International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

Botanical Surveys as an Agent of Colonial Rule in Northeast India: Scientific Knowledge, Resource Extraction, and Environmental Transformation, c. 1826–1947

Protiksha Hatibaruah

Guest Faculty, Jagannath Barooah University

Abstract:
Botanical surveys constituted an important, though insufficiently examined, dimension of British colonial expansion in Northeast India. Beyond their contribution to the classification of regional flora, these investigations generated knowledge that could be mobilised in the commercial exploitation of natural resources, the development of plantation agriculture, and the consolidation of colonial forest administration. This paper examines the relationship between botanical exploration and colonial governance, focusing primarily on Assam and situating the region within wider imperial networks of scientific knowledge and resource extraction. The paper analyses three interconnected processes, the production of botanical knowledge, the commercialisation of nature through tea cultivation, and the transformation of forests into administratively regulated and economically valuable spaces. It argues that botanical surveys contributed to colonial rule not simply by discovering plant species, but by establishing connections between scientific classification, commercial priorities, and state intervention. The development of Assam's tea industry demonstrates how botanical research intersected with imperial trade, racialised scientific assumptions, and the restructuring of labour. The history of colonial forestry further illustrates how knowledge of natural resources became embedded in systems of territorial classification and regulation. The paper also considers the consequences of these processes for indigenous ecological knowledge, customary resource use, and environmental change. It concludes that botanical surveys should be understood as part of a wider colonial knowledge regime whose authority depended on its integration with administrative institutions and commercial interests.

Keywords: Colonial botany; Northeast India; Assam; environmental history; scientific knowledge; tea plantations; colonial forestry; imperialism.

Introduction:

Since ancient times India has seen the keeping of records of important plants and its utility. In Rig Veda the complete utility of plants was given in *Vrikshayurveda*. There are three terms related to plant exploration or scientific field studies, namely excursion, exploration and expedition. Excursion involves a short duration of plant research on a specific, limited space. Exploration includes intensive research where a broader region is studied in different seasons. On the other hand, expeditions are undertaken to remote and difficult areas and usually of several months' duration (Sikarwar, 2020). When the Europeans arrived in India, their curious minds led them to explore the flora and fauna of the different areas. One of the pioneering works on botany was carried on by Garcia de Orta, a Portuguese explorer, physician, herbalist and naturalist. His magnum opus "*Coloquois dos Simples e Drogas da India*" recorded medicinal and economic plants of India. A line of interested explorers began to investigate further. It was the Society of Arts, during the Seven Years War, which originally encouraged the creation of colonial botanic gardens to facilitate plant exchange. In 1786, deriving inspiration from the scientist Joseph Banks' vision of empire and botany flourishing in tandem, the Bengal military officer Robert Kyd floated a scheme for a 'Garden of Acclimatisation' at Calcutta, to act as a hub for the wider scientific study of the Indian continent. Henceforth, the establishment of such gardens would become an integral part of the consolidation of conquests, particularly in the Crown Colonies. In Britain, Kew Garden was begun in 1772 as a royal hobby, but by 1841 it won the status of a state institution 'aiding the Mother Country in everything that is useful in the vegetable kingdom' and coordinating the efforts of 'the many gardens in the British colonies and dependencies whose utility is wasted for want of unity and central direction'. The Royal Botanic Gardens formed in 1787 eventually comprised a long chain of thirty-three government stations radiating out of Kew, stretching all the way from Calcutta to Singapore to Jamaica to Fiji to Kisanto and Eala. As Kyd declared, the introduction and dissemination of plant wealth should enable the British to 'outstrip our rivals in every valuable production which nature has confined to this part of the globe (Sharma, 2006). Later in 1890 the Botanical Survey of India was formed to further explore the plant resources of India. Behind these explorations and expeditions, the main motive was to extract plants and their products which would be commercially viable for the British.

