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Green Colonialism and Forest Policies in South India, 1800-1900

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British colonial rule and its impact on the environment of the Indian sub-continent has made for a fascinating historical research subject over the last three decades. While exploitation of forests and the socio-economic impact of the process on tribal and other forest-dependent communities are well documented, the role of scientific discourse in facilitating the hegemonic control of the colonial state over forests had not been adequately treated in the existing literature. This article looks at the history of colonial forest policies in South India to argue that initially British destroyed most the accessible forests by logging them for ship-building, railways and the requirements of the military and public works departments. When the sustainability of the wood supply emerged as a problem, desiccationist ideas began to be systematically propagated. The desiccationist discourse branded forest utilisation by the natives as the main culprit for deforestation and the consequent reduction of the water flow of some rivers in South India. This alarmist discourse facilitated the control of the colonial state over most of the forests in South India by establishing a rhetoric of the preservation of forests as a means to save the environment and irrigation as prerequisites for the well-being of the agrarian economy. This article illustrates how desiccationist fears were used to justify the colonial state's monopolistic control over the forests of South India.

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Green Colonialism and Forest Policies in South India, 1800-1900

V.M. Ravi Kumar

Going green has become a popular slogan in the discourse of environmental conservation, and one that has been gaining wider popularity as global warming begins to threaten the very existence of the biotic world. The global environmental crisis has created a context in which the protection of forests has become a top priority in environmental conservation



strategies. The preservationist and restorationist discourses advocate forest conservation as a means to save the earth from environmental disaster. However, in spite of this strong emphasis on the preservation of forests, their destruction continues. In most of the developing countries of Asia and Africa, this contradiction between advocated preservation and effective destruction of forests is a legacy of British colonial rule.

In South India, in particular, the British Empire used desiccationist ideas projecting fears of a catastrophic impact of deforestation on the climate and irrigation sources as a means to extend its control over vast forest landscapes. The hegemonic control of the British over forests was facilitated by desiccationist discourses advocating the preservation and expansion of green cover under the guardianship of the state for the well-being of the country. The history of desiccationist discourse in South India indicates that the British initially destroyed forests and later propagated desiccationist ideas, branding the natives as destroyers of forests. This article attempts to trace the origins of desiccationist ideas and their implications for forest policy formulations in colonial South India.

Desiccationist discourses served as an influential justification for state intervention in forest management in colonial and post-colonial India. South India holds a unique position in the historical literature on colonial forestry in South Asia, since between 1800 and 1947 it witnessed especially rigorous policy interventions in forest management. During this period there was much debate within the colonial bureaucracy on the subject of forest versus people. While the resource requirements of the colonial state called for rigid state control over forests, propped by desiccationist discourses promoted by the colonial scientific community, revenue officials brushed these concerns aside as fanciful fears and a deterrent for the progress of the country. It is this contradiction that shaped the nature of forest policy in India by making it mainly a land management system rather than a scientific undertaking. This article analyzes the history of forest policies in South India from 1800 to 1900, the period that saw the colonial state stepping in and gaining control over forests, with special emphasis on the context of desiccationist discourse and

its role in facilitating the state's monopolistic control over forests through the rhetoric of increasing green cover. The historiography of forest policies in South India reveals multiple dimensions of desiccationist discourse, reflecting the plural nature of colonial policy-making processes in India. It also shows how in this region colonial science and political economy contradicted one another and sometimes came to a compromise.

Some of the sources used in this article have not been adequately tapped by existing studies. They include working plans of forest departments, reports of colonial scientists, and the Proceedings of the Board of Revenue of the Madras Presidency. Here we find reflections by various sections of the colonial bureaucracy on the evolutionary process of forest policies, providing a multidimensional picture of desiccationist discourse as enunciated by technocrats and administrators in various sections of the colonial bureaucracy.

The present essay is organized into three sections: a brief survey of literature on the history of desiccationist discourse; a documented excursus on the context and history of desiccationist discourse in South India; and a summary and conclusions.

I use the term "South India" here to designate the territories of the southern part of the Indian peninsula placed under the jurisdiction of the Madras Presidency. The maximum linear extension of the Presidency, from north-east to south-west, was 950 miles. Excluding the five native states, the area of the Presidency was 141,075 square miles. Within this vast area, I have devoted special attention to the east and west coastal regions of South India, where forest canopies exist, both natural and manmade. The desiccationist ideas emanated from these regions reflected to a large extent the core features of macro-level forest conservation policy, which was essentially aimed at tightening state control over forests.

Green histories. A brief survey of literature

Contemporary ecological concerns have profoundly influenced the historical investigation process worldwide, placing special emphasis on historical analyses of the factors that destroyed or conserved the green-

ness of the globe.¹ Over the last three decades, the writing of history from an ecological perspective has emerged as an established branch in academic historiography.² As part of this trend, scholars have been investigating forest histories in the erstwhile colonies of European countries. The South Asian region, in particular, has witnessed a phenomenal increase in the literature on its environmental history. Much of these writings concentrate on aspects of colonial forest policies such as deforestation, the establishing of forest plantations, and the impact of forest policies on the livelihood patterns of the natives.³ I use the concept of “green colonialism” here to refer to the desiccationist narratives of colonial scientists and officials, which contributed to the extending of state control over forests in South India. The topic of colonial forest policies in South India is undoubtedly vast. This article confines itself to analyzing the process whereby the colonial state reinforced its control over forests by brandishing a discourse centered on the influence of forests on the physical climate and irrigation systems.

In the historical debate on colonial forest policies, the nature of desiccationist discourse⁴ has been a contentious issue. Works on desiccationist discourse during the British colonial period can be ranged into three broad categories. The first includes studies by colonial foresters proposing that the destruction of forests had reached a critical point at the beginning of British rule in India and systematic policy intervention consequently became necessary to halt the process. These studies project British rule as the savior of India’s climate and irrigation sources through its conservation of forests.⁵ In the second category we

¹ A. Crosby, *Ecological Imperialism: The Biological Expansion of Europe, 900-1900*, Cambridge University Press, Cambridge 1986.

