Journal of Environmental studies [JES]
An International Journal
https://jesj.journals.ekb.eg/
doi: *10.21608/JESJ.2024.307339.1087*

Sal Forest in Assam Dooars and Conservation Management: An Ecological History

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Citation: *Daimary, R.; Basumatary, S.C. (2024). Sal Forest in Assam Dooars and Conservation Management: An Ecological History. Journal of Environmental Studies, Vol. 36(1): 67-80.*

Article Information

Received 26 July 2024,
Revised 17 Oct. 2024,
Accepted 17 Oct. 2024,
Published online. 17 Des. 2024

Abstract: The northeastern landscape below the foothills of Bhutan is a complex ecosystem in terms of forest coverage, tall grassland, and floods in India. This ecosystem is distinct regarding its natural resources, geographical description, and socio-economic implications. The extended landscape can be discussed about the history of the Dooars and *Sal* forest. Dooars is a geographical term that means "door" or "gateway" between Bhutan and the Himalayan foothill plains in India. This landscape is considered the best environment for the *Sal* forest. Moreover, *Sal* forests were extracted by the colonial rules in the region. *Sal* forest was in high demand with the introduction of railways in Assam, besides boat and house construction. In order to extract *Sal* timber, new policies were formulated by the colonial rulers. This study tries to draw the colonial policy towards *Sal* forest and its conservation management from the perspective of regional history. Also, it explores the broad period of colonial and post-colonial forest management systems, economic, and socio-political factors, wildlife habitats, and occasional changes to land cover and land uses in the region. The methods used in this study are a search for archival evidence of Dooars on natural resources from the colonial and post-colonial periods. The anthropogenic data have been collected from group discussions and archival documents. The Assam State Archive and the National Archive of India were primarily used as data sources and narrating the historiography.

Keywords: Dooars, Ecological history, Forest distribution, Governing system, *Sal* forest.

Introduction

The northeastern part of India is rich in biological diversity and continues to yield discoveries of new species and range extensions for many faunal groups (Athreya 2006; Das *et al*. 2006; Datta et al. 2003; Mishra *et al*. 2006; Pawar & Birand 2001; Sinha *et al*. 2005; Sharma, *et. al*. 2012). It is counted among the 34 biodiversity hotspots in the world. A wide grassland landscape of northeast India is located in the transboundary areas of Bhutan and Assam. Therefore, the conservation of this area is an important phenomenon given the growing population and declining natural resources. So far, it is significant to understand that conservation management focuses on the Dooars and Manas landscapes of Assam in northeast India. This landscape is known as a complex ecosystem, including *Sal* forests, tall grasslands, and swamps maintained by flooding, which is one of the most diverse ecosystems in the country (Uniyal & Hore, 2008). Recently, it also became an important landscape for wildlife conservation and livelihoods for the large, growing human population in the area. This landscape has been inhabited by different sociopolitical groups of people since British rule and pre-British rule. This area's geography and forest land have changed over time, owing primarily to socio-political consequences. Conversely, the Dooars and Manas landscapes of the region have been discussed in the following sections.

Earlier in this landscape, the socio-political and cultural management of nature protection was

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prioritized. This landscape was an important business hub for countries like India, Nepal, Bhutan, and Tibet. There is some common engagement that takes place among these countries, called Dooar. Dooars are mainly made for developing relationships among neighboring countries and providing business opportunities for the people of that area. Dooar is a geographically descriptive name for the Bhutan hills. The average breadth of 30 kilometers and length of 350 kilometers are spread out in West Bengal and Assam. Dooars means a gateway to Bhutan or, vice versa, to the plains of India. There are a total of 18 dooars, 11 in West Bengal and 7 in Assam (Debnath, 2010). These 11 Dooars are also known as Western Dooars, and the remaining 7 are known as Eastern Dooars. Eastern Dooars are also known as Assam Dooars. Western Dooars are well known, and many scholars have worked in the area compared to Eastern Dooars or Assam Dooars. Boree Goomah, Kalling, Shurkolla, Chappaguri, Baksa, Chapkahama, and Bijini are the main Assam dooars. But earlier evidence mentioned mainly five in Assam state, namely Bijnee, Cheerung, Gooma, Repoo and Sidlee, covering a total area of 1569.92 square miles, which was given more significance. The Goalpara district was mentioned on the lower provinces' revenue survey map from 1868–69 as having five Dooars. The positions of the district were at latitudes North 25^0 $30^{/}$, 27^0 $0^{/}$ and longitude East 89^0 $45^{/}$ 91^0 and were bounded on the north by the Bhutan hills; east by the Manas on the north bank of the Brahmaputra; and by the Singer river on the south; south by the Garo hills; and west by the Sankos river.

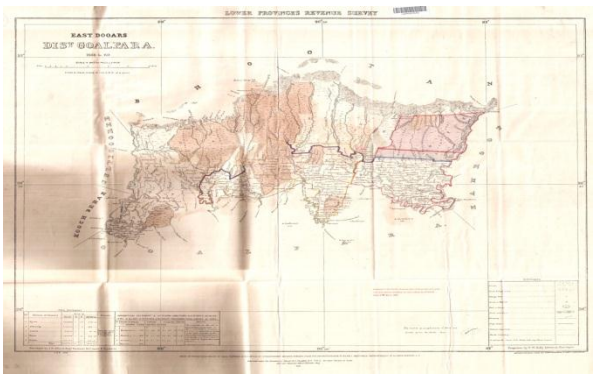

Figure 1: East dooars in Goalpara district 1868-69 (Source: Assam State Archive)