The establishment and consolidation of British colonial authority in Northeast India involved more than military expansion, political agreements, and administrative reorganisation. It also required the systematic acquisition of knowledge about the region's geography, population, agricultural potential, forests, and natural resources. Scientific investigations of the environment became important within this broader process because they enabled colonial officials and commercial interests to identify, classify, and assess the economic potential of unfamiliar landscapes. Among these investigations, botanical surveys occupied a distinctive position. By collecting specimens, documenting plant distributions, identifying commercially useful species, and circulating scientific findings through institutional networks, botanical exploration contributed to the transformation of nature into an object of colonial knowledge and economic management. The Treaty of Yandaboo in 1826 marked a significant turning point in the expansion of British authority in Assam. The subsequent development of colonial institutions created new opportunities for investigating the region's agricultural and forest resources. Assam's indigenous tea plants attracted particular attention because they offered the possibility of developing a tea industry under British control at a time when the East India Company's commercial relationship with China was changing. Botanical

exploration was therefore connected not only with scientific curiosity but also with imperial efforts to establish alternative sources of a valuable commodity (Sharma, 2006).

The relationship between botany and empire, however, cannot be reduced to a simple claim that scientific research was merely a disguise for economic exploitation. Botanical investigations generated genuine scientific knowledge and depended on observation, experimentation, classification, and the exchange of specimens. Their colonial significance lay in the institutions through which this knowledge circulated and the purposes to which it could be put. Drayton (2000) demonstrates that botanical institutions and imperial projects of agricultural improvement developed in a mutually reinforcing relationship. Scientific knowledge could contribute to economic intervention, while the language of improvement helped legitimise imperial authority. In Northeast India, the practical consequences of this relationship became visible in the development of tea plantations and the emergence of colonial forest administration. Sharma (2006) shows how botanical expertise, Chinese horticultural knowledge, imperial commercial ambitions, and racialised representations of Assam shaped the making of the region into a tea-producing landscape. Saikia (2011), meanwhile, demonstrates that colonial forestry involved the mapping and commercial assessment of forests, the creation of new administrative categories, and conflicts over access to forest resources. These developments suggest that botanical knowledge formed part of a wider transformation through which colonial authorities sought to make landscapes more accessible to commercial and administrative intervention. The present paper examines botanical surveys as an agent of colonial rule in Northeast India, with particular emphasis on Assam between 1826 and 1947. It investigates the relationship between botanical exploration, plantation agriculture, forestry, and the production of colonial knowledge. It also considers how these processes affected established relationships between communities and their environments. The central argument is that botanical surveys contributed to colonial governance by connecting scientific classification with commercial exploitation and administrative intervention. Their significance did not arise from scientific discovery alone. Rather, botanical knowledge acquired political and economic force when it was incorporated into plantation enterprises, forest policies, and the colonial state's broader attempts to classify and regulate land and resources. This argument also requires recognising the limits of colonial authority: scientific investigations depended on local knowledge and practical experience, while the application of colonial policies generated conflicts and environmental consequences that could not always be anticipated or controlled.

The relationship between knowledge and colonial authority has been a central concern in the historiography of British India. Cohn (1996) argues that colonial rule involved the collection, classification, and codification of information about Indian society. Such knowledge was not simply descriptive. By producing categories through which colonial officials understood and administered the populations they governed, colonial scholarship contributed to the construction of imperial authority. Although Cohn's work primarily examines forms of knowledge concerning Indian society, law, language, and cultural practices, its analytical framework can be extended to environmental knowledge. Botanical surveys similarly organised complex realities into identifiable and classifiable categories. Plant species, forest types, agricultural possibilities, and geographical distributions could be documented in ways that facilitated comparison and administrative decision-making. The relevant question is not whether botanical classification was scientifically valid, but how the resulting knowledge circulated and what institutional purposes it served.