² B. Fay, “Environmental History: Nature at Work”, in *History and Theory*, 42, 4, 2003, pp. 1-4.

³ For an overview, see K. Sivaramakrishnan, “Colonialism and Forestry in India: Imagining the Past in Present Politics”, in *Comparative Studies in Society and History*, 37, 1.4, 1995, pp. 3-40. M. Rangarajan, “Environmental Histories of South Asia: A Review Essay”, in *Environment and History*, 2, 2, 1996, pp. 129-44.

⁴ R.H. Grove, *Green Imperialism: Colonial Expansion, Tropical Island Edens and the Origins of Environmentalism, 1600-1860*, Cambridge University Press, Indian reprint, Foundations Books, Delhi 1995.

⁵ E.P. Stebbings, *The Forests of India*, Vol. I, John Lane, London 1922. R.S. Troup,

find an approach that is an extended version of the first, employing a more sophisticated methodology. These studies adopt a moral perspective on colonial rule. They propose that the colonial scientific community evolved environmental conservation ideas and strategies in various colonies in order to save their fragile ecosystems,⁶ and that it was public interest that guided colonial forest conservation policies.⁷ They also argue that colonial governance brought order to the irrational practices of natives, which to some extent were undermining the fragile ecosystem.⁸ In the third category we find authors who analyze desiccationist discourse from the perspective of political economy. Their argument is that desiccationist ideas were articulated in the context of the colonial state's attempt to evolve efficient productive forestry regimes required for its physical expansion.⁹ This proposition was empirically tested by studies in different parts of the Indian subcontinent, which challenged the perception of desiccationist discourse as a moral conviction of the British raj and proposed that it was used as a pretext, instead, to regulate the customary access of the native population to forests.¹⁰

In the historiography on desiccationist discourse, South India has not received adequate attention from environmental historians. This article analyzes the multiple dimensions of desiccationist discourse and its influence on forest policies in South India.

Colonial Forest Administration, Oxford University Press, London 1940. B. Rebbentrop, *Forestry in British India*, Indus Publishing Company, New Delhi 1986.

⁶ R. Grove, *Ecology, Climate and Empire: Indian Legacy in Global Environmental History*, Oxford University Press, New Delhi 1998.

⁷ A.G. Barton, *Empire Forestry and the Origins of Environmentalism*, Cambridge University Press, Cambridge 2002, p. 47.

⁸ R. Drayton, *Nature's Government: Science, Imperial Britain, and the "Improvement" of the World*, Orient Longman, New Delhi 2005.

⁹ R. Rajan, *Modernizing Nature: Forestry and Imperial Eco-Development 1800-1850*, Orient Longman, New Delhi 2006, p. 187.

¹⁰ On this subject, see V. Saberwal, *Pastoral Politics: Shepherds, Bureaucrats, and Conservation in the Western Himalaya*, Oxford University Press, New Delhi 1999, p. 1. M. Rangarajan, "Production Desiccation and Forest Management in the Central Provinces, 1850-1930", in *Nature and Orient: Essays on Environmental History South and South-east Asia*, R. Grove, V. Damoderan, S. Sangwan (eds), Oxford University Press, New Delhi 1998, pp. 575-595.

Context and history of desiccationist discourse

The history of desiccationist discourse in India is a classic example of the interaction between global and local discourses on forest conservation. The context of desiccationist discourse has been a matter of debate among environmental historians. Grove maintains that forest policies in early British India drew their inspiration from the argumentations of medical professionals and botanists,¹¹ and that their desiccationist discourses were a powerful catalyst for state intervention in forest conservation. Some studies on colonial forest policies in South India, however, have challenged the validity of this argument. Sarvaran has demonstrated how revenue and resource requirement imperatives shaped imperial forest policies in South India.¹² His studies, however, mostly concentrate on quantitative aspects of forest resource exploitation, while the strategies evolved by the colonial state to tackle the issues of deforestation and maintaining a sustainable timber supply remain unaddressed. The present article shows how desiccationist discourse facilitated the colonial state's control and sustained exploitation of forests.

British colonial expansion took place at massive costs of forest resources in different parts of the globe. Initially, the North American continent supplied most the timber required for the shipbuilding industry in Britain.¹³ It is estimated that one third of British registered tonnage was built in North America.¹⁴ The Indian forester Lyones

¹¹ Grove, *Green Imperialism* cit., p. 440.

¹² V. Saravanan, "Commercialization of Forest, Environmental Negligence and Alienation of Tribal Rights in Madras Presidency: 1772-1882", in *Indian Economic and Social History Review*, 35, 2, 1998, pp. 125-146. Id., "Commercial Crops, Alienation of Common Property Resources and Change in Tribal Economy in the Sheraroy Hill of Madras Presidency During the Colonial Period", in *Review of Development and Change*, 4, 2, 1999, pp. 298-317. Id., "Colonial Commercial Forest Policy and Tribal Private Forests in Madras Presidency: 1792-1881", in *Indian Economic and Social History Review*, 40, 4, 2003, pp. 403-423.

¹³ J. Lawrence, *The Rise and Fall of the British Empire*, Abacus, London 2007, p. 6.

