

Perfumed the axe that laid it low: The endangerment of sandalwood in southern India

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*Between 1950 and 1970, on average over 480,000 Indian sandalwood (*Santalum album*) trees were harvested annually in the state of Karnataka in southern India. Then, in 1974, it was suddenly discovered that there were only approximately 350,000 standing trees left in the entire state. Overnight, India's sandalwood industry ground to a halt. The species was on the brink of extinction. Harvesting and trade in Indian sandalwood, long considered the most precious wood in the world, was ineffectively banned. Smugglers could now make more money by felling sandal trees than by poaching elephants for ivory. This article uses the history of sandalwood to assess claims about the nature and impact of colonial and postcolonial forestry, arguing that at least when it came to Indian sandalwood, though European foresters did overexploit the species and also failed to conserve it, the real watershed moment for the species came not during the colonial period but rather in the independence period when industrialisation led to a major endangerment crisis for the tree.*

Keywords: Endangered species, environmental history, Karnataka, sandalwood, *Santalum album*

'The Sandal Tree as if to prove,
How sweet to conquer Hate by Love,
Perfumes the axe that lays it low'.¹

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¹ Although often attributed to Rabindranath Tagore, the verse from which this article's title is drawn was penned before the great poet's birth by S.C. Wilkes in 'The Sandal-Tree', *True Briton*, p. 228.

Introduction

This is an article about the modern environmental history of sandalwood (a widely-accepted 16 species of fragrant trees within the genus *Santalum* including the species *Santalum album* or Indian sandalwood, which this article focuses on specifically), a history defined by anthropogenic impact endangering the genus across its range. Selling at about \$147,000 per metric ton, the aromatic heartwood of Indian sandalwood (*S. album*) is arguably the most expensive wood in the world.² Globally, 90 per cent of the world's *S. album* comes from India, with most of the remaining 10 per cent or so coming from the island of Timor.³ And within India, around 70 per cent of *S. album* comes from the state of Karnataka, with an additional 20 per cent coming from neighbouring parts of Tamil Nadu largely falling within the erstwhile Kingdom of Mysore (see Figure 1).⁴ Yet whereas histories have been written on the sandalwood trade in China, the Pacific, Australia, Hawaii, Timor and even Tamil Nadu, not a single study on the environmental history of sandalwood in Karnataka has been published.⁵

This article presents a regional history of the sandalwood industry based in what is today the state of Karnataka in southern India (primarily encompassing the former Kingdom of Mysore), but it also shows that when it comes to a commodity traded on the world market, like sandalwood, regional studies cannot be conducted in a vacuum and so a comparative global perspective is also necessary. The article argues that while both early nineteenth-century capitalist commodification and late nineteenth-century bureaucratic forestry department control were detrimental to the tree's population in southern India, it was not until postcolonial mismanagement by the state-run sandal oil industry in the 1950s–70s that the species came to the brink of extinction. Using the case of sandalwood to compare and contrast the forestry regimes under the British East India Company at the beginning of the nineteenth century, the Imperial Forest Department from 1860s to the 1920s, and the Karnataka Forest Department from the 1950s to the 1970s, this article finds major continuities between the three; but whereas the colonial period saw

The same sentiment was framed only slightly differently as early as 1812 in the Reverend C. Colton's *Hypocrisy*, p. 237, in which he wrote 'The falling Sandal-Tree sheds fragrance round,/Perfumes the axe that fells it to the ground'. It is possible that the turn of phrase predates all of these.

² 'Beyond Carbon Unit Trust, Indian Sandalwood Project'. Though *S. Album* often receives the superlative 'the most expensive wood in the world', there are certain difficulties in attempting to verify this, for example, black market prices, different prices across international markets and the fact that while most timber is priced in board feet, sandalwood is sold by the metric ton.

³ Clarke, 'Australia's Sandalwood Industry', p. 11.

⁴ Rao et al., 'Assessing threats and mapping sandal resources', p. 926.

⁵ Fontenoy, 'Ginseng, Otter Skins, and Sandalwood', pp. 1–16; Marks, 'NTT Sandalwood', pp. 223–40; Merlin and VanRavenswaay, 'The History of Human Impact', pp. 46–60; Saravanan, 'Environmental History of Tamil Nadu State', pp. 723–67; Shineberg, *They came for Sandalwood*; Statham, 'The Sandalwood Industry in Australia', p. 27; Villiers, 'The Vanishing Sandalwood of Portuguese Timor', pp. 86–96.

state monopolies and zealous resource exploitation primarily to satisfy mercantile and imperial agendas, by the independence period the major motivation for the state monopoly on this dwindling forest product was industrial demand. Though sandalwood smugglers were often blamed for the tree's precarious status since the 1970s, in fact illegal poaching only became an overwhelming problem after the state-industrial complex failed to effectively manage this precious resource, leading to its endangerment and skyrocketing prices.

Thus, the history of Indian sandalwood may help to shed light on at least one key debate that has dominated environmental history since the field's inception. As a preeminent scholar of environmental history in South Asia has pointed out, a broad theme of enquiry in the field has often been to ask to what extent 'colonialism was an ecological watershed'.⁶ For many years, debate on the environmental history of India primarily focused on forestry, exploring the nature and impact of government-controlled forest management in both colonial and independent India. While the predominant view in the historiography has been to emphasise empire forestry as 'the culprit responsible for widespread deforestation of the subcontinent', recent revisionist writings by Barton and Bennett have attempted argue that the Imperial Forest Service 'did not develop a dominant ethic of resource exploitation, nor ... rapidly accelerate the rates of deforestation during the colonial period'.⁷ Since the 1980s, the first wave of environmental historiography of India saw scholars such as Ramachandra Guha declaring that the British had 'presided over the unprecedented denudation of the vast forest cover to meet commercial as well as strategic needs of the empire'.⁸ By the mid-1990s, a concerted response to this postcolonial critique arose, with scholars such as Richard Grove, most prominently, asserting that imperialism was green; institutions such as the Imperial Forest Service had conservationist motives and even laid the foundations of modern environmentalism.⁹

The question of the environmental impact of empire continues to stoke debate; however, scholars have not yet sought to answer it through specific single-species case studies, preferring broader regional and thematic approaches instead. In part, this article is also a call for more and better single-species studies by environmental historians. Largely driven by a public appetite to know the basics about the species and commodities we consume, in the popular domain the single-species history is on the rise.¹⁰ Yet in the academic world of environmental history scholarship,

⁶ Rangarajan, 'Environmental Histories of South Asia', p. 129.

⁷ Barton and Bennett, 'Environmental Conservation and Deforestation in British India', pp. 83–104. See also Barton, *Empire Forestry and the Origins of Environmentalism*.

⁸ Saravanan, 'Colonial commercial forest policy', p. 404.

⁹ Grove, *Green Imperialism*.

¹⁰ Perhaps the best-known example of this genre is Mark Kurlansky's New York Times bestseller *Cod: A Biography of the Fish that Changed the World* (1998), which may have started the trend. Single-species historical monographs have certainly thrived on bestseller lists ever since, and the impact of

single-species and single-commodity studies themselves seem to be a sort of 'endangered species'.¹¹ As this article hopefully proves, detail-oriented, primary source-driven studies of lesser-known species could potentially yield major breakthroughs in environmental historiography. Single-species studies, used effectively, can unlock important information about the historical regimes of power and the transitions between them.

This article shows that at least when it came to sandalwood, though European colonists and foresters did overexploit the species and also failed to conserve it, the real watershed moment came not during the colonial period but rather in the independence period, when industrialisation led to a major endangerment crisis for the tree. At the same time European foresters were primarily concerned with maximising profit and maintaining the state's monopoly, these foresters failed to achieve a sustainable yield from sandalwood, partly because they simply did not have the botanical expertise to grow the tree on plantations as they had struggled to do. Regarding the status of the forest industry in the postcolonial era, it has long been asserted that under Jawaharlal Nehru and Indira Gandhi, India was in a developmental phase during which economic growth was seen as paramount and forestry was dominated by industry interests.¹² This economic ethos might go some way towards explaining the drive to overharvest, but on the other hand a recent wave of environmental histories focusing on the Nehru–Gandhi legacy in the 1950s–70s have attempted to reinterpret these towering figures as pioneering environmentalists rather than industrialists.¹³ There seems to be little or no evidence of national-level pressure on sandal oil industry in either direction through this period, but the national ethos towards industrialisation could still be pointed to as a driving factor in the overexploitation that led to the sandal tree's critical endangerment by 1974. This essay thus situates itself within the broader debate about the nature of colonial and independence-era forestry in India by challenging both postcolonial environmentalist and colonial apologist interpretations of South Asian environmental history. It does so in two key ways by showing how, on the one hand, the British instigated a series of detrimental changes that structured postcolonial deforestation, though on the other hand in the end the final push to

Kurlansky's work is reflected in the several titular knock-offs that followed suit such as *Tea: The Drink that Changed the World* by Laura C. Martin (2007) and *Banana: The Fate of the Fruit That Changed the World* by Dan Koepfel (2007). More recently there was *Wheat Belly: Lose the Wheat, Lose the Weight, and Find Your Path Back to Health* by William Davis (2011) and *Tomatoland: How Modern Industrial Agriculture Destroyed Our Most Alluring Fruit* by Barry Estabrook (2011), both of which continued the popular activist bent that characterises so many works in this genre, playing on people's environmental and health concerns. These works all appear in the trade press and largely synthesise existing scholarship spread across a variety of scattered sources.