According to Debnath (2010), the Assam Dooars are located between the rivers Dhanshiri on the east and Manas on the west. Bengal Dooars were located between the rivers Manas to the east and Tista to the west. He mentioned Morang, which is located in Bengal between the rivers Tista and Mechhi. Again, the Morang was divided into two sections called Eastern Morang, which were located between Tista and Mahanada. The Western Morang was between Mahanada and Michhi in the Bhutan hills. Morang is contiguous with Nepal and is located down the hill of Sikkim. Chila Roy, the first king of these distant areas, established Kosh Kamta's kingdom and empire before the colonial period. The entire Dooar was in western Kamrup until the middle of the seventh century. Then it came to the Kamtapur regime and became an important hub for the Koch kingdom in 1515. However, in the 1760s, the Bhutanese army occupied a large portion of Koch territory. Tongsa Penlop and Paro Penlop, Bhutanese governors, were in charge of both the eastern and western Dooars. Again, in 1865, the British annexed the Dooars region, effectively ending Bhutanese dominance territory. The main reason for their occupation of this area was its abundant forest resources and the possibility of growing tea. The ruling government passed the Bhutan Dooars Act in 1869 and declared the area a 'wasteland' and all forest resources became government property (Choudhury, 2015).

Methodology

This study uses a historical research methodology, gathering qualitative data in addition to doing archive-based inquiry. We mostly obtained archival materials from the National Archive of India and the Assam State Archive, concentrating on records pertaining to the management of *Sal* forests and other natural resources in the Dooars region throughout the colonial and post-colonial eras. The paper looks at colonial policies on *Sal* forest extraction, which were influenced by the growth of railways and the rising need for timber. It also looks at later measures for forest conservation. Group talks with local populations were held in conjunction with archival research to collect anthropogenic data, which provided insights into the socio-economic and political issues that have driven efforts to save forests and changes in land usage. These conversations assisted in placing the local history in the larger perspective of the environment and wildlife habitat. By using these approaches, the research seeks to create a thorough historical account of the socioeconomic changes and forest management in the area over time.

Colonial management of Dooars and forest resources

Because of map uncertainties, it was difficult to describe Bhutan's forest along the eastern Bengal and Assam borders. There was no clear demarcation in the Dooars' bordering area from Sikkim to the Manas River in Assam. In 1912, the deputy conservator of forests, W. R. Leg. Jacob, mentioned making demarcations between Bhutan and Indian forests that lacked paths and constant rain, which increased the

difficulties in preparing maps (Assembly, 1912). Apart from that, the tour through Bhutan was rendered extremely difficult by the complete and astonishing ignorance of both Bhutias and Nepalis of the country they live in. It was rare to meet anyone who knew anything about localities a few miles from their own house. As the boundaries are uncertain and the maps are inaccurate, the estimated area of the hill country of Bhutan is around 13,200 square miles; the length of the country from east to west is roughly 200 miles, and the broadest part from north to south is about 100 miles. The area configuration and climate were divided into three zones: a southern or outer zone; a middle zone; and a northern zone. The southern or outer zone consists of the outer hills, which are about 20 miles broad. There is a small amount of nearly level land at the foot of the hills in some parts, but the area consists most of steep hills and deep valleys, often precipitous and in some cases inaccessible; in one or two places the hills rise to over 10,000 feet, but generally do not exceed 8,000. This tract is inhabited chiefly by Nepalis except immediately north of Buxa and to the east of the Manas river, where Bhutias live, and in the same place, Bhutias come down from further north in the cold weather largely for grazing purposes. During that time, the climate was damp, with the rainfall in the outer range probably reaching 200 inches per annum. Snow does not last long and melts during the day, except on northern slopes where it is heavily shaded. The forest was entirely broadleaved. In the middle zone, which is about 50 miles wide. The slopes are generally less steep than in the outer mountains; the mountains reach up to 16,000 feet, and snow falls for much of the year above 11,000 feet. The valleys are very variable, with some being broad and nearly level and others very precipitous. Bhutias lived in that region. The forest over 9,000 feet is primarily coniferous; below that elevation, it is broad-leaved in the western portion of Bhutan. But in the eastern portion, a large part of the area below 6,000 feet is stocked with *Pinuslongifolia* (Pine tree). The climate is drier, and the rainfall is much less than in the outer hills. The northern zone is composed of high mountains, is little inhabited, and is nearly devoid of forest. Bhutan's geological formation and soil are primarily composed of micaceous rocks, with some sandstone in the front hills. The remainder is mainly limestone country.

The species in this boundary area were incredible. The lower forests up to about 4,000 feet contain *lampatia, panisaj, tun, champ, castanopsisindica, and chilanuns. Sal* is not at all common. There is a little in the Raidak valley and in the low hills, and at the foot of the hills between the Sankos and Saralbhanga rivers. But this lack is probably due to excessive felling and constant fires in the areas where *Sal* grows. Rubber was scarce west of the Manas River, most likely due to trees being killed by overtapping in the past; east of the Manas River, it is more plentiful, but there are many dead trees from overtapping. In this area, forest from 4,000 to 8,000 feet contains chiefly *oaks* and *chestnuts; tun*i was found fairly frequently up to 5,000 feet, *champ* at 6,000 feet and over; walnut was scarce. Over 8,000 feet, a poor forest of *oak and rhododendron* was chiefly found with a heavy undergrowth of *maling* bamboo.

