient for fish. Faecal matter and weeds mixed in the soil also dissolve in the water, which is beneficial for fish growth. In addition, when harvesting *boro* rice, only the rice ear is cut off and the lower stalk is left in the field. The remaining stalks are submerged and rot during the rainy season, which is also a good fish food.

Many villagers admit that the profitability of fish farming is so high that rice is grown to increase fish catches. In *boro* rice cultivation, the cost



Figure 6 Land Use of *Boro* Rice-Cum-Fishery in Muslim Immigrants' Village

of chemical fertilizers and diesel fuel for pumps is high, and the profit after selling the product is lower. Villagers must grow a certain amount of *boro* rice to produce rice for home consumption and straw for livestock feed. *Boro* rice cultivation is not very important as a source of cash income because sufficient profits can be made from fish cultivation.

Interactions Between Muslim Immigrants and Indigenous Hindus

From the results obtained, it can be concluded that the Muslim immigrants found the utility value in the ecological environment of the floodplains where the indigenous people did not live, and they achieved high land productivity by developing technologies that did not exist in Assam. Previous studies have argued that they threaten the livelihoods of indigenous communities because of their high productivity. However, from the author's field survey, Muslim immigrants and indigenous communities are not always in conflict; rather, the livelihood activities of Muslim immigrants support the lives of indigenous communities.

An example is the production and supply of food. As mentioned earlier, Muslim immigrants modify the original environment to grow fish, *boro* rice, and other crops year-round, and they earn a cash income by sell-

ing their products through agents or markets. The food produced in their villages is transported not only within Nagaon district but also throughout the state, and is consumed by many local people. Among them, the fish supplied by the Muslim immigrants have a special importance for the Hindus in Assam. In Muslim villages, fishing begins in November, when the rainy season ends and the water level in the cultivated areas begins to fall, and it reaches its peak in January. In mid-January, Hindus in Assam celebrate Magh Bihu, one of the three Bihu festivals during the year. Magh Bihu is an annual event when all the work of rice harvesting is completed and farmers can rest at home. During the festival, it is customary for families and relatives to visit their native homes and eat fish and duck meat (Borah 2005, 23–4). On Uruka Day, the eve of Bihu, people in rural villages go to nearby rivers and ponds to catch fish with bamboo fishing gear. On the same day, people in the towns go to the market to buy fish. A certain amount of the fish consumed by Hindus living in the towns during the Bihu festival is supplied by Muslim immigrants. Although they do not participate directly in the festival, they use it as a great business opportunity. When the price of fish increased during this period, some villagers from village C made a turnover of more than 1 *lakh* rupees in one day in Uruka by supplying fish for the town dwellers.

In contrast, Muslim immigrants also depend on the Asamiyas in the study area. One example is rice straw, which is essential as cattle feed. In Muslim immigrant villages, cows used for tillage are gradually being replaced by power tillers and tractors, but many households keep cows to produce milk for their own consumption. It is important for these households to have fodder for their own livestock throughout the year, but the straw from the *boro* rice they grow is not as good as fodder. *Boro* rice is harvested from May to June, which is the beginning of the rainy season. After harvesting, the rice straw is piled up and stored in the homestead garden. However, since it is in the open, it gets wet from the rain and rots easily. Cows do not eat rice straw that is wet and damp. In addition, *boro* rice grown in village C is a high-yielding variety (HYV) whose stalks are generally harder than those of local varieties, so they do not fall over when a large amount of chemical fertilizer is applied. Because of this characteristic, the stalks and rice straw of HYV *boro* rice are not suitable for livestock feed.

Some Muslim immigrants who grow only *boro* rice buy rice straw as cattle feed from the Asamiyas who grow *sali* rice (figure 7). *Sali* rice is harvested in November and December, when the rainy season is over and the



Figure 7 Rice Straw Brought from Asamiyas Villages

straw can be fed to cows in a sufficiently dry condition. Since the prevalence of HYV in *sali* rice is limited in the villages of indigenous communities, it is possible to obtain straw of local varieties suitable for feeding to cows. Therefore, Muslim immigrants visit village D or other Asamiyas villages near Nagaon town to buy surplus rice straw in cash. In the past, rice straw was available free of charge, but recently the value of the leftovers after harvest has increased, and villagers have to pay some money for rice straw.