¹¹ For a theoretical discussion of the ways in which concept of 'endangerment' has been variously used and abused see the introduction to my Ph.D. thesis: Rashkow, *The Nature of Endangerment*, pp. 1–39.

¹² Guha, 'Forestry in British and Post-British India', pp. 1882–96.

¹³ Rangarajan, 'Ideology, the Environment and Policy', pp. 50–64.

harvest sandalwood to the brink of extinction in Karnataka must be attributed to the sheer drive for revenue of the independence era state-industrial regime.

The research for this article makes use of numerous previously unexplored primary sources from the India Office Records in London, the National Archives of India in New Delhi and the Karnataka State Forest Department in Mysore and Bangalore. The first section of this article following this introduction presents a detailed examination of primary sources from the colonial archive on the history of *S. album* in India, particularly in Mysore state. Indigenous resource management systems that suggest an awareness of the limited nature of this precious commodity give way to intensive exploitation under the British East India Company after 1799. The Company, with an eye to the Chinese market, negotiated the annual harvest of sandal resources with the Mysore *durbar*, overexploiting the tree but only so far as the market would allow. The second section largely deals with the failure of scientific forestry in the late nineteenth century to effectively conserve the sandal population. The colonial state under crown rule appropriated the vast majority of southern India's forest resources, yet could do little to control the tree's decline. Finally, the article concludes with independent India's twentieth-century history of endangerment of sandalwood. Using forest department records, materials from state gazetteers and scientific papers, this section argues that it was primarily industrial scale state-run exploitation of sandal resources for the sandalwood oil industry from the 1950s onward that led to the tree's extremely precarious position in Karnataka by 1974.

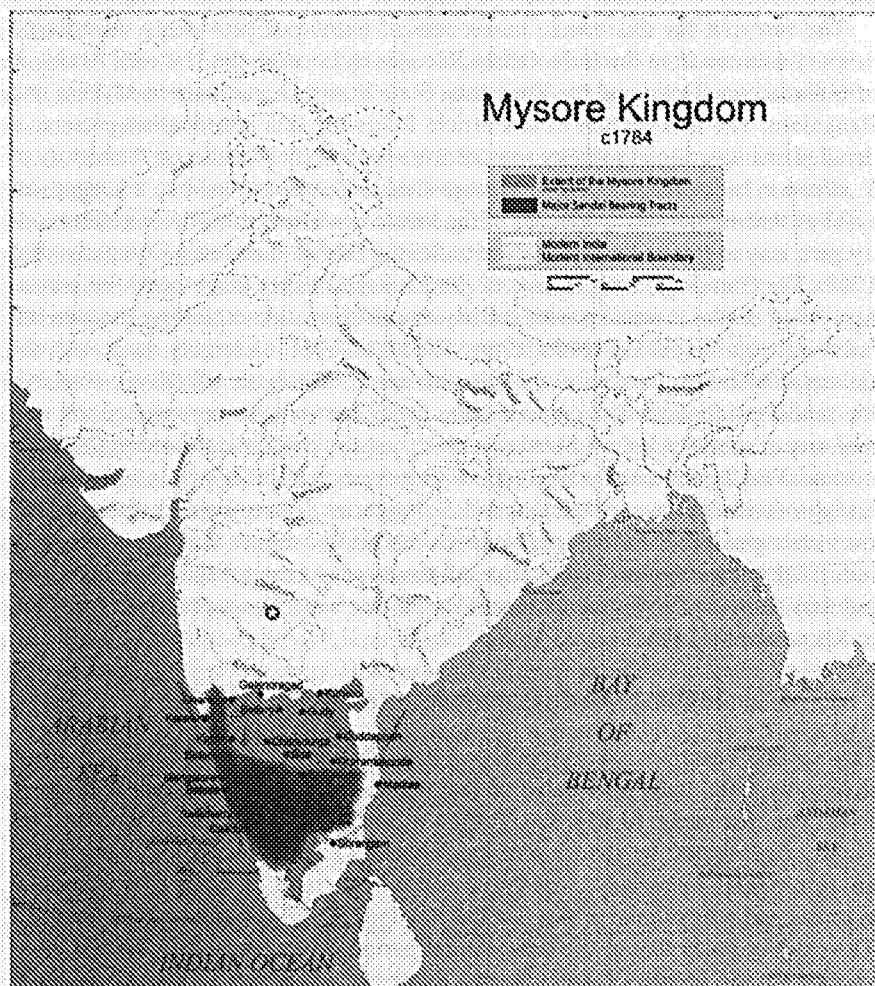
Indian Sandal: Transition to a Colonial Economy

This section describes the move from a pre-colonial to colonial forest economy in Mysore state, India's sandalwood heartland. The structural transformations in forest use that occurred with the coming of the British East India Company are vividly highlighted by the case of sandalwood. The first wave of South Asian environmental historians, who have often been read as both environmental activists and anticolonial critics, set the standard reading of Indian forest history. The reading holds that in the pre-colonial period rulers made only limited interventions in the people's forest use, that relatively autonomous villagers typically used forest resources as they pleased or as customary arrangements determined, and that there was greater ecological equilibrium than in subsequent eras.¹⁴ This view is somewhat modified by the case of sandalwood.

On the one hand, the limited evidence available on pre-colonial Mysore's forest villages does seem to back up this narrative on local autonomy and customary arrangements to some extent. Francis Buchanan's 1807 *A Journey from Madras through the Countries of Mysore, Canara and Malabar* is one of the few European

¹⁴ See Gadgil and Guha, *This Fissured Land*.

Figure 1
The range of *S. album* in India



Sources: Rao, 'Assessing threats and mapping sandal resources', p. 930; 'Indian Mysore Kingdom 1784 map.svg', adapted from *Wikipedia, The Free Encyclopedia*. Wikimedia Foundation, Inc., 2007. http://en.wikipedia.org/wiki/File:Indian_Mysore_Kingdom_1784_map.svg

sources to offer insight into pre-colonial forest utilisation in the region. Fortunately the three-volume account does contain several interesting references to sandalwood and indigenous conservation practices. Buchanan records:

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[Any] person may cut whatever trees he pleases, except sandalwood, and such as grow in forests producing pepper. The sandal trees are numbered, and put in charge of the head-man of the village. The custom of this district (*Taluc*) is, once in twelve years to cut the sandal. Three years ago a man purchased all that was fit for cutting, and procured about 100 Maunds of 40 Seers each, or about 21.5 hundred-weight.¹⁵

This tradition of only harvesting sandalwood once every dozen years may have been an effective local pre-colonial conservation measure. Another indigenous institution that Buchanan describes was that of the *Gyddā Cavila* or keeper of the forests, a position about which we have relatively little information and which seems to have disappeared by the early nineteenth century. As Buchanan describes it:

In every *Taluc* or district, where there are forests, there is a *Gyddā Cavila* [keeper of the forests], who annually pays to the government a certain sum, and has the exclusive privilege of collecting honey, wax and lac. On all such as cut timber for building their houses, he also levies a duty; and all the trees, except sandal-wood, are in fact his property.¹⁶

On the other hand, the rule that pre-colonial states stayed out of forests finds an exception in the case of sandalwood. State control over forest tracts was traditionally argued to have been a limited phenomenon before nineteenth-century colonialism, yet some recent scholars have argued that the political boundaries of the Vijayanagara Empire in the thirteenth to sixteenth centuries were possibly shaped by the availability of bio-resources such as sandalwood in the Deccan, which its rulers could trade for commodities such as firearms and horses.¹⁷ Further, the establishment of a state monopoly on sandalwood was not originally imposed by the British, but rather by their pre-colonial predecessor in Mysore, Tipu Sultan (d. 1799).

Tipu Sultan and his father Hyder Ali before him certainly were shrewd administrators of the state's most valuable natural resources such as spices, ivory, gold and sandalwood. According to at least one biographer, Tipu Sultan established an ambitious commercial system and 'saw the immense potential source of wealth in Sandalwood'.¹⁸ Starting in 1786, Tipu Sultan stopped trading pepper, sandalwood and cardamom with the British. As a result, trade prospects for the company were looking so bleak that by November 1788, Lord Cornwallis suggested abandoning Tellicherry on the Malabar Coast and reducing Bombay's status from a presidency to a factory. Bangalore had been a major centre of the sandalwood trade, but

¹⁵ Buchanan, *A Journey through the Countries of Mysore, Canara and Malabar*, Vol. 3, p. 227.