Governing system and forest management 1864-1946

This area has long been known for its sociopolitical upheaval zone, and it is continuing today. Following their political control over India in general and forests in particular, the British perceived that they had inherited the properties of India. From the earliest days of British occupation of India, the necessity of a vigorous forest policy was strongly indicated. However its necessity and direct and indirect value of the forests were underestimated (Ribbentrop, 1989 (Reprint)). Apparently, in the year 1864, there was the establishment of proper organization of the forest department in British India. Although the forest departments were organized in 1864 in other provinces, the forest of Assam could not be organized in the same year. Thus, Assam was placed under the forest department of Bengal from 1865 till 1868. Anderson stated in December 1864 that the question of forest conservancy in Assam was not settled. It appeared to him that while there were valuable forests to preserve, still little revenue could not be expected by local sales of timber (Stebbing, 1926). This reveals the fact that the British wanted to have an idea of economic potentiality in the first place through a survey of forest resources because the collection of revenue was the primary concern.

The forest department in Assam was organized in 1868 (Ribbentrop, 1989 (Reprint)). When the forest department was organised the reserves were reported to cover 615 square miles (Brandis, 1875). The British monopolized the forest of Assam from the year 1874 when the province was reconstituted as a Chief Commissioner’s province. (Handique, 2004). As work increased, experience taught that several provinces were too large to remain in charge of one conservator, and thus Assam was separated from Bengal in 1874. (Ribbentrop, 1989 (Reprint)) As soon as the forest of the province was tackled by the British, its trade policy on forest products was started. Thus, it was the imperial needs that dictated the British interest in the forest resources of Assam, which resulted in the establishment of control over forest resources. The forest department was formed in the year 1868. But it

was not completely organized until 1873. Before its complete organisation, Gustav Mann who was appointed as the first forest officer of Assam, examined the forests of the province from 1868 to 1871 (See Handique, British Policy in Assam, p. 32-35.).

In the words of Sarah Hilaly, "The devastated economy of Assamese economy had very little to offer to the British for exploitation" (Hilaly, 2007). Henceforth, the British turned their attention towards land revenue and other sources. Among the other sources, one of the most important was the forest products. Thus, gradually there was a beginning of commercialization of forest products. As commercialization went ahead, exploitation became the key component of the ideological framework of the working plan (Saikia, 2000). Moreover, forest management in Assam offers a picture where it could be perceived that a uniform forest policy was not followed throughout Assam (Handique, 2004). Before the formation of the Forest Department in 1868, management of the forest was also attempted to be controlled by the British. It was in the year 1850 that the Collector of Kamrup suggested that the woodcutters from Bengal, who felled *Sal* forests in the lower parts of the Brahmaputra and found their way to Kamrup, should be levied tax on felled trees (Handique, 2004). Thus, the new tax was attempted to be levied and lasted till 1852. It was a measure to conserve the forests of Assam. On the other hand, it also became clear that the measure was aimed at enhancing the revenue. The income from the new tax was estimated at Rs. 500 to Rs. 600 annually (Mann, 1875). Moreover, taxes came to be imposed even on axes and in the forms of *gorkhati*, *khasury* and *bunkur* (Handique, 2004). *Gorkahti*, *khasury* and *bunkur* were different forms of taxes imposed on timber, grazing and reeds respectively.

The forest of Assam was under Bengal till 1874 and managed by the Forest Act of 1865. There were two types of forests in Assam, reserved and open forests. The survey of the forest of Assam was started with the formation of the Forest Department so that valuation could be estimated properly. The most comprehensive valuation survey of the Assam forests and their codification as an economic entity took place during 1872-91 (Saikia, 2000). Thus, the survey was for economic gain. After 1874, the first survey began in the Sidli Duar Forest Reserve in Goalpara (Saikia, 2000).

The working plan prescribed the whole management of the area, having in view the objects fully required from the area and assuming their realization possible (Stebbing, The Forest of India, Vol. II, 1923). The proposal for a working plan took a long time for its sanction. It was in the year 1884 that the Working Plan Branch obtained sanction from the Government of India (Ribbentrop, 1989 (Reprint)). After the sanction of the government, working plans continued to be carried out by the local agency. Likewise, in the province of Assam Forest survey branch commenced work in 1889 (Saikia, 2000). After that working plans continued to work for Assam for several years. The working plans served mainly two purposes. Firstly, it aimed at scientific forestry and on the other hand, secondly, to maximize the revenue from the forests. Proper plantation and removal were to be carried out by the department so that there might not be harm done to the important forest products. The second purpose of earning revenue was also to be served through proper mechanisms which was successful in later years. It represented the best example of the imperialistic design of the British in the region. The most important feature of the working plan in Assam was confined to certain primary targets of the forest product, viz., *sal* tree. Thus, the working plan was mainly based on the extraction of *sal* tree. There was a reason for preparing such working plans based on primary targets. The forests in Assam were mostly multi-species where preparing a working plan was difficult. Henceforth, working plans in Assam became specific species which could provide them high financial return (Saikia, 2000). In the next couple of decades, several working plans were prepared for the province of Assam and the Dooar region.

Among the Working Plans in Assam, Mr. W.F. Peree made the Working Plan for the Goalpara Division which received sanction in 1906-07 and expired in 1920-21 (Stebbing, The Forest of India, Vol. II, 1923). Mention may be made of the Working Plan for the Forests of the Goalpara Division, Western Circle, Assam (1929-30 to 1938-39); Working Plan of the Nambor Reserved Forest of the Golaghat Range, Sibsagar Division, Assam for a period of fifteen years from 1904 to 1919. Another Working Plan was introduced known as the Kamrup *Sal* Working Plan, 1919 and the second Working Plan for the Goalpara Forest Division, Eastern Bengal and Assam covered all of the Dooar region. In the Western Circle, Working Plans were prepared for the Lakhimpur and Sibsagar Division for a period from 1931-32 to 1940-41. It was very important to mention that in the Working Plans, the Show Division had always been Goalpara (Stebbing, The Forest of India, Vol. II, 1923). The preparation of the Working Plans during the time seems clear that most of the Working Plans were based on the Goalpara Division with specific species, *sal*. Thus, there was a huge difference

percentage in between the Eastern and Western Circles in covering the forests under the Working Plans. In 1921 only. 29 percent of the Eastern Circle was under the Working Plans and on the other hand, 24.6 percent of the Western Circle was covered (Stebbing, The Forest of India, Vol. II, 1923).