¹⁴ J.M. Price, "The Imperial Economy, 1700-1776", in *The Oxford History of British Empire*, P.J. Marshal (ed.), Vol. II, Oxford University Press, New York 1998, p. 83.

testified to the unprecedented deforestation caused by American settlers.¹⁵ After the American Revolution, timber imports from America were ceased. Having lost their timber supplies from America, Britain depended upon Scandinavian countries and India for their shipbuilding lumber. Indian teak, in particular, became heavily in demand. The Bombay dockyard on the West Coast,¹⁶ and Coringa, a port town on the East Coast, emerged as India's main shipbuilding centers. This process consumed an enormous quantum of accessible forests, soon leading to a shortage in timber for shipbuilding.¹⁷

Now, it is an acknowledged fact that in South Asia the British initially destroyed forests and subsequently implemented policies for their conservation.¹⁸ In South India, in particular, desiccationist ideas and the deforestation process had an explicit correlation. The British exploited accessible forests to provide timber not just for shipbuilding, but also for railways and the requirements of the military and public works departments. Initially, private enterprise played an important role in the timber trade. Notably, the East India Company began to exploit south Indian forests to procure timber for shipbuilding. The Godavari region of the East Coast was identified as suitable area with a good stock of teak timber. Coringa, a port town, emerged as a trading center for teak, usually selling 2000-3000 logs of teak annually for the Bombay market.¹⁹ Due to transportation issues, the teak timber trade was later shifted to the districts of the West Coast. The first organized attempt to log forests for teak on the West Coast dates back to 1796, when William Maconochie established a timber syndicate in the Malabar district. This syndicate supplied 7000 candies of teak annually to the Bombay market for ten years, until it was dissolved due to losses

¹⁵ Report from the Select Committee on Forestry: Together with the Proceedings of the Committee, Minutes of the committee, Henry Hansard and Sons, London 1885, p. 5.

¹⁶ Stebbing, *The Forests of India* cit., pp. 61-62.

¹⁷ *Ibid.*, pp. 87-79.

¹⁸ R. Chakrabarti (ed.), *Situating Environmental History*, Manohar, New Delhi 2007, p. 22.

¹⁹ R. Rao, *Economic Development of Andhra Pradesh*, Popular Book Depot, Bombay 1958, p. 35.

incurred.²⁰ The timber trade, however, continued to flourish. The collector of the Malabar district reported to the Board of Revenue that 33,000 teak logs were exported from the Malabar district in 1837.

After 1800, the process of deforestation in South India was expedited. In 1805, the Court of Directors sent a dispatch to the Company government with instructions to ascertain to what extent the King's Navy could depend upon teak timber supplies from the forests of the Malabar district.²¹ The Company government appointed a committee to enquire into the status of teak forests in the Malabar and Canara districts. The committee reported that the accessible forests were being overexploited and suggested restrictions on the cutting of teak trees.

Excessive exploitation of teak forests emerged as a problem especially from 1830 onward. The ruler of Travancore presented a petition to the Bombay government in 1830 concerning unrestricted cutting of teak trees in the West Coast forests.²² In 1838, Clementson, the Collector of the Malabar district, reported severe deforestation due to overexploitation of the teak forests.²³

Besides being used in the Bombay dockyard, teak timber was also exported. The following table shows teak exports, mainly from the West Coast, to European countries:

Table 1. Teak wood exports from India

Year	1840	1841	1842	1843	1844	1845	1846	1847	1848
Tons	4952	6399	11487	10528	14245	13360	16798	11250	18000

Source: Report of the 21st Proceedings of the British Association for the Advancement of Science, 1851, p. 88.

²⁰ M. Mann, "German Expertise in India? Early Forest Management on Malabar Coast, 1792-1805", in *Explorations in the History of South Asia: Essays in Honour of Dietmar Rothermund*, G. Berkemer, T. Frasch, H. Kulke, J. Lutt, (eds), Monohar, New Delhi 2001, pp. 9-27.

²¹ Ribbentrop, *Forestry in British India* cit., p. 68.

²² Stebbing, *The Forests of India* cit., p. 72.

²³ *Ibid.*, p. 75.

Apart from the timber requirements of the Bombay dockyard, teak timber was also used by government establishments such as gun-manufacturing factories and public works departments. The Neilgherry Barracks and the Madras Gun Carriage Manufactory consumed 17,378 cubic feet of wood from the Annamali forests during the 1847-1851 period.²⁴ After 1850, the public works department of the Madras Presidency consumed about 600 tons of wood annually.²⁵ According to Dr. H. Cleghorn, the military department of the Madras Presidency consumed 98,652 ½ tons of firewood annually from 1851 onward.²⁶ It is estimated that the total quantum of wood consumed by military factories from 1857 to 1863 was close to 500,000 cubic feet.²⁷ This unprecedented utilization of timber led to shortages, generating anxiety among scientists posted as heads of forest department, botanical gardens and medicinal departments. Worries about this situation were aggravated by the history of deforestation of Great Britain itself, where industrial overexploitation of forests had reduced them to a mere 3% of the island's total surface.²⁸ Thus, desiccationist ideas emerged from a context of anxiety over deforestation and the consequent scarcity of wood required for the expansion of the colonial state's apparatus. In South India, anxiety over timber availability was manifested in two forms: the starting of forest plantations, and emphasis on forest preservation and conservation to save physical, climatic and irrigation resources.

²⁴ M.V. Lovirie, *Revised Working Plan for the Mount Stuart Forests, South Nilambur Division*, Government Press, Madras 1919, p. 34.

²⁵ Letter from the Deputy Conservator of Forests, Annamallai Range, to Conservator of Forests, 25 January 1876, n. 289, in *Board of Revenue Proceedings* (hereafter referred to as BRP), Madras 21 March 1876, Board Number (B.N.) 797, Forest Number (F.N.) 1934, p. 2902. Tamil Nadu State Archives (TNSA).

²⁶ H. Cleghorn, *Forests and Gardens of South India*, H. Allen, London 1861, p. 152.

²⁷ H.G. Hicks, *Revised Working Plan for the Mudumali Forests (Nilgri-Wynad), 1927-1937*, Government Press, Madras 1928, p. 18.

²⁸ A.J. Stuart, *Extracts from Man and Nature, or the Earth as modified by Human Action, with Some Notes on Forests and Rain-fall in Madras*, Higginbotham and Co., Madras 1882, p. 56.