¹⁶ Buchanan, *A Journey through the Countries of Mysore, Canara and Malabar*, Vol. 1, p. 391.

¹⁷ Ganeshiah et al., 'Bio-resources and empire building', pp. 140–46.

¹⁸ Fernandes, *Storm over Seringapatam*, pp. 224–36.

after 1791 when the British captured that city and turned it into a pressure point of resistance against the Kingdom of Mysore, Tipu Sultan would not allow any sandalwood from the region to enter the city's markets. 'He either did not allow it to be cut, or else stored up in his forts whatever was felled'.¹⁹ The Anglo-Mysore wars were an attempt by the British to change all that. Yet it was only in 1792, the same year that Sultan was forced into a disastrous treaty with the British, and probably in direct response to European pressure, that he declared sandal a 'royal tree' and established a monopoly on its wood in his kingdom. Even in 1792, it was only 'royal' sandalwood and a few other highly valuable commodities that were brought under state control. Still, Sultan's intervention somewhat destabilises the first wave of environmental historiography.

Although one cannot argue that it was sandalwood alone that led the British to battle local rulers in southern India (Hyder Ali and Tipu Sultan), establish a puppet monarchy when Sultan was defeated (the Wodeyar Dynasty), and thereby dominate Mysore for some 150 years, sandalwood certainly spurred colonial intervention.²⁰ Southern India in particular represented a vast and untapped market to the British East India Company in the eighteenth century. Between 1766 and 1799, the British and the state of Mysore fought four wars known as the Anglo-Mysore Wars, which resulted in British control over most of the south and ultimately over the whole of India. One way to understand these wars is as part of the global struggle between the British and the French, where Mysore was a French ally. However, late eighteenth-century British East India Company wars need also to be understood as trade wars. They were about economic conquest as much as any other kind of expansion, and sandalwood was one of Mysore's most prized commodities.

In 1799, at the Battle of Srirangapatna, Tipu Sultan was defeated. The kingdom of Mysore became a princely state within British India and ceded surrounding areas (Coimbatore, North Kanara and South Kanara) to the British. Power of state was immediately handed to the friendly Wodeyar Maharajas on extremely unfavourable terms: the British 'enforced the payment of an annual sum equivalent to one-third of the new State's gross revenues, to be paid in cash by monthly instalments'.²¹ Yet the East India Company also immediately started paying the Wodeyars for the right to trade sandalwood.²² At this point the British did not take direct command

¹⁹ Buchanan, *A Journey*, Vol. 1, p. 202.

²⁰ When writing a single-species history a common pitfall might be to overemphasise the role of that species any given context.

²¹ Chancellor, 'Mysore: The Making and Unmaking of a Model State', p. 112.

²² India Office Records (IOR), f/4/276 f.6162, 'Extract Political Letter to Fort St. George'. The text of this extract is quite interesting: 'desirous soever we are to ensure an annual Provision of Sandal Wood in the Mysore Territories, as would answer the purpose of a large and profitable remittance to our China Supra Cargoes, it is by no means our wish that it should be procured in a manner which may be deemed inconsistent with the established principles of Commerce or repugnant to the nature of our connexion with the Mysore Government'. Also see 'Extract Commercial Letter from St. George, Date 23 March 1804' regarding purchase of Sandalwood for the Company, from the Rajah of Mysore.

of the region's sandalwood for themselves, but as in the case of the Mysore's gold and silver mines, progressively worked to expand their control.²³ In 1805 the government of Mysore asked for an augmentation of the price paid for their sandalwood. The company responded that they would check if the China market would allow it. In fact it would. In the previous three years, merchants were often turning 83 per cent profits, even on consignments of inferior-quality wood. And the Chinese seemed willing to pay more and more.²⁴ Already at this early period, Indian sandal was acknowledged to be one of the most expensive woods in the world. In contrast to evidence about some island chiefs in the Pacific, it seems that the government of Mysore, though friendly to British trading interests, was aware that it had an interest in keeping the cost of sandalwood high. The Wodeyars realised that sandalwood was dear and that underselling would not benefit them.²⁵ But by 1812, company traders were getting impatient. They engaged to purchase all the marketable wood produced in Mysore and grumbled that the Mysore government was attempting to defraud the company by selling unmarketable wood. The steadily increasing selling price to the company led to dissatisfaction in the commercial department, which complained that sandalwood was one of the only 'productive sources of revenue of Mysore'.²⁶

There also seems to have been a relative free-for-all involving local elites' cutting down sandal trees after the British victory at Seringapatam, this again being indicative of wider trends at the time. For example, in the hills and forests around Magadi, a town some twenty miles outside of Bangalore, a *brahmin* who seems to have been working only for his own private profit and was not under the authority of the *amildar* (district head) or any other local administrator 'procured about three thousand trees', bringing his own men as well as hiring local woodmen to cut them down and send them to market. Following this harvest, Buchanan reported, 'in less than ten years no more will be fit for cutting'.²⁷ At this time, numerous local overharvests probably occurred, yet the overall species population did not seem to be endangered. Sandal trees were supposed to be considered the property of government, but as one early British administrator reported, 'it would be ridiculous to suppose, that they will always be considered as such by the occupiers of estates, who undoubtedly commit frequent depredations upon them'. Mr Read, a collector in Kanara district, worried about this illicit felling and in 1807 suggested it would be beneficial to the Company to 'cut down immediately' all the eligible sandal

²³ Elliot, *Gold, Sport, and Coffee Planting*, Ch. 7.

²⁴ IOR, f/4/276 f.6162 'Modification of the arrangement with the Mysore Government for the Supply of Sandalwood' (Examiners Office, July 1809). See especially Extract dated 8 March 1805.

²⁵ IOR, f/4/276 f.6162 'Purchase of Sandalwood for the Company from the Rajah of Mysore'. Extract Commercial Letter from St. George, date 23 March 1804.

²⁶ IOR, f/4/385 9800 'Admission of the claim of the Mysore Government to compensation for the carriage hire of sandalwood brought to the depots for sale to the Company, March 1808–Feb 1812'.

²⁷ Buchanan, *A Journey*, Vol. 1, pp. 186–87.

trees in the region. To this suggestion, Francis Buchanan responded, 'Mr Read was probably not aware, that last year all the ripe sandal in Mysore had been cut, and a great danger has consequently been incurred of glutting the market; while some years hence it will probably be greatly enhanced in value'.²⁸ The British monopolised the sandal trade in southern India, used it to balance their accounts in China, and overexploited the species as far as the market would allow. This represents a significant departure from the pre-colonial period where local elites were happy to trade with outside powers, but with eyes thoroughly fixed on the domestic market.

Thus, the modern environmental history of Indian sandalwood needs to be understood in global context. Besides the fact that sandalwood was a key commodity in China trade and the emergence of colonial trading networks at the turn of the nineteenth century,²⁹ sandal species fared dramatically differently in different regions and under different resource regimes. By comparing and contrasting these various histories we can more clearly understand how and why sandal survived better in India than it did elsewhere in the world. Comparing and contrasting regional variations also highlights the fact that a case study on a single highly-valued species or commodity, in this case sandalwood, can reveal in technical detail and with remarkable acuity the functioning of various political and cultural ecologies and economies, the differences between power formations in various regions and historical epochs, and the transitions and ruptures between them. As Michael Williams put it, deforestation stories do not happen in a vacuum: 'There is a need for each deforestation story to be firmly rooted in an intellectual and scholarly context that helps explain the society of the age in which it occurred'.³⁰

To date, the few studies addressing the modern history of sandalwood have almost exclusively situated their narratives in the Pacific, usually ignoring India altogether, a problem often leading to faulty analysis and conclusions. The history of the Pacific sandalwood trade contrasts markedly with the South Asian situation. India—rather than the Pacific islands or Australia—has been the largest supplier by far of sandalwood to the world market during the entire modern period.³¹

²⁸ Buchanan, *A Journey*, Vol. 3, p. 192.

²⁹ The final destination for most of the world's sandalwood was, first and foremost, China. It is a well-known fact that prior to the Opium Wars, there was a net outflow of European gold and silver species to China. Less commonly understood is that before the trade in opium rose to its heights in the 1840s, sandalwood was one of the most important commodities that the Chinese were willing to purchase, along with gold and silver. Thus we can correlate the fluctuating prices of sandalwood in China to booms and busts happening around the world.

³⁰ Williams, *Deforesting the Earth*, p. xxii.

³¹ Today, 'Global production of sandalwood is about 4,000 tonne. Officially, India produces about 400 tonne; the unofficial figure is about 2,000 tonne, which is smuggled. Australia produces about 1,800 tonne of the Australian variety; about 350 tonne comes from Timor, Malaysia, Cambodia, Vietnam, Thailand and Myanmar'. The Australia figure of 1800 is well above its historical average, as it has made major strides in increasing its sandalwood production through plantations in recent years. *Times of India*, 'Demise of Sandalwood'.