The interviews in village D also revealed that some Asamiyas learned agricultural technologies from Muslim immigrants. They saw that Muslim immigrants in nearby villages had started *boro* rice cultivation and began to learn the technique through personal communication. Although the area under *boro* rice cultivation in village D is small, the knowledge and skills of Muslim immigrants can help increase agricultural productivity in villages of indigenous communities.

As stated above, the presence of Muslim immigrants has become indispensable in contemporary society in Assam. Moreover, Muslim immigrants also depend on the indigenous communities for their livelihood and they need to maintain good relations with each other, at least in economic terms. The conventional view that Muslim immigrants threaten the survival of indigenous communities does not necessarily correspond to the reality of Muslim immigrants trying to coexist with indigenous people.

Changes in the Land Use Pattern of Indigenous Hindus

Living Spaces by Ethnic Groups in Kamrup District

The last case study was conducted in Kamrup district and shows how important the living spaces of different ethnic groups are for agricultural development. In this region, the differences in the ecological environment are relatively smaller than in the other regions, with a gentle slope extending from the floodplain near the Brahmaputra to the foothill zone along the border with Bhutan. The urban city influence is more dominant than the environmental factors. The state capital, Guwahati, attracts people living in the surrounding rural villages. The distribution pattern of villages by ethnic groups roughly shows the pattern that Asamiya villages are located near Guwahati, Nepali villages are located in the foothill zone, and Bodo villages are located in the middle plains (figure 8). However, the differences between the living spaces of each ethnic group are not as clear as in other regions. Like living spaces, livelihood activities are almost identical among ethnic groups. They mainly grow rice in the rainy season and some vegetables in the dry season.

However, the living spaces in the region historically showed a different pattern. The Bodo people first lived in the northern part of the region, but population density there was low and much land with forests remained unused. In the 1950s and 60s, some Asamiya farmers who lived in villages near Guwahati migrated to the northern region in search of large arable land. At that time, people could freely own unoccupied land after reclaiming trees and grass themselves. Field research has shown that the people of Asamiya moved northward during this period in search of resources. However, the direction of human movement is now reversed. Some of the migrated Asamiyas living in the border area with Bhutan have migrated to the southern region near Guwahati in the last decade. The value of the land has declined for villagers as they show less interest in continuing farming. More villagers prefer to work off-farm or in white-collar jobs, which are more feasible in urban areas. The number of households migrating south is not large, but many people are going to the southern region near Guwahati to work.

The political factor also influences the movement of people in the region. The northern part of the region (the area between Goreswar and the border with Bhutan) was declared an autonomous Bodo region in 2003, promoting the Bodo First policy. Non-Bodo people, including the Asamiyas, are relatively disadvantaged in the region and have difficulty finding