Drayton's (2000) *Nature's Government* provides a more direct framework for understanding the relationship between botany and imperial expansion. He demonstrates that botanical institutions,

particularly botanic gardens, were connected with projects of agricultural improvement and the transfer of economically valuable plants across imperial territories. Botanical knowledge was therefore embedded in wider networks of scientific exchange, commercial ambition, and imperial governance. The significance of this framework for Assam becomes apparent in the history of tea. The identification of indigenous tea plants did not automatically produce a commercial industry. Their economic importance depended on experimentation, the movement of plants and cultivation expertise, investment, and the development of plantation systems. Botanical knowledge became an instrument of colonial economic intervention through this wider institutional process.

Sharma's (2006) study, "British Science, Chinese Skill and Assam Tea: Making Empire's Garden," is particularly important for understanding the connection between scientific investigation and colonial commercial ambitions. She situates the emergence of Assam's tea industry within the East India Company's search for alternatives to its dependence on Chinese tea supplies. Although tea plants grew in Assam, colonial authorities also sought Chinese plants and skilled growers, reflecting contemporary assumptions about the superiority of Chinese cultivation knowledge. Sharma's analysis demonstrates that the making of Assam into a tea-producing region was simultaneously scientific, economic, ideological, and social. The region's plants and inhabitants were often represented through racialised distinctions between supposedly wild local environments and supposedly more advanced Chinese cultivation practices. These assumptions influenced the development of the tea industry and its labour system (Sharma, 2006). This interpretation complicates any account of botanical surveys as straightforward scientific progress. The identification of plant resources took place within unequal imperial networks that determined whose knowledge was considered authoritative and how economic benefits were distributed.

Saikia's (2011) *Forests and Ecological History of Assam, 1826–2000* offers a complementary perspective by examining the transformation of Assam's forests under colonial and postcolonial rule. The book explores how forests were mapped, incorporated into commercial networks, and reorganised through forest institutions and legislation. It also examines the consequences of these developments for customary resource use and the relationship between agrarian communities and forest authorities. Saikia's analysis is particularly relevant because it demonstrates that colonial forest categories were not simply neutral descriptions of ecological conditions. Their creation and implementation were shaped by political and economic considerations. The distinction between different categories of forest, for example, helped establish new boundaries around access, use, and administration (Saikia, 2011). Botanical surveys should therefore be understood in relation to, but not equated with, the development of colonial forestry. Botanical investigations generated knowledge about plant species and vegetation, while forest departments and other institutions converted selected forms of knowledge into systems of management and regulation.

Borkotoky's (2023) study of changing narratives of soil in colonial Assam's tea plantations extends this discussion to the environmental consequences of commercial agriculture. The article examines how colonial planters and scientists increasingly investigated soil as plantation productivity declined. It demonstrates that tea cultivation transformed not only visible landscapes through deforestation and monoculture, but also the physical environments on which production depended. This study is useful because it directs attention to the changing relationship between scientific knowledge and environmental problems. Colonial scientific intervention did not always resolve ecological difficulties. Instead, the environmental consequences of commercial cultivation could generate new investigations, explanations, and management strategies (Borkotoky, 2023). Taken together, these works provide the foundation for analysing botanical surveys as part of a broader colonial knowledge regime. The contribution of the

present paper lies in bringing these historiographical strands into a single framework: botanical exploration, plantation development, forest governance, and environmental transformation.

Sources and Methodology

This paper adopts a historical and environmental approach, combining published scholarship with contemporary botanical records. Its primary geographical focus is Assam, although the activities of botanical explorers in adjoining hill and frontier regions provide a wider regional context. The methodological approach involves close reading of botanical reports, comparison with secondary scholarship, and analysis of the institutional context in which scientific findings circulated. The paper distinguishes between the production of botanical knowledge and its subsequent use in commercial or administrative activities. Where the connection between a survey and a particular policy cannot be demonstrated directly, the paper treats the relationship as contextual rather than assuming a causal link.