And whereas the Pacific trade often involved island rulers newly introduced to the concept of world trade racing to overharvest local species in order to maximise short term profit and monopolise local resources for their own gain, even Mysore's puppet rulers in the nineteenth century were more foresighted and conservation-minded than this. As opposed to these other regions, South Asia had long-established trade networks with evidence of sandalwood being traded that dates back to before the Common Era. It also had long-established resource management systems that benefited both *S. album* as a species and also the region's economy and ecology.³²

Thus the colonial critique that only includes the Pacific overkill neglects the fact that it is not until 1974 that supply of the most valuable species of sandalwood was depleted in the major sandal-bearing region of India. Western Australia, too, entered the sandal trade from the 1840s and has stayed there until the present.³³ It might be hypothesised that it is simply the large size of India and Australia's sandal tracts that allowed the tree to flourish there while disappearing on the smaller Pacific islands much earlier. However, there is at least one case that can be used to contradict this hypothesis: the island of Timor. The Timorese sandal trade has also survived, admittedly with large fluctuations, until the present. Part of the difference, then, lies in each region's history of governance and relationship to the market. Islands abruptly brought into the modern world system were quickly overexploited, whereas areas such as southern India and Timor, which had both been centres of world sandalwood trade since at least the eleventh century, managed to negotiate the pressures of the European trading companies and forest bureaucracies in the nineteenth century. In these situations it was only with massive industrial scale exploitation in the mid-twentieth century (and wartime looting during the Indonesian occupation of East Timor) that stocks of this precious wood dropped precariously low.

In contrast to regions such as southern India that had long been involved in world trade, much of the Pacific was introduced to the international market by sandalwood traders who moved from one island to the next harvesting the tree until there was no more left to harvest. India and Timor had been the sole suppliers of sandalwood to the world market until the late eighteenth century. While there had long been a world market for *S. album*, at the end of the eighteenth century European, American and Australian merchants tried to take control of the sandalwood

³² There is some speculation that *S. album* is not in fact indigenous to India, but there is neither consensus on this point nor is it particularly relevant to the species' modern history. For a fascinating textually grounded argument about the non-Indian origins of Indian sandalwood see Donkin, *Between East and West*, pp. 15–18.

³³ Besides *S. album* in India, *S. spicatum* (Australian or Desert Sandalwood) is the only other species of the tree widely consumed and studied in the twentieth century. However, *S. spicatum* is about 10 times less valuable than *S. album* because (a) its wood is not as fine-grained and so is less suitable for carving; (b) it is dryer and therefore it is not commercially viable for the production of oil; and (c) many also argue that it is less aromatic. 'Australian sandalwood was trading at A\$14,000 per metric ton in January 2012'. WA Sandalwood Plantations: Markets. <http://www.wasandalwood.com/index.php?id=67>

trade by selling newly discovered Pacific species of sandalwood to China. By the mid-nineteenth century these sandalwood traders had systematically stripped most of the Pacific islands of this precious tree. Time and again sandalwood species were exploited until they went locally extinct, or nearly so, often with massive ecological damage, not to mention the political and cultural toll on the islands.³⁴ In Hawaii, also known as *Tahn Heung Sahn* or 'the Sandalwood Mountains' to the Chinese, the sandalwood trade collapsed by 1828, only decades after it began. The first shipwrecked Europeans to land on Fiji's second largest island, Vanua Levu, also called it Sandalwood Island. The sandalwood trade collapsed there within 20 years of its discovery and inauguration. In the Marquesas, the British and Americans decimated sandalwood in just three years, between 1814 and 1816.³⁵ A similar story can be told in the case of *S. austrocaledonicum* of Vanuatu.³⁶

Though the broad outlines of the sandalwood story in the Pacific are familiar to many historians of nineteenth century world trade, the details are typically either glanced over in terms of sweeping ecological imperialism by postcolonial historians or glossed over in terms of an industry perspective seeking to revive supply of this valuable timber.³⁷ For example, the most common narrative of sandalwood's modern history holds that European traders wiped out sandalwood groves across the Pacific islands in a remarkably short time span between the 1770s and collapse of the trade in the 1830s. However, instead of sheer rapacious felling causing local extinctions and the end of the sandal trade before the middle of the nineteenth century as in the Pacific, southern India's sandal stocks continued to provide the international market without interruption into the independence period.

³⁴ For all this it is remarkable that only one species of sandalwood is considered extinct today, that is, *Santalum fernandezianum* of the Juan Fernández Islands off the coast of Chile. Although this first-documented extinction of a species of sandalwood occurred only in the early twentieth century, with Carl Skottsberg the Swedish botanist and explorer reporting to have seen last live specimen of *S. fernandezianum* when he visited Juan Fernández Island in 1908, the extinction was the result of an extended history of colonial exploitation with naturalists and explorers reporting the species extinct as early as the 1870s. Europeans harvested *S. fernandezianum* at least since 1624 when L'Heremite 'reported that the precious sandal-wood was abundant', but it was not until the early nineteenth century that as elsewhere overexploitation led to endangerment, and in this case extinction.

³⁵ Tucker, *Insatiable Appetites*, pp. 71–77.

³⁶ Watson and Smith, 'Vanuatu: Country Papers', pp. 63–70.

³⁷ For a powerful critique of US 'ecological imperialism' with regard to the sandal trade see Tucker, *Insatiable Appetite*, pp. 71–77. For two market-centric government-sponsored explorations sandalwood focused on the economic, scientific and legal issues regarding the tree see the following two conference volumes: Hamilton and Conrad, *Proceedings of the Symposium on Sandalwood* and Radomiljac et al., *Sandal and Its Products*. The US Department of Agriculture and the US Forest Service sponsored the Hawaii symposium. As stated on the title page of the proceedings, 'The first substantial logging of sandalwood in Hawaii in 150 years generated local controversy in 1988...eventually led to the symposium in 1990'. Even the one academic peer-reviewed article to appear in recent years on the history of the sandalwood trade framed the entire argument in terms of the benefits of privatisation for the sandalwood trade in Timor. See McWilliam, 'Haumeni, Not Many', pp. 285–320.

Similarly, in the one study of the independence era sandalwood industry in Tamil Nadu, the author failed to look at data on the sandalwood industry in neighbouring Karnataka. If he had done so, he would have understood that the reason behind the spike in sandalwood harvesting that he observed as occurring in Tamil Nadu in 1974 was the sudden loss of Karnataka's sandal forests.³⁸ Thus, the question is why the tree survived better under some regimes than others, and the modern environmental history of Southern India's sandalwood needs to be studied to solve this riddle.

The Failure of 'Scientific' Forestry in India

This section documents the failures of colonial forest bureaucracy and so-called scientific forestry to conserve India's sandal stocks, arguing that, at least in the case of *S. album*, the for-profit mentality of the state far outweighed any movement towards conservation, a position that starkly contrasts with that of Gregory Barton and those who see the origins of environmentalism in empire forestry. By the mid-nineteenth century, British control over South Asia's natural resources was reaching its peak and a sophisticated new imperial forest administration was being developed that sought to solidify state control of the sandalwood trade. In 1864, the extraction and disposal of sandalwood came under the jurisdiction of the Forest Department. By 1867, it was decided that collection from contractors was a failure. Colonial anxiety to maximise profits from sandalwood meant that a government agency was established specifically to oversee the sandalwood trade and ensure that no precious wood be lost—to deterioration, destruction or smuggling—and so began the government sandalwood depot or *koti* system.³⁹ Forest administrators also focused on how to ensure continued profits from the sandal trade. From the 1860s the government briefly experimented with a survey tallying every sandal tree standing in Mysore, but these plans were abandoned by 1878 because of the impracticality of the task.⁴⁰ Instead, an intricate system of classification was developed in an effort to maximise profits. By 1898, an 18-tiered sandalwood classification system was instituted, up from a 10-tier system a decade earlier; it seems this led to much confusion and was eventually reduced back to 12 tiers as most traders simply could not tell the difference between all of the various grades of wood, and once the wood reached Bombay, merchants would end up simply mixing various classes together (see Table 1).⁴¹

One decision designed to maintain state monopoly was to crack down on landowners, making sure they did not privately gain from the trees on their lands. As the Chief Commissioner of Mysore would insist in 1871, 'fixing the responsibility for the due preservation of this class of trees on the only parties

³⁸ Saravanan, 'Environmental History of Tamil Nadu State', pp. 723–67.

³⁹ National Archives of India (NAI), Political Works Department (PWD), Forests, March 1867, nos. 58–61, 'Revision of Sandalwood Agency Establishment, Nuggur Division, Mysore'.

⁴⁰ NAI, PWD, Forests, September 1878, nos. 15–16, 'Enumeration of sandalwood trees in Mysore'.

⁴¹ Gildemeister, *The Volatile Oils*.