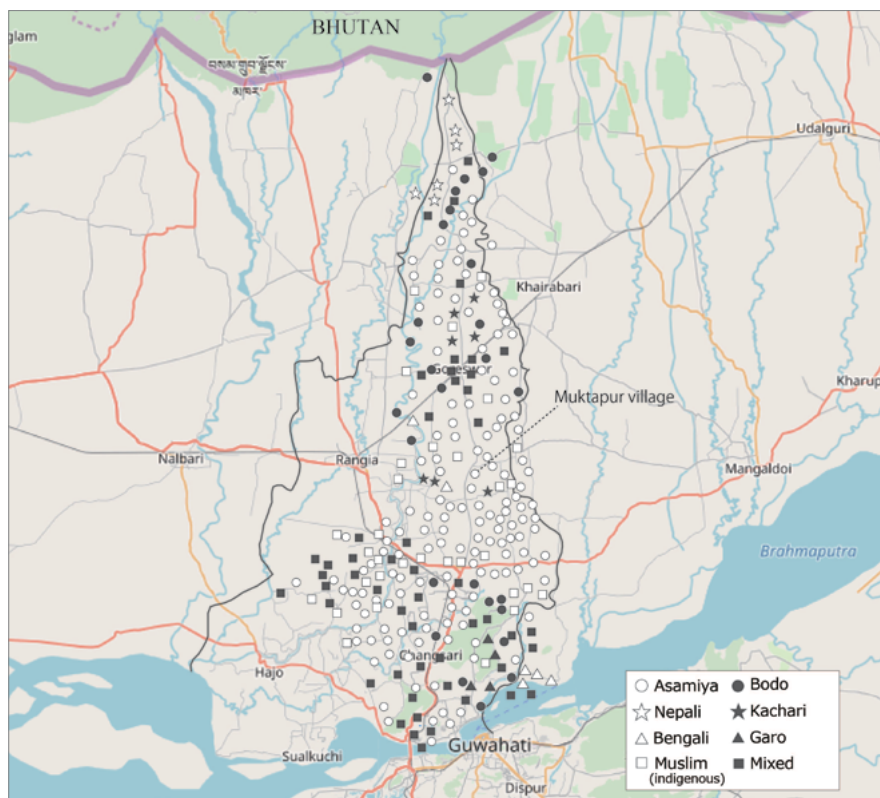


Figure 8 Village Locations by Ethnic Groups in Kamrup District

official jobs or accessing the tax system. This newly introduced policy is one of the factors causing more Asamiyas to migrate to the southern region.

As a result of historical and political factors, living spaces of ethnic groups in this region are to some extent blurred. Although there is a certain pattern of distribution of villages by ethnic groups, in this region not only the influence of the ecological environment but also the distance from the urban centre is predominant. This is also related to the gradual change of livelihood patterns from agricultural to non-agricultural activities.

Motivational Changes of Farmers Towards Rice Cultivation

In recent times, labour shortage in agriculture due to rural-urban migration has become a challenge for Muktapur village. The growth of the urban industrial sector has attracted rural labour. Since the village is not

far from the urban centre of Guwahati, more and more villagers are looking for white-collar jobs or entrepreneurial activities instead of continuing to work in agriculture, a sector that requires significant input costs and hard labour. Thus, interest in rice-based subsistence agriculture has gradually declined among village youth. Given the declining interest in agriculture, farming activities can no longer be sustained at the previous level, leading to changes in the use of agricultural land and associated environmental changes.

Several additional factors have contributed to this trend. The first is the low rice yield in recent years. In FY 2016, rice yields in Assam averaged 2.1 t/ha, below the national average of 2.6 t/ha and only half that of the highest-yielding state, Punjab (4.0 t/ha; Government of India 2017). Along with Bihar and Odisha, rice yields in Assam are among the lowest in the country. The low yields are related to the predominance of HYVs. HYVs accounted for 71 percent of total rice production (in terms of area under cultivation) in FY 2014 and only 66 percent for *sali* rice, the main rainy season rice crop (Government of Assam 2016). Without adequate irrigation facilities, HYVs, and chemical fertilisers, rice yields in Assam remain much lower than in other Indian states, making it difficult for farmers to earn sufficient income from rice cultivation.

The second factor is unstable weather conditions. Monsoon rainfall is characterised by large annual fluctuations and has shown an overall decreasing trend after 2000 (Jhahharia et al. 2012; Fukushima, Kanamori, and Matsumoto 2019). When rainfall is low in June and July, the first half of the rainy season, transplanting work on non-irrigated cropland cannot be carried out at an appropriate time, severely affecting yields (Asada 2012, 76–8).

The third factor is rising wages for agricultural labour. Rice cultivation requires wage labour for transplanting and other tasks. However, in Assam, daily wages of labourers have roughly quadrupled in the last 10 years (from Rs 65 per day in 2006 to Rs 241 per day in 2015). As a result, landowners are finding it difficult to hire workers to grow rice because the costs exceed the benefits. In 1991, farm owners accounted for 51 percent of the total labour force in Assam; however, this number declined to 36 percent in 2011 (Government of Assam 2017). However, during the same period, the share of agricultural labour in the labour force declined only slightly from 12 percent to 10 percent. These trends may reflect a situation where incomes are better for wage labourers than for farmers who employ labour.