Plantations

Silviculture, which means cultivation of forest trees as a strategy, was experimented with after 1840 to cope with timber shortages in India. Teak, eucalyptus and fuel wood plantations were established, mainly in four areas in South India. Conolly, the Collector of Malabar, took a personal interest in the foundation of famous teak plantations known as the “Nilambur plantations” in the Malabar district. From 1843 to 1860, Chatoo Menon, a local official, managed the Nilambur plantations, planting more than a million teak plants on 1200 acres of land.²⁹ Further teak plantations were later established on the Annamallays hill in the Coimbatore district. Between 1856 and 1875, Rs. 9,59,003 were invested in these forests.³⁰ Extensive eucalyptus plantations were set up in the Neilgherry district after 1850, mainly to supply wood for the public works department and Wellgenton Barracks.³¹ Finally, extensive fuel wood plantations were established in the districts through which the railway ran after 1860s, including Cuddapah, North Arcot, South Arcot, Madura, Salem, and Tinnevely. By 1876, there were in South India 123,625 acres of natural reserves and 3434 of artificial plantations.³²

Timber-tree planting in South India did not achieve the expected results due to four problems. In the first place, drought and unfavorable seasons constantly undermined the health of the trees.³³ Secondly, due to failure to regulate the respective rights of use of the government, zamindars, private owners, and farmers in the forest areas set aside for plantations, the Madras government was unable to evolve the efficient protective system required for the development of the plantations.³⁴

²⁹ R.S. Brown, *Revised Working Plan for Nilambur Valley*, Government Press, Madras 1929, pp. 59-60. C.A. Innes, *Madras District Gazetteer: Malabar and Aujengo*, Vol. I, Government Press, Madras 1908, p. 245. H. Morgan, *Forestry in South India*, Higgin Bothems, Madras 1884, p. 9.

³⁰ BRP, B.N. 2493, F.N. 36, Madras 3 October 1876, p. 8312.

³¹ Morgan, *Forestry in South India* cit., p.60.

³² BRP, 8 April 1879, B.N. 919, p. 3171.

³³ BRP, 7 December 1876, B.N. 3096, F.N. 105, p. 9786.

³⁴ *Ibid.*, p. 9795.

Thirdly, the insalubrious jungle surroundings of the plantations made it difficult for even the most enthusiastic foresters to properly carry out their tasks.³⁵ Finally, there were difficulties in securing the labor of the tribes, who mistrusted the forest department because it prohibited shifting cultivation.

Another important reason for the limited success of plantations was the nature of forest tenure in the pre-colonial period. Before colonial intervention, forests on the East Coast were mainly owned by zamindars. On the West Coast, they were controlled by traders from several groups, such as Chittes and Moplahs. Besides, hill forests were inhabited by tribes which practiced shifting cultivation, paying a nominal tax to hill chiefs. Initially, forest land for plantations was taken on lease. The establishing of plantations and consequent imposition of restrictions interfered with the tribes' customary access to forests for shifting cultivation. It also reduced the profits of forest owners and traders, who hence refused to cooperate with foresters in plantations and, indeed, gave them a hard time by igniting fires and other mischievous activities. Due to these problems, the maintenance of plantations became a difficult task. After 1870, a policy shift occurred whereby the artificial plantation concept was replaced by that of natural conservation of forests. This was known as the "block system"³⁶ and required extensive control of foresters over forests. The forms of this control are illustrated by the following account by Baddome, conservator of forests: "To carry out this block system the forest must be declared a strict reserve, and the forest officer must have complete control over it: razing cannot be allowed under *reboisement*, and no one can be allowed up in the forests except with permission".³⁷

Thus, the case was made for an expansion of the colonial state's control over forests. This was achieved by branding the natives' use of forests as irrational and destructive. The Sub-collector of the Malabar district argued that most of the forests on mountain slopes were be-

³⁵ BRP, 29 July 1879, B.N. 2141, p. 7219.

³⁶ This means natural forests were divided into several blocks and the logging was timed according to the age of the different blocks.

³⁷ BRP, 3 October 1876, B.N. 2493, F.N. 36, p. 8313.

ing destroyed by their owners for immediate profit and by tribes for shifting cultivation: “I anticipate that if our gnat forests are destroyed, we shall have here a change for the worse in climate – eight months of arid drought succeeded by four months of rain, deluges, and floods. I am therefore also of the opinion that it would be unwise to stand still, and that an effort is needed to reclothe the hills with timber, in place of that of which this ponnam system of cultivation has denuded them”.³⁸ The state was thus expected to take systematic action to expand the green cover process. Indeed, it was proposed that all private forests should be taken over by the state to allow the implementation of a strict conservation policy to protect the climate resources that fed the rivers of South India.³⁹ Between 1840 and 1882, colonial forest policies in South India shifted from limited state intervention – the establishing of plantations – to extensive control over vast natural forests. In this context, desiccationist ideas facilitated state control by stressing the connection between forest conservation and the protection of the irrigation sources on which the welfare of the agrarian economy of South India depended so heavily.

Desiccationist discourse in South India

Desiccationist ideas were mainly articulated by colonial scientists such as botanists,⁴⁰ surgeon generals,⁴¹ and foresters, but also by native officials, revenue bureaucrats, and policy-makers. Grove argues that forest conservation policies were rooted in the discourse of the

³⁸ BRP, 24 July 1875, B.N. 2065, F.N. 147, p. 6051.

³⁹ BRP, 3 October 1876, B.N. 2493, F.N. 36, p. 8313.

⁴⁰ Botanists such as R. White and H. Cleghorn advocated forest conservation to improve the physical climate.

⁴¹ From 1840 onward, surgeon generals reflected upon the importance of forest conservation for the physical climate. General Cullen in 1849, General Smith from Mysore in 1849, and General Gibson from the Bombay Presidency reported upon the extensive deforestation of South India and its possible effects on its physical climate. Their reports are published in E. Balfour, *Influence Exercised by Trees on the Climate and Productiveness of the Peninsula of India*, Government Press, Madras 1878, pp. 7-8.

colonial scientific community, which prescribed strategies of forest conservation and invoked state intervention.⁴² He thus projects a one-dimensional picture of the desiccationist discourse of the colonial scientific community. So does Ravi Rajan, who maintains that colonial forest policies originated from continental forest-management traditions. In India, however, as a careful examination of local records will show, desiccationist discourse was multi-dimensional.

Desiccationist ideas were contested within the colonial bureaucracy at one level and by the natives at another. This contestation prevented forestry from becoming a specialized scientific branch and caused it to remain a mere land management system supplementing agriculture. This shows the limitations of desiccationist discourse, which was mainly a means for the colonial state to justify its control over forests by placing it under the banner of conservation.