Table 1
Bangalore Sandalwood *Koti* (Depot) classification system, c. 1913

1. First Class Billets (<i>Vilayat Budh</i>)	Thoroughly sound billets weighing not less than 20 lbs. and of which not more than 112 make a ton.
2. Second Class Billets (<i>China Budh</i>)	Slightly inferior billets weighing not less than 10 lbs. each and of which not more than 224 are required to make a ton.
3. Third Class Billets (<i>Panjam</i>)	Billets with small knots, cracks and hollows, weighing not less than 5 lbs. each and of which not more than 448 are required to make a ton.
4. <i>Ghotla</i> (short billets)	Short sound pieces, without reference to weight and number.
5. <i>Ghat badala</i>	Billets with knots, cracks and small hollows at both ends that do not weigh less than 10 lbs. each and of which not more than 240 are required to the ton.
6. <i>Bagaradad</i>	Solid pieces without special reference to weight and number. NB. Pieces belonging to classes 5 and 6 are not planed, neither are the ends rounded off.
7. Roots (first class)	Pieces of not less than 15 lbs. of which not more than 150 are required to the ton.
8. Roots (second class)	Pieces of not less than 5 lbs. of which not more than 448 are required to the ton.
9. Roots (third class)	Small and lateral roots weighing less than 5 lbs. each.
10. <i>Jugpokal</i> (first class) or <i>Badala</i>	Hollow pieces of not less than 7 lbs. of which not more than 320 are required to the ton.
11. <i>Jugpokal</i> (second class)	Hollow pieces of not less than 3 lbs.
12. <i>Ain Bagar</i>	Solid cracked and hollow pieces, of not less than 1 lb.
13. <i>Cheria</i> (large <i>Chilta</i>)	Pieces and chips of heartwood of not less than 0.5 lb.
14. <i>Ain Chilta</i>	Pieces and small chips of heartwood.
15. <i>Hatri Chilta</i>	Chips of heartwood and shavings obtained by planing billets with the <i>Hatri</i> or <i>Randha</i> , Indian tools.
16. <i>Milwa Chilta</i>	Mixed pieces and shavings of both heart wood and sap wood.
17. <i>Basola Bukni</i>	Small mixed heartwood and sap wood chips.
18. Sawdust	Obtained by sawing sandalwood.

Source: Gildemeister, E., *The Volatile Oils*, pp. 332-334.

who could be so held responsible, viz., those on whose land the trees grow' would be the most effective way to guarantee compliance with state demand.⁴² Such strictures gave no positive incentives to landowners to preserve the species, and so it was noted that, 'Ryots are naturally much averse to having the sandal tree in their fields, as it is so strictly reserved wherever growing. Hundreds of seedlings are plowed up yearly'.⁴³ Thus state monopoly on sandalwood has repeatedly been argued to work against the interests of propagation and conservation.⁴⁴ Meanwhile, private European companies also made significant inroads into Mysore territory at this time. By convincing the government to classify forests as 'wastelands', and arguing that Europeans would improve these tracts from their 'semi-savage state', starting in the 1860s vast areas were taken from local inhabitants and converted into private plantations for the 'production of cardamom, pepper, coffee and sandalwood'.⁴⁵

Yet attempts to cultivate sandalwood on both forest department and privately owned plantations proved to be a dismal failure. There were two major problems facing sandalwood supply in the period before the twentieth century besides overexploitation and European monopoly. First was the inability to cultivate. Before the first quarter of the twentieth century European foresters simply could not figure out how to grow sandalwood trees effectively. The main reason for this is that sandal is what is now known as a semi-parasite or root parasite; besides a main taproot that absorbs nutrients from the earth, the sandal tree grows parasitical roots (or *haustoria*) that derive sustenance from neighbouring brush and trees. Already in the 1860s, the Public Works Department, which was then in charge of forests, informed the commissioner of Mysore: 'an increased production of the Sandalwood tree, either by cultivating or by aiding its natural growth and regeneration, would be most useful, and be productive of a large revenue', and 'asked whether the importance of the work would not warrant the introduction of a specifically trained and skilled Forest Officer either from Scotland, or from the Continent of Europe'.⁴⁶ In 1865–66, the government attempted to start a sandalwood plantation, but efforts failed miserably. A report from the plantation enumerated:

One hundred and fifty germinated in the nursery at Kankanhullee; 60 were transplanted at Coongul, but notwithstanding the greatest care, 50 died, the remaining 10 are progressing favourably. Of the 90 left in the nursery, 10 are in good health; of the rest a few died, but unfortunately the greatest part were washed away by heavy rains.⁴⁷

⁴² NAI, PWD, Forests, February 1871, nos. 28–30 (B), 'Preservation of sandal wood trees in Mysore' and NAI, PWD, Forests, March 1871, nos. 87–88, 'Preservation of Sandal-wood trees, Mysore'.

⁴³ NAI, PWD, Forests, December 1870, nos. 5–9, 'Mysore Forest Report for 1869–70', pp. 16–17.

⁴⁴ Agarwal, 'A law creates an outlaw'.

⁴⁵ Chancellor, 'Mysore: The Making and Unmaking of a Model State', pp. 109–26.

⁴⁶ NAI, PWD, Forests, July 1868, no. 15, 'Forest Progress Reports, Mysore, 1865–66 and 1866–67'.

⁴⁷ NAI, PWD, Forests, February 1868, nos. 5–6, 'Reply to orders on Mysore Forest Progress Reports, 1865–66 and 1866–67'.

By 1871, at least one scientist, John Scott, curator of the Royal Botanical Gardens in Calcutta, had discovered the secret of the sandal tree's root parasitism.⁴⁸ Yet Scott's paper 'did not receive the attention it deserved', remaining almost entirely unknown in forestry circles until the twentieth century. Dietrich Brandis, the man often regaled as the father of Indian forestry, reported being unaware of the paper when he worked at Kew Gardens in London on South Asian 'forest flora' in 1872–73. Thus it was not until 1902 that the issue started to receive attention in the scientific community, when C.A. Barber, a government botanist in Madras who was also apparently unaware of Scott's work, published a similar account in *Indian Forester* claiming to have proven sandal's root parasitism on his own. As Barber himself pointed out, 'no one seems to be at all sure whether the sandalwood is or is not a true parasite'.⁴⁹

Well into the early decades of twentieth century, silviculture of sandal proved a complete failure. The problem was the typical monoculture approach of tree farming in which all other species were removed and so the tree could not survive. There were some early pioneers who dibbed sandal in hedgerows or found that they could make it grow by spreading the seeds broadcast, but these were both rather ineffective methods of cultivation. Colonial officials typically blamed 'natives' not only for being detrimental to sandal stocks but also for the general decline in health of Mysore's forests in this period. As one administrator complained: 'owing to the liberal spirit in which the jungles were thrown open to all ryots [farmers]... much damage was done to portions of the forests'.⁵⁰ Yet it was also observed that sandal mostly occurred in the vicinity of villages, rather than in the dense isolated jungles.⁵¹ This fact suggests that these villagers possessed traditional environmental knowledge relating to sandal cultivation that the British plantation managers and foresters did not. Though this is a counterfactual observation, because no such study exists, perhaps if British silviculturalists had studied village-level sandal cultivation they could have solved their problem far sooner.

This inability to cultivate goes a long way towards explaining not only the ever-dwindling supply of sandalwood in India over the nineteenth century but also why sandalwood traders in the Pacific during this period would not take the time to invest in the regeneration of sandal stocks, a fact often overlooked or ignored by authors writing on the overexploitation of Pacific sandalwood. The

⁴⁸ Scott, 'The Germination and Attachment of the Loranthaceae', pp. 257–96.

⁴⁹ Barber, 'The Natural History of the Sandal Tree', pp. 340–41; Brandis, 'Treatment of the Sandal Tree', pp. 3–6.

⁵⁰ NAI, PWD, Forests, September 1867, nos. 17–22, 'Progress Report, Forest Department, Mysore 1865–66 and 1866–67'.

⁵¹ Fischer, 'Santalum Album in India', p. 200. Fischer himself would take this as evidence that sandalwood was not indigenous to India. For an extended textually based argument claiming the Timorese origins of *S. album* see Donkin, *Between East and West*.

long wait time until maturity of the tree must also be considered. Only sandal heartwood and roots develop fragrance, and trees only begin developing fragrance in significant quantities after about thirty years.⁵² Not only did traders, who were typically just sailing through, not have the botanical know-how to replant the tree, but they almost certainly would not be there to see a return on their investments even if they did. The British Raj, on the other hand, believed it would be in place to see the rewards of its silviculture experiments, and so throughout the late nineteenth and early twentieth century pushed on with the overharvest of wild sandal trees.