The fourth factor is the economic policy of the Indian government. The Food Corporation of India (FCI) regularly buys more rice and wheat produced in Punjab and Haryana than in Assam. In 2016, the FCI purchased 372,443.12 tonnes of rice from Assam, which is only about 7 percent of Assam's total rice production of 5,127,000 tonnes (Government of Assam 2017). In addition, the Indian Public Distribution System (PDS) discourages local farmers from growing rice in their fields. The PDS distributes rations, including rice produced in Punjab and Haryana, to 'above poverty line' (APL), 'below poverty line' (BPL), and 'Antyodaya Anna Yojana' ('poorest of the poor', AAY) households at prices far below market levels. Because government policies do not encourage local farmers in Assam to engage in subsistence agriculture, Assamese residents have little incentive to grow staple crops in their own fields.

These factors have combined to reduce the incentive for agriculture in Assam, leading to changes in agricultural land use. Various impacts of changes in agricultural land use are already being observed, including reduced expansion of rice acreage, changes in the rice field ecosystem, and changes in rural landscapes. The following section discusses the resulting changes in land use in the context of Muktapur village. Both cultural and economic factors influencing current land use patterns are discussed.

Conversion of Farmland to Other Land Uses

Much cultivated land has been converted to uses other than rice cultivation. In the 2018 Kharif season, 6.7 hectares of agricultural land in Muktapur village were not cultivated and lay fallow due to lack of water or labour, or because of decreased productivity, especially at higher elevations. Apart from the fallow land, the abandoned cultivated land is mainly used as forest land or fish ponds, depending on the size and distance from the owners' residences.

In Muktapur village, 63 out of 491 households converted part of their cultivated land into forests. On average, 0.04 hectares per household were converted in this way, representing about 11 percent of each household's cultivated land.

In addition to planting trees, villagers in Muktapur also worked to create fish ponds on formerly cultivated land (figure 9). Of the 491 households in the village, 164 have converted some of their cultivated land into fish ponds; thus, this approach is more widespread than converting cultivated land into forest land. The average area of fish ponds is 0.08 ha, which is about 20 percent of the total cultivated area per household. Fish

ponds are less conspicuous than tree stands, making it more difficult to observe such changes in the rural landscape. However, the permanence of this conversion strongly suggests that villagers are becoming less interested in agriculture.

The construction of fish ponds is not a new practice in the village. When sons become independent from their parents and build a house in new locations, the soil is usually taken from cultivated land and a pond is built in the place where the excavation is made (Deka and Bhagabati 2015, 40). Such ponds are called Kal and have no levees. During floods in the rainy season, wild fish from the surrounding waters can enter unhindered. Fish species caught in Kal include Puti (*Puntius chola*), Goroi (*Channa punctatus*), Magur (*Clarias magur*) and Singi (*heteropneustes fossilis*). These fish are used exclusively for household consumption and cannot be monetized.

However, since the 2000s, ponds have been dug on cropland for various purposes. Some households have begun converting cultivated land previously used for farming into ponds to raise fish for income. These ponds are called Pukuri, and are separated from the surrounding ecological environment on all sides by embankments 1 to 1.5 m high (Deka and Bhagabati 2015, 40). Instead of collecting wild fish, Pukuris are used for aquaculture by filling them with fish fry. The most commonly farmed fish species include Rou (*Labeo rohita*), Mirika (*Cirrhinus mrigala*), Bakuwa (*Gibelion catla*), and silver carp (*Hypophthalmichthys molitrix*). These fish fetch high prices in the market, and some can sell for more than Rs 500 per kilogramme.

Croplands that are converted to fish ponds usually share some common characteristics. First, cultivated land is selected that is relatively low lying. Some low-lying cultivated land is flooded during the rainy season, making drainage difficult. Since such land is not suitable for rice cultivation, it is readily converted into fish ponds. In addition, land plots of a certain size are usually selected for conversion into ponds. In some cases, an entire plot of cultivated land is converted into a fish pond, and in others, rice is grown on the remaining parts. For households that have several cultivated areas in the village, the areas near the residence are usually selected for conversion into fish ponds. The reason is that the fish might be stolen from the pond at night and the owners can monitor the theft of fish ponds near their residence.