The Working Plans were prepared with certain objectives no doubt, but at times the Forest Department did not completely follow those plans. It was the need to maximize economic exploitation that compelled them to overwork the limits embodied in the Working Plans. (Saikia, 2000) Departure from the Working Plans can be seen during the period. There were a variety of reasons for the departure. One of the most important reasons was the necessity of exploitation and the requirement of the products. Another reason may be attributed to the shortage of labour, money and staff which led to the departure from the Working Plans. It was during World War II that departure from the Plan could be seen as distinct. A considerable area of the Reserves had to be over-exploited during the World War II. (ASA, 1946) During the War, the forest products were worked out to fulfill the requirement of the War in the Reserve Forest. Although there was a departure, one can't deny the fact that it led to the enhancement of revenue in the forests in Assam.

Dooar area was mainly governed under the Koch kingdom and that established by Viswa Singha beginning of sixteenth century (Borah, 2016). In 1875, the undivided Goalpara district was declared Bijini, Chirang, Ripu and Guma Dooars as reserved forest under the Act VII., of 1865 (Wary & Singh, 2016). The head quarter was in Dhubri and W.R. Fisher was the first Divisional Forest Officer in Goalpara Division. In 1879, Goalpara forest division again comprised several reserve forests in dooar areas as Ripu (65 square miles), Jengasi-Charaidaka (3 square miles), Ateabari (14 square miles), Chirang (250 square miles), Sidli (68 square miles), Bijini (33 square miles) and Guma (25 square miles) (ibid). In the early colonial period of British India was exploiting the forests and generating revenue from it. Later in 1875, the *Indian Forester* journal was established by William Schlich to give scientific forestry to generate more effective forest management and produce more forest resources.

On 4th January 1889, Inspector General of Forest to the Government of India B. Ribbentrop came for the forest inspection in Assam. Before that in 1879 Inspector General of Forest Brandis (Sir Dietrich) had already visited the Assam valley and wrote a remarkable volume of "Suggestions regarding Forest Administration in Assam". B. Ribbentrop started his journey from the Dooar landscape near Haldibari on the Sankos River. Referring to Sir Dietrich, Ribbentrop mentioned the classification of forests for management as (a) Savannahs (b) Sal forests (c) Sissu and Khair forests (d) Mixed deciduous forests (e) Evergreen forests (f) Bamboo forests (g) Cane-brakes and (h) Pine forest. *Sal* forests were generating more revenue for the government among this classification of forest. The *Sal* forests were found in the areas where annual rainfall was below 80 inches, or where when it exceeds this amount; the surface or sub-soil drainage is exceptionally good. The *Sal* forests within Assam thus occupy a belt below the Himalayas, where the local rainfall and the water rushing off the hill slopes disappear in the boulder beds underlying the surface soil. The eastern limit of the *Sal* forests on the north of the Brahmaputra is conterminous with the boundary of Goalpara District where Dooars exists. It occupies the outlying hills which are connected with the main ranges both to the north and south of the Brahmaputra in Goalpara and Kamrup district. The area occupied in Assam by *Sissu and Khair* forests comprises only the stretches below the waterless *Sal* region, where the soil is too sandy and gravelly for the growth of *Sal*. This forest is best developed on the banks of the Manas and Sankos rivers but also occurs in isolated stretches throughout the greater part of the Kamrup district and in Darrang shading into a mixed deciduous forest towards the slopes of the Himalayas. Continuous firing transforms this class of forests into savannashs.

Inspector General of Forests B. Ribbentrop in his inspection recorded some 26,000 trees were extracted from 1874-75 to 1887-88 from the forests in the Goalpara district which are mainly from Dooar areas. The valuation survey results during 1873 and 1874-75 are as follows- From the Chirang Forest, west of the Saumukha River, 36 square miles:

Table 1: Chirang Forest, west of the Saumukha river, 36 square miles

Girth	Trees
Under 1½′	533,323
1½′ to 3′	384,289
3′ to 4½′	98,690
4½′ to 6′	18,490
Above 6′	1,112
Total	1,035,904, or 45 trees per acre.

Table 2: For the Sidli Forest, 36 square miles**.**

Girth	Trees
Under 1½′	982,471
1½′ to 3′	376,083
3′ to 4½′	49,608
4½′ to 6′	5,820
Above 6′	……..
Total	1,413,982 or 61 trees per acre.

In 1889, the area of demarcated state forest in the Assam province recorded the Goalpara district as *Sal* forest of 355 square miles in reserves and there was no protected forest; 250 square miles of Deciduous reserves forests and 20 square miles of evergreen forests in reserved. Therefore, the total area of 625 square miles was reserved for forest in the district. Goalpara district was holding second heights reserved forests in Cachar district (Total: 752 reserved forests) in the province. The bordering area of Bhutans was an opportunity to exploit resources for the forest department with a good management process. In the management process, the organization of controlling staff was given more importance in 1912. The area was not protected by the trained and experienced staff. During the time existing government was seeking some trained and experienced foresters to work on the proper demarcation between Assam, Bhutan and eastern Bengal. Some local Nepalis possess some education and acquired some elementary knowledge in forestry from Bengal Forest training classes to fit them for looking after the forests in the future. Interestingly those trained and impressive officers enforced to application of the methods of forest preservation and exploitation. In the beginning, it was advised to divide the areas for trained staff as- (a) From the Jaldhaka to the Torsa Valley; (b) From the Torsa to the Sankos Valley; (c) From the Sankos to the Sarabhanga Valley; (d) From the Sarabhanga valley to the Manas valley; (e) From the Manas valley to the Daishom valley.