British Expansion and the Emergence of Botanical Exploration in Assam

The expansion of British authority in Assam after 1826 created a new political context for investigating the region's natural resources. The colonial administration and associated commercial interests became increasingly concerned with the economic possibilities of the territory, including its agricultural potential, forests, and connections with neighbouring regions. The discovery and investigation of indigenous tea plants became one of the most consequential episodes in this process. The popularity of tea as a beverage increased since its introduction in Europe in the early years of 17th century by the Dutch traders, who got it from Chinese traders in exchange for dried sage. When tea was introduced in England in 1645 it became a popular non-alcoholic beverage since then (Goswami, 2022). The ever-increasing demand led to profitable trade with China that in the 17th century China became the largest exporter of tea in the world and the English East India Company its principal importer to England and other European countries. After the English EIC annexed Assam following the Treaty of Yandaboo, the region quickly attracted the attention of colonial administrators, botanists and surveyors. Assam's dense forests, fertile valleys and humid climate suggested immense botanical potential. The discovery of indigenous tea plants in Assam during the 1820s was a turning point in colonial economic history. Prior to the Yandaboo Treaty there were trade relations between Assam and EIC. One British trader, Mr. Robert Bruce, came to know about the existence of tea plants in the forests of Assam through the Singpho chief, Besagum. The Singphos made a beverage from it which was locally called *Phanap*. Recognizing the potential significance of the plan, Bruce obtained several specimens from the chief, but he died after he forwarded the collected specimen and information to his brother, Charles Alexander Bruce, who carried forward further research into the plantation of tea. He forwarded his collection to David Scott, who in turn sent them to the superintendent of the Botanical Gardens in Calcutta for examination. After careful analysis, the committee concluded that the plants found in Assam belonged to the same botanical family as the Chinese tea plant, though they were not of the same species. Despite the discovery, significant progress in developing tea cultivation did not occur immediately. It was after the outbreak of the first Opium War in 1839 that the importance of alternative and more reliable sources of supply of tea was felt. The East India Company's earlier dependence on Chinese tea had become increasingly problematic, encouraging the search for an alternative source within British-controlled territories. Assam's tea plants offered an opportunity to develop a new commercial enterprise, but their exploitation required botanical investigation, cultivation experiments, and the mobilisation of capital and expertise (Sharma, 2006).

The search for tea in Assam was closely connected with changing imperial commercial circumstances. The activities of Wallich and Griffith illustrate the relationship between scientific investigation and these economic objectives. The historical account reproduced in the *Records of the Botanical Survey of India* identifies a government deputation in 1834 to examine the region producing indigenous tea and notes Griffith's collection of plants around Sadiya. His work was subsequently used to establish relationships between the flora of Assam and that of neighbouring regions (*Records of the Botanical Survey of India*, 1902). Griffith's journal provides further evidence of the connection between botanical exploration and the tea enterprise. Its opening chapters concern the Assam deputation for examining the tea plant and tea localities in Upper Assam, while other sections record journeys through adjoining territories (Griffith, 1847). Botanical exploration thus involved the movement of scientific personnel through landscapes that were becoming increasingly important to colonial commercial and territorial interests. These activities should not be interpreted as evidence that all botanical exploration was conducted exclusively for economic exploitation. Griffith's journal also reflects broader interests in plant distribution, natural history, and regional geography. Nevertheless, the tea investigation demonstrates how scientific activity could be integrated into the commercial priorities of the colonial state. The accumulation of botanical records also created a longer-term institutional legacy. Later botanists could consult specimens and descriptions produced by earlier expeditions, compare collections, and develop increasingly systematic accounts of regional vegetation. The Lakhimpur botanical tour of 1894, for example, explicitly drew on earlier collections by Wallich and Griffith when identifying and classifying plants (*Records of the Botanical Survey of India*, 1902). The resulting body of knowledge extended beyond the immediate objectives of any individual expedition. Botanical surveys therefore contributed to the production of a durable scientific record of Assam's natural environment. Their colonial significance lay partly in the fact that this knowledge could be reused for purposes that extended beyond the original expedition, including commercial cultivation, forest management, and subsequent scientific research.