The conversion of cultivated land into fish ponds by agricultural households has economic reasons: fish farming requires less labour than rice



Figure 9 Ponds Created in Cultivated Lands

farming and offers higher profits. Households that lose labour due to the death of husbands or sons sometimes cannot maintain their rice fields and therefore convert them to ponds. Unlike rice farming, where income is volatile, income from fish farming is stable and relatively high. In households where sons do not have regular jobs, fathers sometimes build fish ponds to provide a stable income for their sons who will inherit the land.

However, building fish ponds can be difficult and costly for individual farmers. A landowner first turns to a contractor, a Tikedar. During the rice growing period in the rainy season, Tikedars bring tractors to cultivate the farmland for seeding. However, during the dry season, there is no demand for rice cultivation, so these individuals are usually engaged in road construction and housing projects. Tikedars use heavy machinery to excavate the cultivated land. If the landowner wants to keep the excavated soil, he has to bear the cost of excavation. However, if the landowner does not need the soil, the contractor can buy it on the spot, so excavation costs often approach zero. In this way, even households with limited funds can excavate farmland and convert it into a fish pond.

For landowners, building fish ponds is more advantageous than converting them to forest land, not only in terms of financial cost, but also in terms of labour cost. In order to profitably sell the fish raised in the pond, the fish must be caught and transported to a market. Catching fish in the pond is more labour intensive than harvesting rice. The Hindus in the village catch fish for their own consumption, but rarely offer them for sale for religious reasons.

However, Muslims living in neighbouring villages play an important role in converting cultivated land into fish ponds and transporting fish to market (figure 10). The Muslim traders not only catch fish but also sell eggs and fodder to help Hindu landowners start fish farming. It is said that in the past, the Muslim earth diggers (Mati Kata) dug the ponds in the rice fields by hand instead of using machines. Often, Muslim fish traders (Mach Bepari) living in the surrounding villages are invited to collect fish from Hindu ponds. Currently, a group of 5 to 6 traders live in the area around Muktapur village. When they are called, they use a huge net that covers the entire pond to catch the fish, and the landowners are paid on the spot according to the weight of the fish caught. In this way, the landowners can earn an income from the fish ponds with little effort.

Muslim fish traders tend to have many male children. Therefore, each son inherits relatively little arable land from his parents and cannot support his family by farming alone. They can earn an income by catching and selling fish in Hindu villages. In the past, they used to catch fish only in the dry season when the Kals dried up. However, as the number of Pukuri ponds in the cultivated areas has increased, these Muslim fishermen visit many villages throughout the year with their nets on bicycles.

Conclusions

In this chapter, the living spaces and livelihood patterns of various ethnic groups living in the Brahmaputra Valley in Assam were studied. In Lakhimpur district, the different ethnic groups live in different ecological environments and their cropping patterns also differ according to the micro-ecological environment, especially the amount of surface water. These differences allow the different ethnic groups to interact with each other through the exchange of livestock and agricultural labour. Similar geographic cooperation exists between Hindus and immigrant Muslims in Nagaon district. The living spaces of these communities are geographically separated by the availability of water. Their land use patterns are also different. Nevertheless, they rely on each other to maintain their



Figure 10 Muslim Fishermen Around Asamiya Villages

economic relationships. In Kamrup district, the living spaces of indigenous Hindus and other ethnic groups are also not clearly demarcated. In this district, contact between different ethnic groups occurs more frequently than in the other two districts. In addition, farmers in the indigenous Hindu villages have recently lost motivation to continue rice cultivation for various economic reasons; the labour and skills of neighbouring Muslims have enabled the conversion of cultivated land for other purposes.

The various ethnic groups living in the Brahmaputra Valley have different knowledge and skills regarding the use of local natural resources. Although rice-based peasant agriculture in Assam is overall low in productivity, farmers in the region compensate for production deficits by exchanging labour and agricultural technologies with other ethnic groups. Integrating the knowledge available in the region can help locals to sustain their daily livelihoods without the use of modern technology or public funds. The traditional wisdom of geographical cooperation has also enabled different ethnic groups to avoid conflicts with each other. The above micro observation shows the unique economic development path

followed by the multi-ethnic society in Assam, which promotes sustainability rather than productivity by sharing the diverse knowledge of resource utilization among the ethnic groups. Since the Brahmaputra Valley originally has abundant natural resources, it is reasonable to assume that farmers in the region do not need to further increase their productivity to sustain their livelihoods.