The colonial scientific community's discourse on the climatic importance of forests was influenced by three factors: firstly, established theoretical knowledge of the climatic importance of forests in European countries; secondly, the community's attempt to develop forestry into a true scientific branch, which might provide its members with better career opportunities; thirdly, its attempt to employ arboriculture and silviculture as a means to meet shortages in the timber supply. The desiccationist discourse of the colonial scientific community operated within the paradigm of the expansionist colonial state, which required forest resources to build up infrastructure.

The articulation of desiccationist discourse became explicit after the 1840s. In this period there was a shortage in the teak wood supply for the Bombay dockyard that attracted the attention of scientists, especially surgeon generals holding important positions in colonial governance. The issue of deforestation was addressed by Balfour in an article published in the *Madras Journal of Science and Literature* in 1840, and circulated to the governments of Bombay, Bengal and the Court of Directors:

With the exception of a few localities in South India, the whole country seems destitute of trees. Whether they have disappeared under the

⁴² Grove, *Green Imperialism* cit., p. 428.

hands of man while none were being planted to supply their places, or whether they never existed, nothing so much strikes the attention as their general scarcity, and I add, we cannot but look upon the cultivation of trees as of vital importance in such a county as India.⁴³

Prevailing intellectual traditions may have played a role in colonial scientists' objectification of India's landscapes. Notably, utilitarian notions of perceiving India as a land of moral and cultural degradation may have had an impact on these scientists' thinking processes. In this context, the representation of the degradation of forests was used as an argument to encourage state intervention in forest management to halt the destruction of the green cover. Grove argues that the rapid deforestation that took place in several colonies sensitized the colonial scientific community and led it to evolve strategies to conserve forests. But it was British rule itself that was the main cause of deforestation. Forests were exploited initially for shipbuilding. From the middle of the 19th century, railways further contributed to deforestation. This was reflected in the narratives of colonial scientists. In 1846, Surgeon Alexander Gibson suggested that the destruction of forests had a negative effect on the fertility of agricultural land. His tone is alarmed:

Since the South Konkan has been, to a great extent, denuded of forest, all the inhabitants concur in asserting that the springs have left the uplands, that the climate has become greatly drier, the seasons more uncertain and the lands less fertile; and while in Canara that exuberant moisture of the sea air soon covers the denuded hill with a matted jungle of brushwood and small shrubs, the different climate of the upper country does not admit of this effort for speedy reproduction.⁴⁴

Colonial scientists attributed the deforestation process to the shifting cultivation practiced by tribes on hill slopes. Referring to shifting cultivation in the Canara district of the Western Ghats, Dr. Cleghorn observed: "In addition to climatic considerations, the chief evils of this rude system of culture are the destruction of valuable timber, at present

⁴³ Balfour, *Influence Exercised by Trees* cit., p. 6.

⁴⁴ *Ibid.*, p. 5.

urgently required for ship-building and railways, and the rendering of land unfit for coffee... cultivation".⁴⁵ He thus indicated the forest utilization patterns of natives as the main culprit for deforestation.

In this context, desiccationist ideas were articulated as a means to facilitate the British Empire's control over forests. The colonial scientific community persuaded the British government to espouse the desiccationist perspective. A dispatch was sent by the Court of the Directors in 1847 on the issue of the influence of forests on climate and irrigation systems, where the following argumentation was made:

The decrease of moisture which has taken place in various parts of America has usually been attributed to the clearing of the forests, and where the country, as has sometimes happened from political causes, has returned partially to its original forest state, the contrary effect had been observed. As the removal of trees had been followed by great diminution of the volume of water in the rivers and lakes, the restoration of wood was succeeded by a corresponding increase in the quantity of water.⁴⁶

This correspondence generated curiosity among official circles in India about the influence of the green cover on the climate and water sources. In 1848, the Madras government published a memorandum prepared by General Cullen, a specialist in Indian botany. Cullen argued that the tree cover on mountain slopes attracts and condenses rainfall, and that slope denudation may hence result in a decrease of rainfall and the drying up of irrigation sources. In 1849, Surgeon C.I. Smith, after conducting some scientific observations, declared that the presence of trees increases rainfall. These observations gained popularity in the context of expanding timber plantations in South India.⁴⁷

In a bid to expand the knowledge frontier on forest conservation, the British government appointed a committee under the chairmanship of Dr. Cleghorn in 1851, which produced a report on the con-

⁴⁵ Letter from the Conservator of Forests to the Secretary of the Madras Government, 17 August 1859, N. 755, in H.F.C. Cleghorn, *Forest and Gardens of South India*, W.H. Allen, London 1861, p. 137.

⁴⁶ Balfour, *Influence Exercised by Trees* cit., p. 5.

⁴⁷ Ibid.

dition of Indian forests whose main point was that the process of deforestation was due to the irrational exploitive methods of the natives, most notably the shifting cultivation practiced by the tribes. The committee strongly advocated state intervention to restore the forest cover, as the very welfare of the country depended upon its existence. The preservation and expansion of green cover, they argued, was necessary to save India's climate and irrigation systems.⁴⁸

The colonial state's concern with meeting its resource requirements led it to incorporate desiccationist ideas into its policy process as a justification for intervention in forest management. Systematic policy actions were undertaken during the 1850-1865 period in different parts of the Indian subcontinent. Administrative establishments for the management of forests were created in several provinces: Punjab in 1855; Madras in 1856; North West provinces in 1860; Central Provinces in 1861; Oudh in 1861; Coorg in 1864; Bengal in 1864; and Berar in 1865.⁴⁹ These policy interventions were mainly prompted by the heavy demand for forest resources generated by the railways, introduced in 1855. The rhetoric of desiccationist discourse was used as a means to justify these efforts to secure sustained supplies of forest resources. Dr. H. Cleghorn, first conservator of forests in the Madras Presidency, brought out his classic book *Forests and Gardens of South India* in 1861, which hardly discussed desiccationist ideas, but rather concentrated on silviculture and plantations. Again, Cleghorn identified the shifting cultivation practiced by tribes as mainly responsible for deforestation and the consequent ecological changes. It is important to note that this desiccationist discourse was informed by a presumption of racial superiority, where the colonizers branded the native shifting cultivators as destroyers of forests. Thus, desiccationist discourse was used not only as a justification for colonial forest policies, but also as a means to control the access of natives to forests.