Botanical Surveys and the Making of Assam's Tea Economy

The development of Assam's tea industry provides the clearest example of the connection between botanical exploration and colonial economic transformation. The identification of tea plants in Assam opened the possibility of cultivating tea within British-controlled territory rather than relying primarily on imports from China. However, the transition from botanical identification to commercial production was neither immediate nor straightforward. It required experimentation, the establishment of plantations, the movement of cultivation expertise, and the creation of commercial organisations capable of financing and marketing tea. The plant itself was only one component of a much larger economic process. Sharma (2006) shows that the colonial tea enterprise was shaped by an interaction between British scientific institutions, Chinese cultivation knowledge, and imperial commercial ambitions. Although indigenous tea plants were available in Assam, colonial authorities also sought Chinese plants and skilled Chinese growers. This reflected both practical concerns about cultivation and contemporary assumptions that Chinese horticultural knowledge was more advanced than local practices. The example demonstrates that botanical knowledge did not simply reveal an already existing economic resource. Its practical significance depended on decisions about which plants to cultivate, which techniques to adopt, and how to organise production. The making of Assam into a tea-producing region was therefore an active process of environmental and economic transformation.

Botanic gardens and scientific networks played an important role in the circulation of plants and cultivation knowledge. Drayton (2000) explains that imperial botanic gardens functioned as institutions through which plants could be collected, classified, transferred, and cultivated in different parts of the empire. These activities linked scientific investigation with agricultural improvement and imperial economic ambition. The Assam tea enterprise illustrates this broader pattern. Botanical investigation identified and documented plant resources, while subsequent cultivation experiments sought to establish how these plants could be produced commercially. The movement of Chinese plants and growers further demonstrates that the development of colonial agriculture depended on the circulation of both biological material and human expertise (Sharma, 2006). The process also reveals the selective nature of colonial knowledge. Indigenous plants were important to the eventual development of Assam tea, yet contemporary colonial discourse could represent local environments as insufficiently cultivated or scientifically understood. The authority to define useful knowledge was consequently unevenly distributed.

The making of Assam into a plantation landscape also involved ideological distinctions between cultivated and uncultivated nature. Sharma (2006) demonstrates that racialised assumptions influenced colonial perceptions of Assam's tea plants and inhabitants. Chinese cultivation knowledge was frequently privileged, while local people and their environments were represented through ideas of wildness and cultural backwardness. Such representations were not incidental to the economic project. They helped establish a hierarchy in which colonial scientific institutions and selected external experts were positioned as authorities capable of transforming the region's resources into productive commodities. This hierarchy had implications for the organisation of labour. As the tea industry developed, plantation owners increasingly recruited workers from other parts of India under coercive and unequal conditions. Sharma (2006) argues that the development of Assam tea was associated with the growing dependence on migrant labour and the limited participation of local populations in the industry's principal economic benefits. The history of tea thus demonstrates that botanical knowledge and commercial production were connected to broader social transformations. The scientific identification of plants contributed to a system that reorganised land, labour, and economic opportunity in accordance with imperial priorities.

The transformation of Assam into a tea-producing region illustrates how botanical knowledge could alter the perceived value and use of a landscape. Areas once described primarily through their forests, rivers, and frontier geography became increasingly associated with plantation production and commercial agriculture. This transformation was not produced by botanical surveys alone. It depended on capital investment, land acquisition, transport infrastructure, labour recruitment, and administrative support. Botanical research nevertheless contributed by identifying plants and cultivation possibilities around which these economic activities could be organised. Sharma's (2011) broader study of Assam's incorporation into the Indian imperial economy reinforces this interpretation. The tea industry transformed the region's economic and social landscape while generating new relationships among colonial officials, commercial interests, migrants, and indigenous populations. The tea case therefore supports the central argument of this paper, botanical surveys became agents of colonial rule when scientific knowledge was incorporated into a wider institutional and economic system that reorganised the relationship between people, land, and resources.