Earlier socio-economic status in the Dooar region

The dooar area was a common trade landscape among India, Bhutan and Tibet during the 17th century. Bhutan traded with North Bengal and Assam was wool products, musk, and horses, and imported cotton cloth, broadcloth, tools spices and tobacco. In 1773, though the British took over the rule in Cooch Bihar but commercial exchange and trade were open to Tibet, Bhutan and between focusing on the north-east part of India. Tibetan products were mainly for the market of north-eastern India. Interestingly, from the 5th to 13th century, Kamrup now Assam and Bhutan traded with agricultural products, especially areca nut (Tambula, Areca catechu in Latin) and betel (pan, Piper betel in Latin) commonly traded and it later became very favorite to Bhutanese people. In Assam, the cultivation of silkworms was common and the silk produced was mainly for local consumption. However, a part of the silk produce was exported and a small quantity reached eastern Bhutan from Assam and then Kamrup (Pommaret, 1999). In 1775, a traveler George Bogle mentioned in his note that a particular population called Kacharies or Bodos in Assam and Meches in West Bengal had a good relationship with the Bhutanese because of their geographical position. The Bodos were settled down south of the Bhutan border in Assam Dooars. This community was very active in the cultivation of silkworms from which was a raw silk called *Endi.* The Bodo women spent a large part of their day weaving on a dorsal strap loom. Other members of the family help them by providing other domestic tasks. A good weaver was able to weave half a yard per day and earnings from the cloths contributed significantly to the family economy. This silk was mainly prized for its softness, solidity and warmth. When Dooars were under Bhutanese jurisdiction in the 18th century and till 1865, Bodos were paying their taxes to the Bhutanese government in grain and cloth. Bodos were producing two types of textiles that are *kharu* and *dunko lepa* especially for Bhutan. According to Bogle, the Bodos were very good and had land for cultivation to produce rice, mustard seeds, tobacco, a small amount of opium and about 40,000 maunds of fine cotton per year; again, the east they produced black pepper and *munga silk* (*Anthera assama in Latin*) (idib).

The consequences of the ecological process in land cover and land use in the Dooar area also depend on the changes in socio-economic and environmental factors. Similarly, local and small levels of grassroots initiatives affected the land cover and land use of the habitat people. After independence in 1947, this area has been facing socio-economic, socio-cultural, identity politics, ethnicity, immigration and international disputation problems. The British government first documented the significant importance of Dooars in terms of natural resources, economic prospects and strategic importance (Debnath, 2010) during the colonial period.

Demand for *Sal* and communications in the means of development

In a technical sense, it can be related that another important policy adopted by the British to extract *Sal* timber was an improvement of communication. It is visible that to expand trade and commercial activity, they decided to improve the communication network through which they could cater to the needs. Henceforth, the British emphasized communication networks mainly roads and railways. As the British came to Assam with an imperialistic design they attempted to grasp the region in the orbit of British dominion. However, the greatest obstacle in the sphere of tapping the resources of Assam was the absence of proper communication. Despite that, there was a sharp increase in British trade in the region. They were aware that lucrative resources could be extracted from the region. Moreover, tea plantations were blooming simultaneously. Thus, the increase in trade and more

so the growth of the tea industry made it imperative to link Assam with the world market. (Hilaly, 2007) The demand for railways was mainly guided by the imperialistic policy of trade, market and connectivity. These three elements were interlinked with each other. The opening of markets in the interior was important for expansion of trade and these could be possible only with better connectivity. The solution for that better connectivity was found expression in the demand for railways. It is interesting to note that the introduction of the railway itself expanded the *Sal* trade of the region. This high demand for railway expanded the extraction of *Sal* from the forests of Assam providing good revenue to the British.

Consequently, there was a demand for *Sal* from different directions. It was in demand from the native people and, the Public Works Department (PWD) for the construction of roads, bridges and buildings. But the demand from the railways was incomparable to others. The *Sal* timber was in demand for use as the sleeper of railway tracts which was durable to adjust the tracts. With the commencement of sleeper operations in the year 1897, there was a surprisingly high demand for *Sal* timbers for the railway. Especially these sleeper operations were commenced to supply the Eastern Bengal State Railway extension from the Mogal hat to Dhubri. However, the outcome of these operations proved that the exploitation of round timber for the Bengal markets was more profitable than the exploitation of the yield in the form of sleepers. (Carr, 1905) The demand for *Sal* timber was also increased due to the Rangia-Tangla extension. It was the introduction of a railway in Assam that enhanced the importance of hardwood or *Sal* timber for railway sleepers.