The second major natural problem facing southern India's sandal groves was spike disease, otherwise known as the sandal spike: the most deadly of sandal's natural enemies. At the end of the nineteenth century and the beginning of the twentieth century, spike disease was the number one killer of sandal trees, killing more trees annually than were being harvested. This disease was first noted in Coorg (now part of Karnataka) in the 1880s. From Coorg, it spread into what is now called the Kodagu district of Karnataka, then to the rest of the state.⁵³ By the 1890s, spike had killed 'an enormous number' of affected trees. A June 1898 survey of Coorg plantations found 1640 dying sandal trees, 1990 dead and only 703 'fairly healthy'.⁵⁴ Attempts in the earlier part of the twentieth century to halt the spread of the disease failed and actually contributed to the decline of the sandal population. In 1904, the government uprooted 700,000 of the diseased trees in an attempt to save the population at large.⁵⁵ By 1920, officials were getting so desperate to stop sandal spike that they offered an award of 10,000 rupees to anyone who could study and control the disease. One effort to eradicate it involved using arsenic salt to poison and kill all the spike-affected sandal trees. Then a ring 100 yards in width was also cleared with the hope that the disease would be stopped. Several 100,000 trees were killed in this way. Predictably, this scheme did not succeed and the spike jumped beyond the rings and attacked other trees.⁵⁶ Even today, the mystery of spike disease has not been solved and scientific investigation is ongoing to find a cure.⁵⁷

⁵² Anonymous, 'Propagation of Sandalwood Trees in Private Holdings'. At 30 years a *S. album* tree produces 10 kg of heartwood, 81 kg at 60 years, and 350 kg at 90 years, though few sandal trees today live to that ripe old age.

⁵³ Rajan, *Ten Forest Products*, p. 103.

⁵⁴ NAI, Revenue & Agriculture Department (R&A), *Forests*, May 1900, no. 30 (C), 149 of 1900, 'Sandalwood cultivation in Coorg'. No. 200-83, Mecara, 30 June 1898, J. L. Pigot, Esq., Deputy Conservator of Forests, Coorg to Sec. to the Chief Commissioner of Coorg, 4-5.

⁵⁵ Rao, 'Field investigation of 'spike' disease', pp. 58-65 and 'Note on the History of Sandal Spike in Mysore'.

⁵⁶ NAI, R&A, *Forests* (b), December 1918, nos. 35-54, 'Investigation of Spike disease'.

⁵⁷ Khan et al., 'Identification of a "Candidatus Phytoplasma asteris"-related strain', p. 572. Antibiotic treatment has been proven effective in treating spiked trees, but this method of treatment cures the disease only temporarily. It is also nearly impossible to approach every wild sandal tree individually.

The problems facing sandalwood continued to compound in the twentieth century. The main problem facing the sustainable harvest and continued survival of sandalwood in India—worse than the forest department's emphasis on exploitation and control of the sandal market, worse than its failure to cultivate the species and protect it from its natural enemies—came from the advent of the sandalwood oil industry at the beginning of the twentieth century. During World War I, vast amounts of sandal were stockpiled in Mysore because perfumeries in France had stopped production and it had become illegal to export to German perfumeries.⁵⁸ In 1915, a Government Sandalwood Oil Factory was built in Mysore. In 1917, it began distilling.⁵⁹ In 1918, the Government Soap Factory (the manufacturers of the ubiquitous Mysore Sandalwood Soap) was built. These two institutions, managed by the Karnataka State Government, were founded under Krishnaraja Wodeyar IV with the guidance of M. Visvesaraya.⁶⁰ Traditionally burned in incense and pressed into attars and oils, sandalwood had always been a consumable good, but with the coming of an industrial-scale sandal oil factory located in the heart of sandal country, sandalwood production now ramped up immensely. It was at this time that Mysore came to be known as 'the Sandalwood City'.

'Scandalwood'

According to Annual Reports of the Karnataka State Forest Department, between 1950 and 1970, on average over 480,000 sandal trees were harvested in the state each year. Then, in a 1974 resource survey, it was suddenly discovered that there were only about 350,000 trees left standing.⁶¹ Overnight, India's sandalwood industry ground to a halt. *S. album* was on the brink of extinction. Harvesting and trade in sandalwood, long considered by many to be the most precious wood in the world, was now banned. This might seem like an extreme episode in environmental mismanagement, but as we have seen, it was by no means a unique one. For this reason, it may be more appropriate to refer to the tree as 'scandalwood' than sandalwood.⁶²

⁵⁸ Natarajan, 'South Indian Letter', p. 4.

⁵⁹ NAI, R&A, Forests (B), October 1917, 'Report of the Director of the Sandalwood Oil Factories'. An interesting variety of concerns were expressed by administrators here: On the one hand there was the fear that if India sold the wood to neutral allies, at least some of it would wind up being pressed for oil in Germany (the principal German firm engaged in the industry was Schimmel's of Leipzig). On the other hand, one administrator was also troubled that 'the cornering of the market by Mysore [state] will kill the indigenous sandalwood distilling industry'.

⁶⁰ *Karnataka State Gazetteer*, p. 784.

⁶¹ Aranya Bhavan, *Annual Reports of Karnataka Forest Department*; Aranya Bhavan, *Karnataka Forest Department Resource Survey*. Also cited in Rajan, *Ten Forest Products*, p. 120. These numbers are actually estimates based on tonnage assuming about 200 trees per metric ton.

⁶² Another potential scandal related to sandalwood is that according to a rumour bandied about in the Australian press, Mahatma Gandhi was cremated on a funeral pyre of Australian rather than Indian sandalwood. Blanch, 'The Money Tree'.

Since the establishment of India's first Sandalwood Oil Factory (SOF), oil taken from sandal heartwood has been used to manufacture everything from aromatherapies to shampoos, soaps, cosmetics and perfumes on an industrial scale. The production of sandal oil for government factories reached its climax in the mid-1950s. In the 1956–57 season sandalwood oil production was at an all-time high of 2800 tons. Throughout the 1950s and 1960s an average of 2400 tons of sandalwood was being supplied to the SOF annually. According to Rajan, 'From the early 1960s the Karnataka Forest Department found it rather difficult to supply about 2,400 to SOF annually sticking to the prescriptions of the working plan. When there was pressure by the SOF the staff of the Forest Department ignored the prescriptions of the working plan and started felling smaller trees'.⁶³

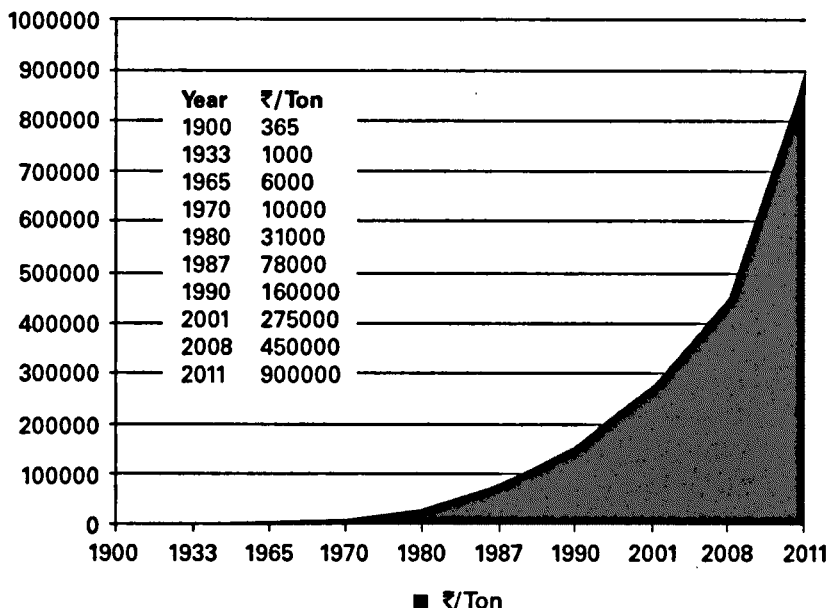
As mentioned, by 1974 when the Karnataka Forest Department completed its resource survey, there were only 347,128 sandal trees standing in all forest divisions of the state it surveyed. Of these trees, only 4360 were more than 30 cm in diameter—this, after decades where the Forest Department had supplied an average of 480,000 trees yearly to the oil factories alone. When the forest department finally acknowledged what was happening, the price of sandal began to skyrocket and the production levels plummeted. Supply declined drastically and for many manufacturers synthetic substitutes, which were coincidentally invented in the mid-1970s, became commonplace. Until 1987, when the Mysore Sandal Oil Factory stopped distilling entirely, it continued to produce essential oils at levels far below capacity.⁶⁴ Sandal smuggling meanwhile was on the rise. The following figures and table depict this story in no uncertain terms (Figures 2–5, Table 2).

The fact that the government continued to maintain its monopoly on sandalwood after independence not only represents a clear continuity with the colonial past, it also disincentivised growers and became a major liability for the species itself. Thus many recent voices have called for privatisation. Since the colonial era, conservation efforts have focused on top-down government control of this resource. Chapter X of the Karnataka Forest Act of 1963 extended the rules, making sandal trees the exclusive property of the government and making it illegal for landholders to fell trees on their own land. Today, landholders must still report damage or theft of any tree. Violators face imprisonment up to seven years and fines of ₹25,000. Advocates of privatisation have argued that this strongly discourages growing sandalwood, as private growers assume all the responsibility and risk and gain none of the benefit. Already colonial administrators were aware of this issue, saying 'the people have now no common interest with us in the matter of sandal'. Since the colonial period people found sandal a nuisance for this reason, and so rather than let it grow on

⁶³ Rajan, *Ten Forest Products*, p. 120.