Botanical Knowledge and the Consolidation of Colonial Forestry

The relationship between botanical knowledge and colonial governance extended beyond tea plantations. Forests constituted another major arena in which the classification and assessment of natural resources

became connected with state authority. Saikia (2011) demonstrates that the colonial transformation of Assam's forests involved mapping, commercial assessment, institutional development, and the regulation of resource use. He examines how the colonial state investigated forests and interpreted their commercial possibilities. The importance of this argument lies in the distinction between a forest as a complex ecological and social environment and a forest as a category of administrative and economic value. Botanical knowledge could help identify tree species and describe vegetation, while maps and administrative records could establish the location and extent of forest resources. Together, these forms of knowledge made forests more accessible to officials seeking to regulate and exploit them. This did not mean that botanical classification determined forest policy by itself. Commercial priorities, revenue considerations, institutional interests, and political calculations also shaped the administration of forests. Saikia's analysis shows that the classification of forests into administrative categories reflected political and economic objectives as well as changing ideas about conservation (Saikia, 2011).

The development of colonial forestry introduced new ways of organising the relationship between communities and forest landscapes. The emergence of reserved and protected forest categories and the role of forest legislation in establishing greater government control over resources. The Bengal Forest Act of 1865 formed part of the wider legislative development of colonial forest administration. In Assam, the growth of forest institutions and regulations contributed to the creation of a new spatial order in which access to and use of forests became increasingly subject to official rules (Handique, 2004). These developments illustrate how the knowledge produced through environmental investigation could become connected to the exercise of territorial authority. Mapping and classification made it possible to define administrative boundaries, distinguish areas according to their designated uses, and regulate activities within them. The connection between botanical surveys and forest reservation must nevertheless be established carefully. Botanical surveys provided knowledge of plant species and vegetation, but the creation of reserved forests depended on legislation, administrative decisions, and wider commercial and political priorities. The relationship was therefore institutional rather than automatic. The larger significance of the process was that forests increasingly became objects of formal government management. Their value was defined not solely by the variety of plants they contained or their importance to local communities, but also by their potential contribution to timber markets, revenue, and the imperial economy.

Colonial forest administration was frequently associated with claims about scientific management, conservation, and the orderly use of resources. These ideas should not be dismissed as entirely insincere, since forestry officials did engage with questions of regeneration, resource availability, and long-term management. However, conservation was also shaped by commercial priorities and the state's desire to establish control over forest resources. Saikia (2011) shows that the development of forestry in Assam was connected with the transformation of forests into economically managed spaces. Scientific and administrative approaches to forest management operated within a political economy that sought to regulate the extraction and use of resources. Drayton's (2000) broader argument about imperial science helps clarify the significance of this relationship. Scientific expertise could give colonial intervention an appearance of rationality and improvement. The classification and management of natural resources could consequently be presented as beneficial interventions even when the resulting policies restricted customary uses or privileged commercial interests. Botanical surveys formed part of this broader process by contributing to knowledge about plant distributions, forest composition, and the potential uses of vegetation. Their political importance lay in how this knowledge could be incorporated into administrative

practices rather than in the assumption that every botanical investigation was designed to establish forest control.

The reorganisation of forests had consequences for communities whose livelihoods depended on access to land, timber, grazing areas, and other forest products. Saikia (2011) examines conflicts between forest officials and local people, including activities that colonial authorities treated as forest offences. These conflicts reveal the difference between customary relationships with forests and the administrative categories through which the colonial state attempted to regulate them. Practices such as removing timber marks, allowing cattle to enter reserved forests, or cultivating land within forest boundaries could be interpreted by officials as violations of forest law. From the perspective of local users, however, such activities could form part of established livelihood practices and claims to customary access. These examples demonstrate that colonial forestry did more than regulate vegetation. It also redefined the legal and political relationship between people and their environments. A landscape that had previously supported multiple forms of use could be reorganised into categories that privileged particular forms of production and restricted others. Botanical knowledge was only one element of this transformation, but it contributed to a broader system in which scientific description, administrative classification, and legal regulation reinforced one another. The history of forestry therefore strengthens the argument that environmental knowledge acquired colonial significance through its incorporation into institutions of governance.