As the *Sal* timbers were mostly inaccessible terrain, it became difficult to extract *Sal* from the thick forests of western Assam. Initially, the cut timber logs were brought near to the river banks manually or dragged with the help of buffaloes or elephants and then floated by the river streams. (Sinha, 2012) There were only cart roads to carry timbers. But these cart roads were also unfeasible, owing to the total absence of suitable metalling. Kutcha roads would have been served only a few months of the year. (Carr, 1905) However, the demand for *Sal* logs fell far short of the estimated outturn and operations undertaken to extract logs had been irregular and spasmodic due to improper communication. (Sinha, 2012) More additional elephants were required to carry out *Sal* timber logs. The additional elephants depended on high prices and the impossibility of purchasing trained dragging elephants pointed to the adoption of mechanical means that would assist the then-existing staff of elephants. (Sinha, 2012) Extraction by river was fair, but large trees could not be extracted by this means. The difficulty of extraction of *Sal* timber compelled the government to undertake a new venture of the tram in the district of Goalpara in the year 1901 with the purchase of two and a half miles of plant (Sinha, 2012) and continued working with extensions. The extension of the tramway was sanctioned in December 1922 and bridge building was undertaken during the last three years or so. (Stebbing, The Forest of India, Vol. III, 1926) By 1931-32 the total length of the line was forty-four miles. The line is divided naturally into two sections: - The first was the forest section consisting of 26 ½ miles of track including 10 ¾ miles of sidings and the second was the Fakiragram Section of 17 ½ miles which ran from Kochugaon to Fakiragram (ASA, 1932). Fourteen bridges including that over the Hel River which were greatly damaged by earthquakes of 1930 were reconstructed during the year. This led to a great change in finding new markets for the swan material as large tracts were opened due to the improvement in communication. With the improvement of communication especially, tramline, revenue was increased. The revenue of 1922-23 was double that of 1921-22 and approached Rs. 1,25,000 in 1923-24 against the revenue of 1922-23 Rs. 85,000. (Stebbing, The Forest of India, Vol. III, 1926)

Extraction of *Sal* timber from the region

Extraction of *Sal* in colonial Assam may be divided into three phases for the convenience of the study. The first phase starts from the formation of the Forest Department in the year 1868 to the preparation of working plans for the forests in the 1890s. The second phase started with the emergence of the working plans till the end of World War I. The third phase started after the end of World War I till independence. In the first phase, less extraction can be seen as it was the formative years of the Forest Department. The Forest Department was organized in 1868 and Assam became Chief Commissioner's Province in the year 1874. Moreover, in this phase, it was difficult to extract *Sal* due to a lack of proper communication. The second phase shows the development of working plans for forests. The development of working plans led to the proper extraction and extraction became easier. In the third phase of *Sal* extraction, it became much easier because there was saturation in the working plans and the mode of communication had improved to a greater extent than the other two phases. Henceforth, larger extraction can be seen in this phase. But the third phase included two important events of the world, i.e., Worldwide Economic Depression and World War II. These events led to the ups and downs of *Sal's* trade.

Sal trade was carried by the native contractors in local markets before the emergence of the Forest Department in 1868. After the monopoly of forest

went into the hands of the Forest Department in the year 1874, its trade started to be looked after by the department through the imperialistic mechanism of trade. After the extraction, *Sal* was carried to the markets. There was no local market except for railway sleepers and all the round timber was exported to eastern Bengal, the principal centers of demand being Daccca, Mymensingh, Faridpur and Pabna. (Peree, 1907)

Timber was mostly worked by the departmental agency till 1879. (Saikia, 2000) The most important mechanism of exploitation of forest products was a chain of agencies. There were mainly two agencies, the first was the government agency; second purchasers. Moreover, *gorkhati* permit holders and free grantees could also exploit forest products with certain limitations. Undoubtedly, it is visible that as soon as the British set up their rule in Assam, they started the exploitation of forest products. Initially, the forest trade was confined to merchant trade through an institutional shape of network for the extraction of forest products from timber felling to market. Gradually, with the establishment of the forest department, it was converted into an imperial economy to serve the purposes of the imperialists. It was the beginning of the monopoly of forest and its products. As commercialization was one of the most important features of the colonial rule, likewise forest was commercialized in Assam by the colonial rulers as a part of the greater imperialistic design. It was only in the year 1874 that the forest department was monopolized by the government; interestingly by 1889-90, timber trade had been primarily increased. The timber trade can be categorized into two based on its characteristics; one was local trade and another was export trade. The timber trade had improved very considerably during the year 1889-90, and what was more satisfactory was that local trade had also increased as well as the export trade. (ASA, Progress Report of Forest Administration of Assam for the years 1889-90, 1890) To speak particularly about *Sal* trade, the outturn of *Sal* timber, which was the most important from a revenue point of view, was 506,849 cubic feet, as compared with 433,955 in 1888-89 or an increase of 72,894. (ASA, 1890). In the year 1899, there was a huge surplus from the forests of Goalpara, Kamrup and Garo Hills (the then districts of the Province of Assam) in which most of the forest products were *Sal* timbers. The surplus from the forests in these three districts was Rs. 51,285,06, Rs. 23,789,09 and Rs. 11,610,119 in the districts of Goalpara, Kamrup and Garo Hills respectively (ASA, 1890). It is evident that from the very beginning forest products mainly *Sal* timber were abundant in the districts of western Assam.