⁶⁴ Rajan, *Ten Forest Products*, p. 126.

Figure 2
Sandalwood Prices at Auction in India (Rupees per metric ton)



Sources: Rai and Sarma. 'Depleting Sandalwood Production and Rising Prices'; Rai, 'Status of Cultivation of Sandalwood', p. 68; Puttasetti, Interview; 'High Demand—Rajnish Estates' http://rajnishestates.com/rajnishController/project ROI_sandal/1/High_Demand

Note: As illustrated, it is only around 1974 that *S. album* prices start skyrocketing; when it became apparent that Karnataka's sandal stocks were depleted.

their land, some would even feed it as fodder to their livestock.⁶⁵ There is also documentation of sandalwood theft occurring from government supplies at least as early as the 1870s.⁶⁶

The major difference between the economics of sandalwood in the colonial and post-1947 periods, then, is that whereas earlier sandalwood was primarily exploited as a raw good for export to international markets, by the mid-twentieth century southern India had its own booming sandalwood industry that spurred ever-increasing demand. Still, a large factor contributing to this drive for destruction

⁶⁵ NAI, R&A, Forests, May 1900, no. 30 (C), 149 of 1900, 'Sandalwood cultivation in Coorg'. No. 807 Lt. Col. Donald Robertson, ISC, CSI, Chief Com. of Coorg to Inspector General of Forests, GoI, Simla, Bangalore, 1 May 1900.

⁶⁶ NAI, PWD, Forests, January 1870, nos. 27–27, 'Progress Report, Forest Department, Coorg'. no. 26, 24 Dec. 1869, Govt. of India, PWD to Chief Com. of Coorg, 2.

Table 2
Metric Tons of Sandalwood Produced in Karnataka and Tamil Nadu According to Various Sources, 1952 — 1992

Source	Rajan (1994)	Rai & Sarma (1990)	Saravanan (2007)	Rajan (1994)	Rai & Sarma (1990)
Year	Karnataka (tons)	Karnataka (tons)	Tamil Nadu (tons)	Tamil Nadu (tons)	Tamil Nadu (tons)
1952-53	1504				
1953-54	1420				
1954-55	2323				
1955-56	2382				
1956-57	2800		967	1181	
1957-58	2070		1162	1202	
1958-59	2332		1183	1207	
1959-60	1883		1187	1922	
1960-61	1871		1882	1789	
1961-62	1938		1761	1958	1244
1962-63	1671		1927	2097	1187
1963-64	1820		1385	3800	1385
1964-65	2247	2240	1400	1496	1400
1965-66	2616	1504	1496	1730	1249
1966-67	2403	2566	1221	1810	1221
1967-68	2670	2386	1082	1656	1082
1968-69	2748	2422	1165	1468	1165
1969-70	2800	2516	1302	582	1201
1970-71	2705	2493	1415	1660	1415
1971-72	2977	2513	1465	720	1455
1972-73	2633	2553	1390	1845	1390
1973-74	2134	2181	1370	1445	1370

(Table 2 continued)

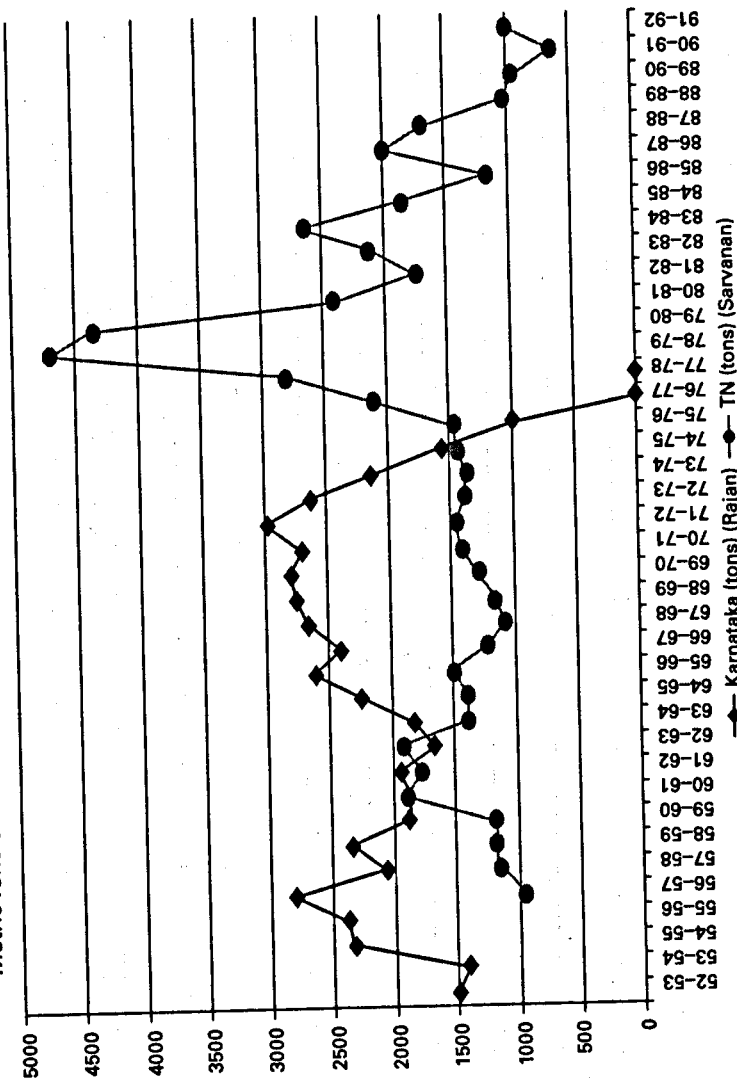
(Table 2 continued)

Source	Rajan (1994)	Rai & Sarma (1990)	Saravanan (2007)	Rajan (1994)	Rai & Sarma (1990)
Year	Karnataka (tons)	Karnataka (tons)	Tamil Nadu (tons)	Tamil Nadu (tons)	Tamil Nadu (tons)
1974-75	1570	1575	1445	1473	721
1975-76	1000	1167	1473	2110	1185
1976-77	NA	NA	2110	1484	1450
1977-78	NA	NA	2822		750
1978-79		1000	4693		945
1979-80		647	4353		1166
1980-81		832	2411		1547
1981-82		NA	1755		1923
1982-83		202	2123		1947
1983-84		1171	2660		1907
1984-85		1989	1854		2000
1985-86		949	1170		2089
1986-87			1992		1919
1987-88			1691		
1988-89			1032		
1989-90			968		
1990-91			643		
1991-92			1012		

Sources: Rajan, *Ten Forest Products*, p. 118; Rai and Sarma, 'Depleting Sandalwood Production', pp. 348-55; Saravanan, 'Environmental History of Tamil Nadu State', pp. 723-67.

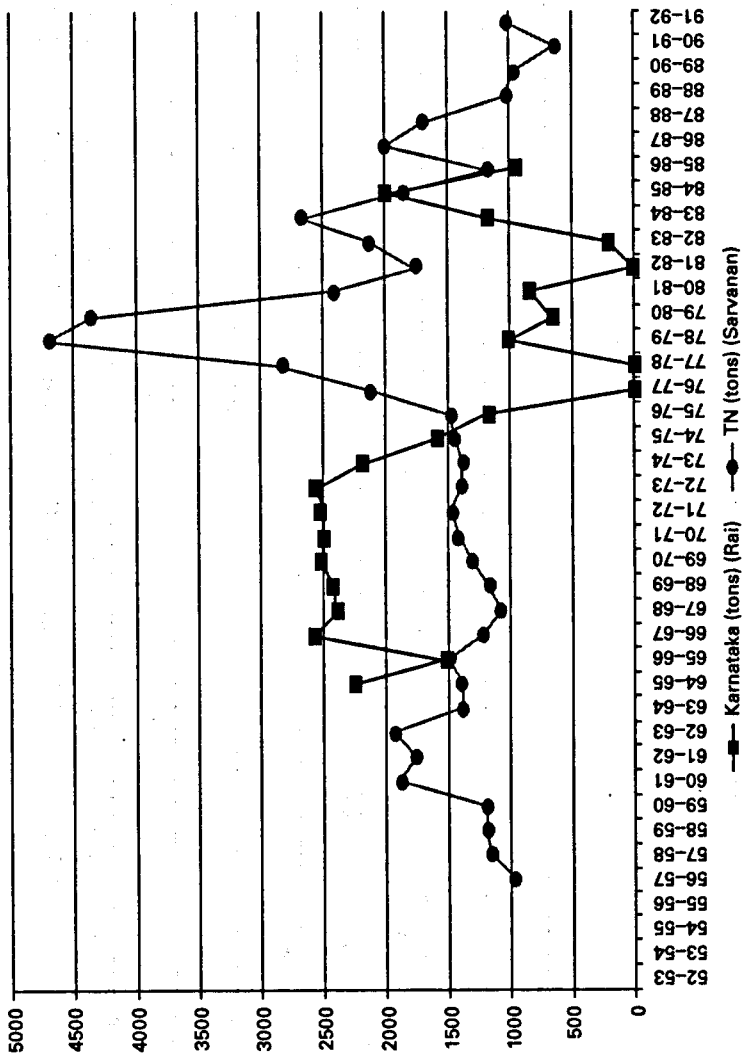
Note: Although Rajan, Rai and Sarma, and Saravanan all provide conflicting data on the amount of sandalwood harvested in Karnataka and Tamil Nadu, as the following two graphs depict all three sources also roughly display the same trend. Prior to the 1970s Karnataka was producing over 2000 tons of sandalwood per year. Then when that state's sandalwood population collapsed, harvesting skyrocketed in neighbouring Tamil Nadu. Noteworthy, also, is the fact that while Saravanan's data from 'Environmental History of Tamil Nadu' records a sharp spike in sandalwood production starting in 1976, his article offers no explanation for this rise. The correlation with the situation in Karnataka seems to be the most obvious explanation.