Indigenous Ecological Knowledge and Colonial Classification

A history of botanical surveys must also consider the relationship between European scientific investigation and existing knowledge of plants and landscapes. Indigenous communities possessed varied forms of ecological knowledge developed through cultivation, hunting, gathering, healing practices, forest use, and long-term interaction with local environments. The surviving colonial botanical record does not necessarily preserve these forms of knowledge on equal terms. Scientific publications commonly organised information according to European systems of classification and attributed discoveries or identifications to named botanists. Local guides, collectors, cultivators, and knowledge holders may be less visible in the published record, even where their practical knowledge contributed to field investigations. Griffith's (1847) journal illustrates the geographical and observational character of botanical exploration, while the later *Records of the Botanical Survey of India* demonstrate how observations and specimens were incorporated into a continuing scientific archive. These records are valuable sources for reconstructing botanical activity, but they must be read critically to understand whose knowledge was recorded and how it was represented. Cohn's (1996) framework is useful here because it draws attention to the power involved in collecting and codifying information. The production of authoritative knowledge could privilege particular methods and institutional positions, making some forms of expertise more visible than others. Applied to botany, this perspective encourages historians to investigate how local knowledge was translated into scientific descriptions, selectively incorporated, or left unacknowledged. At the same time, the relationship between indigenous knowledge and colonial botany should not be assumed to have been uniformly antagonistic. Scientific investigators could learn from local practices, and colonial institutions depended on practical information about landscapes that could not always be obtained through European methods alone. The extent of this dependence must be established through specific records rather than inferred in every case. The consequences of colonial classification were also uneven across Northeast India. Communities differed in their ecological practices,

political relationships with the colonial state, and access to forest resources. A historically grounded account must therefore avoid treating indigenous populations as a single group with identical interests or experiences.

Environmental Transformation and the Limits of Colonial Science

The development of tea plantations and the expansion of commercial forestry altered Assam's environmental landscape. Plantation agriculture involved the conversion of land to commercial cultivation, while colonial forestry reorganised access to forest resources and encouraged particular forms of management. These processes affected vegetation, land use, and the relationship between communities and their environments. Borkotoky (2023) offers an important perspective on the environmental consequences of plantation agriculture. Her analysis shows that colonial tea planters and scientists increasingly investigated soil conditions as problems of productivity emerged. The article connects plantation expansion and monoculture with changes in the physical environment, demonstrating that the environmental effects of commercial cultivation could become visible through declining production and the need for new scientific explanations. This example complicates any assumption that scientific intervention necessarily resulted in more effective environmental management. Botanical and agricultural expertise could improve knowledge of cultivation, but plantation production also created ecological pressures that demanded further investigation. Scientific knowledge was therefore produced within a changing relationship between commercial objectives and environmental constraints. Saikia's (2011) analysis of Assam's forests similarly demonstrates that colonial intervention generated ecological and social conflicts. Forest management affected customary resource use, while the commercial integration of forest resources changed the relationship between forests, agriculture, and local livelihoods. The relationship between colonial science and environmental transformation must nevertheless be understood through a careful distinction between knowledge and intervention. Botanical surveys did not directly cause every instance of deforestation, soil deterioration, or social conflict. These outcomes also depended on commercial investment, plantation practices, administrative regulations, labour arrangements, and broader economic pressures. The surveys contributed indirectly by making resources identifiable and potentially exploitable. Their findings could inform decisions about which plants to cultivate, which forest products to extract, and how natural environments might be organised for economic purposes. The actual consequences depended on the institutions and practices through which these possibilities were pursued. This distinction is central to understanding the limits of colonial scientific management. Botanical knowledge could improve the identification and classification of plants without resolving the contradictions inherent in a system that prioritised commercial production. The resulting environmental difficulties, in turn, generated new scientific questions and administrative responses. The history of colonial botany thus reveals a recurring tension between the pursuit of economic improvement and the ecological complexity of the landscapes being transformed. It also demonstrates why environmental history must examine the relationship between scientific knowledge, economic practice, and the long-term consequences of colonial intervention.