⁴⁸ Report of the 21st Proceedings of the British Association for Advancement of Science, 1851, p. 79.

⁴⁹ D. Brandis, *Memorandum on the Forest Legislation Proposed for British India, other than the Presidencies of Madras and Bombay*, Government Press, Simla 1875.

Railways and deforestation

After 1870, the articulation of desiccationist discourse became forceful, as a direct consequence of the massive requirements of wood for the railway network. Railways consumed forest resources in two ways. Superior quality wood was used for sleepers and inferior quality as engine fuel. The expansion of the Indian railway and deforestation went hand in hand. Dr. Cleghorn estimated that each mile of railway track required 1760 sleepers, measuring three cubic feet of wood each and with an average life span of eight years. In addition to this, the maintenance of a railway track, according to his estimation, required at least 220 sleepers per mile or 22,000 sleepers per hundred miles annually.⁵⁰ After 1855, the railway lines steadily expanded. By 1880, the total length of railway tracks in South India was 1521 miles.⁵¹ If we accept Dr. Cleghorn's estimation of the duration of sleepers, by 1880 the Indian railway must have consumed 2,600,000 sleepers, without counting annual replacements, which must have amounted to 330,000 sleepers. For sleepers, durable timber such as sal and teak was more frequently used. Regarding the impact of the railways on Indian forests, Colonel Pearson wrote: "As soon as mutiny was suppressed, the railways were taken in hand and the timber merchants and sleeper contractors raided the forests for timber, felling trees wherever they liked. It was only necessary for a contractor, whether European or Indian, to obtain *Parwana* orders from authorities to cut timber for him to set to work".⁵²

Railway companies consumed massive quantities of wood as engine fuel. Firewood was preferred to coal because of its lower price. Campbell Walker, deputy conservator of forests, pointed out that firewood cost Rs. 5 per ton, while coal cost Rs. 20, with a co-efficient of 3.25. An engineer of the Madras railways estimated that by using wood fuel railway companies could save Rs. 100,000 per annum. This is the reason why railway companies mostly used wood as fuel.

⁵⁰ Cleghorn, *Forest and Gardens of South India* cit., p. 31

⁵¹ BRP, 8 April 1879, N. 919, p. 3172.

⁵² G.F. Pearson, "Recollection of the Early Days of the India Forest Department, 1858-1864", in *Indian Forester*, XXIX, 8, August 1903, p. 312.

Campbell Walker estimated that in 1883 railway companies might require 90,000 tons annually against the supplied 68,420 tons of 1882. Brandis' estimate for that same year was 81,000 tons.⁵³

It was this alarming situation as regards the wood supply that compelled the colonial state to implement policies for the efficient management of forests. These policies were justified with the argument that forests needed to be protected to safeguard irrigation sources and preserve the climate.

Three important studies propagated desiccationist ideas in South India during the period of 1875-1882. One, a report by Balfour published in 1878, documents the historical trajectory of desiccationist discourse in South India from 1840 to 1878. Balfour advocated the conservation of forests for reasons strictly related to water supply. Extensive clearing of forests diminishes water flow, he argued, because trees surrounding spring sources seem to prevent the dissipation of the water supply.⁵⁴ Balfour's ideas received serious consideration at the time that South India was ravaged by serious famine in 1875.

The second important propagator of the desiccationist argument was J.P. Marsh's celebrated work *Man and Nature*. This was actually published in an abridged form in 1882 by Mr. Stuart - a civil service officer in South India - along with some observations by officials on deforestation and its impact on climate and irrigation sources.⁵⁵ Marsh's study drew on theoretical and empirical observations on environmental changes due to deforestation in different parts of the globe. Desiccationist fear was thus propagated among the official circle and the general public as well.

Similar alarm was expressed by the Commissioner of Neilgherry, who proposed state policy intervention for the conservation of forests aimed at a judicious balance between plough land and woodland:

Centuries of the agricultural industry have encroached on the natural forests, and in many provinces, denuded the country to an injurious extent. For cli-

⁵³ Correspondence by Campbell Walker to the collector of North Arcot District, in BRP, 12 November 1883, N. 3411. TNSA.

⁵⁴ Balfour, *Influence Exercised by Trees* cit., pp. 6-7.

⁵⁵ Stuart, *Extracts from Man and Nature* cit., p.14.

matic and other reasons, I am persuaded the time has arrived for government in its capacity of a “Good Landlord” to restore the balance between Woodlands and Plough-land, by planting large tracts of bare waste, and to exercise some effective control over the primeval forests, that in place still remain. The Government can do this by legislative enactment.⁵⁶

The reflections of local level officials on deforestation and denudation are another important feature of desiccationist discourse in India. The district collector of Tinnevely, for example, reported upon the reduction in the volume of water flow, which was vital for the irrigation of rice fields. He identified the principal cause of this reduction in the destruction of forests in the Western Ghats which protected local stream heads, and proposed strict conservation measures to safeguard the remaining forests.⁵⁷ Fears for the depletion of water resources for irrigation were mainly confined to districts situated in mountain regions. For instance, the Conservator of North Circle suggested that shifting cultivation in the Eastern Ghats was responsible for the destruction of trees which protected mountain springs and argued that this would reduce the volume of water the springs carried down to rivers in South India.⁵⁸ Thus, although deforestation was actually the result of British exploitation, it is primitive tribal cultivation that was identified as the main culprit. People living in forests were depicted as agents of the degradation of forests, and this provided an argument for colonial officials to justify state intervention. The desiccationist discourse thus provided the pretext for the colonial state’s increasing exploitation of forests by branding forest-dependent tribes as irrational children who needed disciplining. However, some revenue officials saw potential danger in the expansion of green cover advocated by the dessicationists.