Felling timbers by different agencies viz., Government agencies, purchasers, trade license holders and free grantees was a crucial part of the forest policies. With the commencement of sleeper operations, there was an increase in the felling of trees through those agencies. The table shows that in the years 1898-99 felling of the *Sal* tree was 7386 numbers including reserved and unclassed forests. After one year it was increased to 10706 numbers. There was an increase in the number of felling *Sal* trees by 3338 numbers. This confirms that the *Sal* timber trade in Assam was

Table 3: Both reserved forests and unclassed forests, the number of timbers felled under colonial rule

Year	Divisions	Felled by Government agency	Felled under trade license	Felled under free license	Total
1898-99	Goalpara	2671	1683	Nil	4354
	Kamrup	419	2033	40	2492
	Darrang	164	10	20	194
	Nowgong	Nil	96	Nil	96
	Garo Hills	Nil	232	Nil	232
	Total	3254	4054	60	7368
1899-1900	Goalpara	3842	2752	Nil	6594
	Kamrup	69	2801	Nil	2870
	Darrang	84	25	Nil	109
	Nowgong	Nil	70	Nil	70
	Garo Hills	Nil	1063	Nil	1063
	Total	3995	6711		10706

*****Prepared from Progress Report of Forest Administration, 1899-1900.

running high and provided good revenue to the government. Moreover, the felling of *Sal* timber was higher in the Goalpara division than in the other divisions.

In the first phase of *Sal* extraction, its trade was moderate because it was the formative stage. The expansion of the trade can be seen as larger from the second phase of extraction. At this phase, working plans had also been prepared and operated for timber exploitation. In the years 1900-01 and 1901-02, the Goalpara Division was the only one in which the forests were exploited according to working plans. It was contemplated for removal of 5,994 *Sal* trees whereas 3,420 were felled, as against 5,924 felled in the previous year. (ASA, 1901) As there was a surplus of *Sal* supply to the East Bengal State Railway in the previous years, departmental sleeper operations were suspended in the division. The plan for 1901-02 contemplated the removal of 5,574 of which 2,814 were felled, as against 3,420 felled in the previous year. (ASA, 1901) Thus, there was a decline in the felling of *Sal* as contemplated in the working plans. The decline can be attributed to the absence of demand from the East Bengal State Railway. This decline caused a diminution of Rs. 38,000 in the receipts from timber removed from the Goalpara division. (ASA, Progress Report of Forest Administration of Assam for the years 1900-01, 1901) *Sal* trade was dependent on the demand for railways at that juncture. Nevertheless, *Sal's* trade was carried on a larger scale with the emergence of working plans. The evidence of large scale *Sal* trade is confirmed by the number felling in the working years. In the years 1903-04, *Sal* timbers were exploited departmentally and converted into sleepers for the East Bengal State Railway. It was the extension of the railway towards Gauhati that led to a large demand for sleepers. (Carr, 1905) The development of sleepers' operations was profitable to the department and beneficial to the forests. The number of sleepers delivered to the railway during the year was 25,912 and arrangements were made for the supply of another 60,000 in the current year. (Carr, 1905) Moreover, the obstacle in removing *Sal* timber was also reduced with the extension of six miles of tramway. This had cheapened the transport considerably for *Sal* extraction. During the years 1903-04, there was an expansion *Sal* trade due to the extension of the railway. On the other hand, there was also fluctuation in the *Sal* trade due to a shortage of labour and communication problems. The gross financial result in the year 1906-07 was satisfactory. On the other hand, the division of Goalpara which used to produce large *Sal* timber had a loss (ASA, 1907). In the years 1910-11, there was a large increase in the number of S*al* sleepers delivered in the Goalpara division. (ASA, 1912).

The extraction of *Sal* timber was continued with time and as per the necessity of the imperial economy. Before the beginning of World War I, there was an increase in *Sal* trade in the western districts of Assam Valley Division. By 1910-11, there had been an increase in work in the Goalpara division, where, for example, 105,238 M.G. sleepers were sawn against 84,366 in the previous year. This division delivered 102,168 sleepers to railways against 39,520 last year, and maintained a reserve in hand about the same figure. M.G. sleepers paid for in 1910-11 had all been delivered to the Eastern Bengal State Railway, as well as 52,660 as against the year's indent. (ASA, 1912) By that year *Sal* trade was carried with the railways. It was mainly carried with the Eastern Bengal Railway, Lower Ganges Bridge, Assam Bengal Railway, Assam Railway & Trading Company, Dacca Municipality and Jorhat State Railway. This led to the earning of surplus revenue by the imperial government. On the other hand, the objective of connecting routes through railways for the purpose of commercialization had also been served. This reveals that double purposes were served by *Sal* trade in colonial Assam. Departmental operations on timber were carried out, although the purchasers were given the right of removal of timbers. But by the year 1910-11, there was little change in these features of the timber trade and the removal by the purchasers was increased to a great extent. There had been a very satisfactory increase in revenue on account of removals by purchasers, notably in Goalpara where it had been possible to abandon departmental operations in some areas. (ASA, 1907)

As soon as World War I came to an end, once again there was an increase in *Sal* trade. From the year 1919 onwards, the supply of B.G. and M.G. sleepers had increased to a great extent. The following data shows the supply of *Sal* timber from the years 1919-20 to 1923-24. After the end of the First World War, *Sal* trade was expanded to a great extent. The reason for the large expansion of the trade was the improvement in communication and projects undertaken for the extension of railways. In the year 1921-22, departmental operation was undertaken in the Garo Hills Division for the first time. From the Garo Hills, 11,300 cubic feet of sleepers and 1,946 cubic feet of scantling were obtained. (ASA, 1922) There was also an increase in the supply of *Sal* from the Kamrup division for the railways. *Sal* sleepers to the number of 13,756 were supplied from Kamrup Division. (ASA, Progress Report of Forest Administration of Assm for the years 1921-22, 1922).