Conclusion

Botanical surveys played an important role in the history of colonial Northeast India by producing knowledge that could be incorporated into commercial agriculture, forest administration, and wider practices of environmental governance. Their significance extended beyond the discovery and

classification of plants. Botanical investigations contributed to the identification of economically valuable resources, the development of plantation cultivation, and the systematic description of landscapes that colonial institutions sought to regulate. The history of Assam's tea industry provides a particularly clear example of this relationship. The identification of indigenous tea plants became connected with imperial efforts to establish an alternative source of tea, the movement of cultivation expertise, and the development of commercial plantations. As Sharma (2006) demonstrates, this process was shaped by scientific institutions, racialised assumptions, and unequal labour relations. Botanical knowledge contributed to economic transformation, but its consequences extended well beyond the cultivation of a single crop. The development of colonial forestry reveals a complementary process; forests were mapped, classified, incorporated into commercial networks, and reorganised through administrative institutions and legislation. These developments transformed access to forest resources and generated conflicts with established livelihood practices. Botanical surveys formed part of the wider production of environmental knowledge that made such interventions possible.

Botanical surveys should consequently be understood neither as purely neutral scientific exercises nor as activities whose every purpose was determined by colonial exploitation. Their historical importance lay in the ways scientific investigation interacted with commercial ambitions, administrative institutions, and local environments. Examining these relationships provides a deeper understanding of how British colonial rule transformed the landscapes of Northeast India and how the production of environmental knowledge became intertwined with the exercise of imperial power.

References

1. Borkotoky, N. (2023). Shifting narratives of soil in scientific discourses of colonial Assam tea plantations. *The Indian Economic & Social History Review, 60*(4). https://doi.org/10.1177/03769836231173254
2. Cohn, B. S. (1996). *Colonialism and its forms of knowledge: The British in India*. Princeton University Press.
3. Drayton, R. (2000). *Nature's government: Science, Imperial Britain, and the "Improvement" of the World*. Yale University Press.
4. Goswami, N. G. (2022). *200 Years of Tea Industry in Assam*. Bidya Bhawan.
5. Griffith, W. (1847). *Journals of travels in Assam, Burma, Bootan, Afghanistan and the Neighbouring Countries* (J. McClelland, Ed.). Bishop's College Press.
6. Handique, R. (2004). *British Forest Policy in Assam*. Concept Publishing Company.
7. Records of the Botanical Survey of India. (1902). *Records of the Botanical Survey of India (Vol. 1)*. Government of India.
8. Saikia, A. (2011). *Forests and Ecological History of Assam, 1826–2000*. Oxford University Press. https://doi.org/10.1093/acprof:oso/9780198069539.001.0001
9. Sharma, J. (2006). British science, Chinese skill and Assam tea: Making empire's garden. *The Indian Economic & Social History Review, 43*(4), 429–455. https://doi.org/10.1177/001946460604300402
10. Sharma, J. (2011). *Empire's garden: Assam and the making of India*. Duke University Press. https://doi.org/10.2307/jj.33610738
11. Sikarwar, A. (2020). History and Footprints of Plant Explorations in Indian Sub-Continent. *Journal of the Indian Botanical Scociety, 100*(A). DOI: 10.5958/2455-7218.2020.00041.8