⁵⁶ Letter from the Commissioner of Nilgiri District, to the Secretary to the Board of Revenue, Madras 14 April 1871, N. 34, in BRP, 1871, N. 3644, p. 5766.

⁵⁷ D. Brandis, *Memorandum on Demarcation of Public Forests in Madras Presidency*, Government Press, Simla 1878, p. 3.

⁵⁸ W. Francis, *Andhra Pradesh District Gazetteers: Vizagapatam District Gazetteers*, Vol. 1, Andhra Pradesh State Archives, Hyderabad, first printed in 1907, and reprint in 1994, pp. 117-118.

Dissenting voices

Extreme desiccationist theoretical formulations were not accepted by some sections within the colonial bureaucracy. Revenue officials, especially, did not accept desiccationist anxieties and argued that clearance of forests was an essential requirement for the progress of the country. Critics of desiccationist ideas dismissed them as groundless alarmism, not deserving of serious attention. Forestry was perceived as an obstacle to progress, since by seeking to preserve the wilderness it hindered the expansion of agriculture. Sir William Robinson, Member of the Board of Revenue, argued that:

The advancement of populations and cultivation has led to the substitution of agriculture for scrub and jungle through great tracts in South India of late years, without any evidence of injurious effect on the south-west or north-east trades which supply South India with its moisture. The stratifications of the earth's surface which fill the country's springs - deep seated enough though to be uninfluenced by surface verdure - and supply its streams, have not changed [...] Human health has improved where formerly malaria fevers searched the pioneers of cultivation under jungle influence and the hunts of wild beasts have receded.⁵⁹

The clearance of forests was thus perceived as offering manifold advantages to the country. Some officials within the colonial bureaucracy empirically challenged the credentials of desiccationist ideas, arguing that excessive forest conservation would actually diminish the water supply and soil moisture; a claim echoed by the Superintendent of Cinchona Plantations:

The quantity of water drawn from the earth by our forested area is therefore probably three times greater than by forest in northern latitudes. It is well known that during sunshine the point of every rootlet of a tree is continuously acting as a pump, which intercepts the water in its flow to the streams and throws it up to the leaves where it is evaporated into the atmosphere. These pumps do not only exhaust the moisture from the surface, but as the roots penetrate deep into the subsoil they effectually exhaust the moisture to a considerable depth below the surface.⁶⁰

⁵⁹ Brandis, *Memorandum on Demarcation of Public Forests* cit., p. 72.

⁶⁰ Letter from the Commissioner of Neilgherry District, in BRP, 13 October 1875, N. 2852, p. 8028.

Thus, in contrast with desiccationist ideas advocating the expansion of the forest cover, some officials argued that excessive forest cover actually diminishes water availability because the roots of trees absorb water at a higher rate than it evaporates. Desiccationist ideas were thus seen as lacking empirical backing and perceived as a potential danger. To quote, again, the Superintendent of Cinchona Plantations:

These observations are intended to show the common belief that trees add to the flow of water in springs and streams to be a fallacy, which cannot be sustained by fact, theory or hypothesis. Even the advocates of this idea admit it to be but an ill-defined theory. Under these circumstances, I believe it to be undesirable that in dealing with our waste lands, we should consign the richest portions to perpetual unproductiveness or in other words to grasp at a shadow while we drip the substance.⁶¹

Native Indian officials did not believe in desiccationist ideas either. They rejected them as false propaganda and warned that they would hamper the expansion of agriculture and thereby jeopardize state revenues. Srinivasa Raghava Inyangar argued that the Forest department's propagation of forests policy posed a potential danger: "I examined the accounts given in the old reports regarding the character of the agricultural season each year from the beginning of the century, and I find that there is no reason to believe either that the rainfall has diminished or that unfavorable seasons are more frequent now than in the past".⁶² He questioned the belief that extensive forest clearance exercised a negative impact on the climate, irrigation and soil productivity: "The importance in subserving the needs of the agriculture cannot of course be over-estimated, but there is, on the whole, no reason to suppose that their clearance has diminished the rainfall to such an extent as materially to affect that yield of lands. The disappearance of forests has undoubtedly improved the public health, for many tracts of country".⁶³ Inyangar's scepticism regarding the scientific basis of

⁶¹ Ibid., p. 8029.

⁶² S.S. Raghava Inyangar, *Memorandum of the Progress of the Madras Presidency: During the Last Forty Years of British Administration*, Asian Educational Service, New Delhi, 2006, p. 51, originally published by the Government Press, Madras 1893.

⁶³ Ibid., 52.

desiccationist ideas was shared by other native revenue officials, whose belief was that the clearance of forests would facilitate agrarian expansion and improve health conditions in the country.

Desiccationist discourse and forest legislation

Though desiccationist ideas were not accepted by revenue officials, important policy makers like Brandis clearly used them as justification for forest legislation. Brandis argued that forests certainly influence the climate, rainfall, and irrigation sources. At the same time, he admitted this was true only to a certain extent: “No data have been established which would justify the hope that by the creation of new forests or the improvement of those existing we shall be able to modify the limits of the regions of moisture, or otherwise materially to alter the climate of many districts in the peninsula. The great features of climate depend upon cosmic causes which are independent of local circumstances”.⁶⁴ At any rate, in spite of his doubts regarding the scientific character of forestry, Brandis was optimistic as to the positive relation between forests and water sources: “We do not maintain that forest protection will regulate the water supply in rivers to such an extent as to obviate the necessity of construction of large reservoirs for storing the flood-waters; what we maintain is that the protection of forests on the hill of South India will increase the usefulness of such and other works undertaken to improve the irrigation from these rivers”.⁶⁵ In 1878, this argument was taken so far as to demand strict forest reservation, as did the Collector of Cuddapah:

It is an established fact that forests play an important role in regulating rainfall and preserving water sources. I continue however to hold the opinion that it is essential to the well-being of the country that some decided steps to ensure the absolute reservation in suitable spots of portions of the forest which is rapidly disappearing should be taken, every year of delay will increase the difficulty of doing them”.⁶⁶

⁶⁴ D. Brandis, *Suggestions Regarding the Forest Administration in the Madras Presidency*, Government Press, Madras 1883, p. 63.