Table 4: Extraction of sleepers for 5 years from 1919-20 to 1923-24

Year	B.G. Sleepers (No)	M.G. Sleepers (No)	Specials & scantling (c.ft.)	Total Cubic Feet
1919-20	NA	13,658	21,725	42,213
1920-21	NA	14,532	20,839	42,667
1921-22	NA	17,062	12,456	38,049
1922-23	8,250	7,179	55,057	90,576
1923-24	27,243	18,839	26,567	1,34,555

*Quinquennial Review of Forest Administration in the Province of Assam for the years 1919-20 to 1923-24 The above data shows the volume of *Sal* trade as railway sleepers required hardwood. Those amounts of sleepers were sold to the railway companies from which the British Government earned revenues.

Table 5: The table shows the extraction of *Sal* timber in the year from the district of Goalpara

Year	Sleepers			Log (cft)	Scantling (cft)	Tramway (cft)	Posts (cft)	Slabs (cft)
	B.G. (Nos)	M.G. (Nos)	Special (cft)					
1925-26	7,067	2,426	18,701	549,472	6,196	3,633	4,455	10,886
1926-27	3,314	3,583	359	75,407	9,216	606	11,036	24,219
1927-28		9,978	74,767	19,789	10,419	12,096	452	126

*PRPA, 1926-27 and 1927-28. The table shows the extraction of *sal* timber in the year from the district of Goalpara

In the year 1929-30, from Goalpara district itself, a total number of 34,014 *Sal* trees were sold (ASA, 1930). There was a decline in *Sal* trade during the depression years in Eastern Bengal resulting from the depressed condition of the jute trade. It was unfortunate that simultaneously the revenue fell by 2.5 Lakhs owing to the general depression in trade, and in particular owing to a reduction in the demand for sleepers and to the poor market for *Sal* (ASA, 1930). This situation continued during the year 1931-32. There was a check in the expansion of forest revenues due to the worldwide trade depression.

Table 6: Orders executed by the Forest Department

Year	*Sal* Sleepers and Logs							
	B.G	M.G	N.G.	L.N.G.	Special size	Logs	Scantling	Others
1939-40		91,135			1,442	152 tons	1,198	
1940-41	26,610	73,478	1,000	1,000				5,002 (ballies)
1944-45	61,424	44,490		2,224	21,542			
1945-46	43,072	42,004			4,520			

*Prepared from the Progress Reports of Forest Administration of the respective years

The above data included the orders executed to both the railway and timber supply directorates. Moreover, the category of sleepers of misc hardwood and *Sal* is not included in the data. The data makes it clear that the supply of *Sal* increased every year earning a huge amount of revenue. The supply of *Sal* timbers was not minimized even during World War II. Instead, there was a demand for B.G. & M.G. sleepers from the War and Defense services. Moreover, there was also demand from the Railway department.

To enhance the academic rigor and broader relevance of this study, a comparative account with other forested regions of Northeast India could be integrated before the conclusion. The Sal forests of the Dooars share ecological and historical parallels with other regions, such as the Khasi, Garo, and Jaintia Hills in Meghalaya, and the forested areas of Arunachal Pradesh, all of which were subjected to colonial extraction policies. Timber species like teak and hardwoods were similarly targeted for commercial exploitation in these regions, profoundly influencing forest governance and management strategies during the colonial and post-colonial periods. A comparative analysis would not only underscore the distinctive features of the Dooars ecosystem but also situate it within a broader framework of environmental historiography. This would provide a more comprehensive understanding of the varied impacts of colonial forestry policies, conservation challenges, and land use changes across Northeast India, thereby enhancing the implications of this study for regional conservation discourse.

Conclusion

The preparation of working plans for the forest of Assam was one of the important technical strategies for earning maximum revenue. It was a scientific mechanism for the exploitation of forest products. The removal of the forest products at once would not provide continuity of revenue earning, henceforth, scientific forestry was to be carried along with the removal of trees. On the other hand, undoubtedly the colonial rulers started the sustainable growth of forest products. They started scientific forestry in Assam like in the other provinces of India which was beneficial for the people. It is very difficult to estimate the deforestation caused by the *Sal* extraction. The British adopted the regenerative policies of *Sal* under the working plans in the region. Moreover, the ecological impact of *Sal* extraction can be viewed only with a proper study of the ecological degradation of the region.

However, forest policy was based on the commercialisation of forest products of Dooars in Assam. It was interlinked with the greater ideology of imperialism and the market system. *Sal* was one of the most important major products of forest and so was its extraction. The extraction of *Sal* was necessitated by the demand for a larger expansion of the market and commercialisation of agriculture in the real economic sense of exploitation. In order to serve the purpose of connecting the interior markets of the region, communication should have to be improved. Improvement of communication enhanced the extraction of *Sal*. Extraction of *Sal* served the British in two ways, firstly, it augmented the revenue and secondly, it led to the expansion of communication, especially the railway communication. The *Sal* trade was closely associated with the improvement of communication because it was required on a large scale as railway sleepers. On the other hand, there was also improvement in communication so that *Sal* could be extracted easily as *Sal* forest was mostly in inaccessible terrain. It is noteworthy to mention that there was the introduction of a tramline in the forest division of Kochugaon in the year 1901 to extract *Sal*. Thus, the extraction of *Sal* which was expanding till independence led to the enhancement of revenue and improvement of communication. This gradually led to the increase of trade in colonial Assam.

At present, the *Sal* forests are under the Indian Forest Department and the state forest department in the region. It is not exploited as before due to applying the conservation approach of the forest and biodiversity.

Acknowledgment

We would like to extend our sincere gratitude to the Assam State Archive, Guwahati, for providing access to rare historical records; the National Archive of India, New Delhi, for offering valuable resources and guidance; Bodoland University, Kokrajhar, for the opportunity to utilize their library facilities and engage with the academic community; and Central University, for the institutional support and encouragement that facilitated my research journey.

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