Acknowledgement

This study was funded by Grants-in-Aid for Scientific Research (25883007) from August 2013 to March 2015, (15K16582) from April 2015 to March 2018, and (18K18254) from April 2018 to present, supported by the Japan Society for the Promotion of Science.

References

- Asada, H. 2011. 'Monsoon Rainfall and Rice Cultivation in the Brahmaputra Valley: A Village Study in Assam, India.' *Journal of Agroforestry and Environment* 5:31–6.
- . 2012. *Climate and Rice Cropping Systems in the Brahmaputra Basin: An Approach to Area Studies on Bangladesh and Assam*. Dhaka: Rubi Enterprise.
- . 2013. Ecology and Ethnicity of the Brahmaputra Valley in Assam, India. *Journal of Agroforestry and Environment* 6 (2): 17–29.
- Barooah, D. P. 1978. *Assam District Gazetteer: Nowgong District*. Guwahati: Government of Assam.
- Baruah, S. 1999. *India Against Itself: Assam and the Politics of Nationality*. Philadelphia, PA: University of Pennsylvania Press.
- Basumatary, K. 2012. *Political Economy of Bodo Movement*. New Delhi: Akansha Publishing House.
- Bhagabati, A. K., and M. M. Das. 1992. 'Agricultural performance in Different Ecological Zones.' In *The Ecology of Agricultural System*, edited by N. Mohammad, vol. 4, 61–77. New Delhi: Concept Publishing Company.
- Borah, U. 2005. *Bihu Festival of Assam: Music, Dance and Performance*. Delhi: Rhythms.
- Das, M. M. 1984. *Peasant Agriculture in Assam: A Structural Analysis*. New Delhi: Inter-India.
- Deka, N., and A. K. Bhagabati. 2015. Wetlands in a Village Environment: A Case from Brahmaputra Floodplain, Assam. *Transaction* 38:35–45.
- Dutta, N. 2012. *Questions of Identity in Assam: Location, Migration, Hybridity*. New Delhi: Sage.
- Fukushima, A., H. Kanamori, and J. Matsumoto. 2019. Regionality of Long-Term Trends and Interannual Variation of Seasonal

- Precipitation over India. *Progress in Earth and Planetary Science* 6 (1): 20.
- Gopalkrishnan, R. 2000. *Assam: Land and People*. New Delhi: Omsons.
- Government of Assam. 2016. *Statistical Hand Book Assam 2016*. Guwahati: Directorate of Economics and Statistics.
- . 2017. *Economic Survey Assam 2017–18*. Guwahati: Directorate of Economics and Statistics.
- Government of India. 2017. *Agricultural Statistics at a Glance 2017*. Delhi: Directorate of Economics and Statistics.
- Guite, J. 2019. *Against State, against History: Freedom, Resistance, and Statelessness in Upland Northeast India*. New Delhi: Oxford University Press.
- Jhajharia, D., B. K. Yadav, S. Maske, S. Chattopadhyay, and K. K. Anil. 2012. Identification of Trends in Rainfall, Rainy Days and 24 h Maximum Rainfall over Subtropical Assam in Northeast India. *Comptes Rendus Geoscience* 344 (1). <https://doi.org/10.1016/j.crte.2011.11.002>.
- Kar, M. 2014. *The Brahmaputra: Flood and Its Preventive Measures*. Guwahati: Eastern Book House.
- Phukan, U. 1990. *Agricultural Development in Assam*. New Delhi: Mittal.
- Saikia, A. 2011. *Forests and Ecological History of Assam, 1826–2000*. New Delhi: Oxford University Press.
- . 2016. *A Century of Protests: Peasant Politics in Assam Since 1900*. New Delhi: Oxford University Press.
- Saikia, B. 2015. *Migration and Ethnic Clashes in BTAD: A Challenges to National Integration*. Guwahati: Eastern Book House.