⁶⁵ *Ibid.*, p. 71.

⁶⁶ Letter from the collector of Cuddapah District, to the Board of Revenue, 17 February 1878, N. 206, in BRP, 1 August 1878, N. 878, p. 2939.

Important policy makers such as Baden Powell proposed state intervention to manage even private forests situated in mountainous areas. Powell argued that clearance of forests might lead to land-slips, erosion of ravines, formation of torrents, diminution of water supply in springs and streams, excessive flooding of watercourses, and other problems. Powell maintained that the preservation of forest belts was necessary to safeguard the climate of mountain slopes.⁶⁷ Brandis also stressed the importance of forests in hilly country to protect the climate and irrigation sources.⁶⁸ His forceful articulation of desiccationist ideas was actually a criticism against the government of Madras, which was reluctant to formulate a systematic forest-management policy. Thus, Brandis was using desiccationist ideas to press the Madras government for promulgation of forest legislation.

In the hilly districts, climatic considerations emerged as an important justification factor for the reservation of forests as state property. The forest reserve committee of Neilgherry district proposed the following arguments for forest reservation: water supply, fuel supply, shelter and pasturage for the buffaloes of the Todas, and a moss supply for the cinchona plantations. The committee also commented on the climatic importance of forests: “We have considered as beyond dispute the fact that woodlands exercise a most beneficial effect in the retention of water and the regulation of the supply, and that any extensive denudation near the sources or along the courses of streams must of necessity be followed by destructive floods and equally fatal droughts”.⁶⁹ This shows that climatic considerations provided a strong justifying argument for the imposition of state control over forests.

Desiccationist anxieties had a global dimension. Similar alarming discourses were also being pronounced in different parts of the globe, wherever European colonization had taken hold.⁷⁰ In Africa,

⁶⁷ B.H. Baden Powell, *A Manual of Jurisprudence for Forest Officers*, Government Press, Calcutta 1882, p. 74.

⁶⁸ Brandis, *Suggestions Regarding Forest Administration* cit., p. 4.

⁶⁹ The Report of the Forest Reserve Committee appointed by government of Madras in 1878, in BRP, 27 August 1878, p. 8015.

⁷⁰ For a review of various empirical observations on the climatic effects of forests in different colonies, see Troup, *Colonial Forest Administration* cit., pp. 21-26.

in particular, desiccationist ideas – especially the raising of alarm regarding the erosion of forest soil as a consequence of deforestation⁷¹ - were used as an argument for state control over forests, especially in East Africa.⁷² A similar process occurred in South India after the passing of the Madras forest act in 1882, which made the state the owner of forests.⁷³ During the period of 1882-1900, about 18,000 square miles of forests were brought under state control.⁷⁴ This unprecedented expansion of state control over forests undermined the customary access rights of forest-dependent communities.

Though desiccationist ideas popularized state forestry, the real imperative of colonial forestry was providing revenue for, and meeting the resource requirements of, the colonial state. Brandis, who was instrumental in preparing the Madras forest act of 1883, was strongly in favor of treating forestry as a commercial enterprise:

Forest management in India has commenced to yield steady and growing annual revenue to the state. This revenue might be much larger if the forests were not managed with the chief object of improving their condition; hitherto cuttings have been restricted and attention has been chiefly devoted to the formation and improvement of these Government domains.⁷⁵

Thus, colonial forest policies mainly guided by revenue considerations and desiccationist ideas facilitated the control of the resource-hungry colonial state over forests.

⁷¹ Ibid., p. 35.

⁷² Ibid., p. 225.

⁷³ C.D. McLean, *Manual of the Administration of the Madras Presidency*, Vol. II, Reprint Edition, Asian Educational Service, New Delhi 1985, p. 314.

⁷⁴ Letter from the Secretary to the Government of Madras to the Secretary to the Government of India, N. 1614, 23 September 1882, in *Collection of Papers Relating to the Administration of Forest Department in Madras Presidency*, Government Press, Madras 1915, p. 92.

⁷⁵ D. Brandis, *Forestry in India: Origins and Early Developments*, Natraj, Dehra Dun 1994, pp. 46-47.

Conclusion

The history of desiccationist discourse in South India shows how the British imposed scientific and moral hegemony over forests by blaming deforestation on the forest utilization pattern of the natives. As I have illustrated in the present article, it was actually the colonial state that was responsible for the severe deforestation of South India. The desiccationist discourses of colonial scientists emanated from a context of anxiety over the wood requirements of the colonial state. Existing studies on desiccationist discourse in India project it as a moral reflection of the colonial scientific community. The history of colonial forest policies, however, indicates that it was rather a means to spread alarm and thereby facilitate the expansion of state control over forests. Desiccationist ideas were articulated not by scientists alone, but also by different sections of the colonial bureaucracy and policy makers. The narrative of the climatic influence of forests was a contested issue within the colonial bureaucracy at one level, and by the natives at another. The desiccationists advocated the protection of forests mainly on mountain slopes, where rivers originate. Their ideas, however, were used as a justification for the expansion of state control over most of the forest landscape in South India. The alarmist narratives were used as a catalyst for the imposition of the state's administrative and legislative control over forests, but the main guiding force of colonial forest policies was the seeking of revenue and resources.

This legacy had an explicit influence on the forest policies of independent India. Most policy interventions since independence – including social forestry, joint forest management and community forest management – have been justified with desiccationist discourse. Green colonialism proposed, at one level, the conservation of forests for the protection of the climate, and at another facilitated the state's monopolistic control over forests. In post-colonial India, green colonialism has been replaced by green nationalism, which has actually further reinforced state control over forests. The history of desiccationist discourse in South India underscores the limitations of state-sponsored desiccationist fears, which are actually used for certain agendas and do not reflect the actual process of environmental degradation.