Figure 3
Metric Tons of Sandalwood Produced in Karnataka and Tamil Nadu, 1952-92



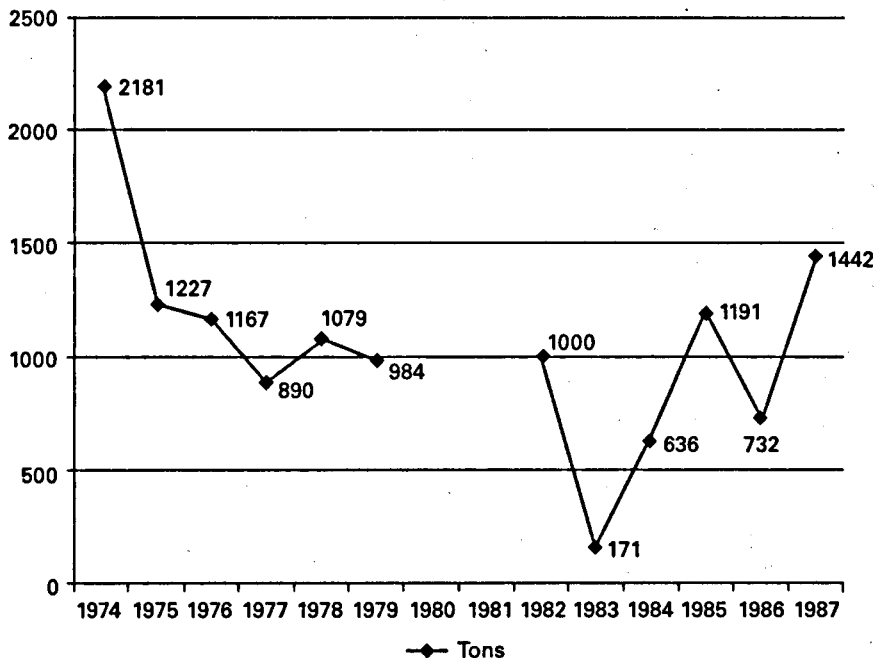
Source: Rajan, *Ten Forest Products*, p. 118; Saravanan, 'Environmental History of Tamil Nadu State', pp. 723-67.

Figure 4
Metric Tons of Sandalwood Produced in Karnataka and Tamil Nadu, 1955-92



Source: Rai and Sarma, 'Depleting Sandalwood Production', pp. 348-55; Saravanan, 'Environmental History of Tamil Nadu State', pp. 723-67.

Figure 5
Metric Tons of Sandalwood Supplied to Government Sandal Oil
Factories, 1974–87



Source: *Annual Reports of the Karnataka Forest Department, 1973–88*; Rajan, *Ten Forest Products*, p. 98.

Note: Karnataka's sandal oil factory regularly processed over 2000 tons of sandalwood yearly before 1974. Oil production briefly stopped in 1980–81 and then the factory shut its doors in 1987.

was international trade. Around the world, individuals with a fondness for scents and natural products like those made from sandal have created a multi-billion dollar industry. By 1984, the United States alone imported 10,000 tons, worth \$100 million, in essential oils.⁶⁷ And according to the United Nation's COMTRADE database, global imports of essential oils stood at \$2 billion in 2005.⁶⁸ Ironically, much sandalwood consumption in the West especially seems to be driven by a desire to live a 'natural' lifestyle coupled with an utter lack of awareness.

The industrial-sized appetite and short-term outlook of the sandalwood oil factories has not only been self-destructive, but has also had a variety of other socio-economic impacts. For example, the traditional sandalwood-carving community

⁶⁷ Myers, *The Primary Source*, p. 234.

⁶⁸ International Merchandise Trade Statistics (IMTS), <http://comtrade.un.org/>

of Karnataka, the Gudigars, have been especially impacted. Originally a *jati* of temple craftsmen from the region of Shimoga, over the course of the twentieth century carving for temples was almost entirely replaced by carving for the handicrafts market, with their works being sold in boutiques across India to domestic consumers and foreign tourists. Thus in 1947, the caste-based Mysore Gudigar Co-operative was set up to support the handicraft industry in the face of competition.⁶⁹ Today, sandalwood craftsmen require a license for possession of bulk sandal, which the government-run Karnataka Handicraft Development Corporation (KDHC) rations to them. Once a month, when it is available, KHDC supplies craftsmen with about 10 kg of sandal per family in round form, which in 2001 they bought for around ₹175 per kg.⁷⁰ The perception of anthropologists and politicians commenting on the craftsmen's situation is that increasing costs and declining supply of sandalwood has seriously threatened the Gudigar community's livelihood, and so along with endangered species we find a whole range of religious and cultural practices becoming co-endangered.⁷¹

By the 1970s, the sandal situation was further aggravated by the fact that sandalwood smugglers could make more money by poaching endangered sandal trees than by killing elephants. As smuggler-bandits amassed private fortunes from the wealth of public forests, such men came to be viewed as heroes by impoverished villagers who want to earn a living wage and by a public that finds solace in the actions of anyone who challenges the status quo. According to one oft-repeated statistic: 'Approximately 75% of the sandalwood leaving [Karnataka] is smuggled'.⁷² Veerappan, dubbed 'the Sandalwood Bandit', was perhaps the most notorious sandalwood smuggler in India. Becoming rich off this illegal trade, as of 1997 the smuggler had a ₹4 million bounty on his head. For more than 15 years, Veerappan made the newspaper virtually every day, becoming a constant source of headlines for the Indian press and an embarrassment for the government and police.⁷³ Before 9/11 and the ensuing hunt for Osama bin Laden, the hunt for Veerappan was the most costly and largest manhunt in Asia. Veerappan was finally killed on 18 October 2004 in a police encounter, and now other smugglers have risen to take his place.

Emerging now from the long history of state monopoly, a large chorus of voices is now insisting that privatisation is the solution for saving the *S. album* and southern India's sandalwood industry. It is not only landowners who are leaning in

⁶⁹ Brouwer, 'Handicrafts and Craftsmen'.

⁷⁰ Field notes.

⁷¹ 'Pass on craftsmanship skills to the next generation, Gudigars told', *The Hindu*, 1 May 2011. Other examples include the impacts on the traditional attar (perfume) industry, on the Parsi Zoroastrian community, which relies on sandalwood for worship in its fire temples, and on the use of sandalwood in Hindu funerary rituals.

⁷² Trade Environment Database (TED) Case Studies: Sandalwood Case. Case #: 428.

⁷³ Atulla and Raghavan, 'On a Wild Goose Chase?', p. 6.

this direction. Even the environmentalist magazine *Down to Earth*, produced by the Centre for Science and the Environment, has argued for privatisation, going so far as to say that in the case of Veerappan 'A law creates an outlaw'. As one forest official put it, 'If the tree is allowed to come above ground the smuggler will vanish on his own'. In the words of one villager, 'If the sandalwood trees were mine, I would shoot anyone who tries to cut a tree that is so valuable'. Or as yet another villager put it, 'Everybody is on the run to make money, but when some villagers make a few rupees from their own forest, the sky falls on them. What kind of justice is this?'⁷⁴ From 2002 to 2004, the government of Karnataka began making limited moves in the direction of privatisation, but still the state remains the only buyer for sandal trees, setting prices artificially low, thus maintaining a monopsony.

The choice, however, is not limited to state monopoly versus privatisation. As Arun Agrawal has shown, while exclusionist policies against local communities have typically failed, and nation states around the world have been forced to move away from them, new idioms of participation and democracy have often come to take their place.⁷⁵ Thus there are policy options available besides privatisation of sandalwood as a moneymaking resource for individual landowners. Social forestry and joint forest management, for example, might have the potential to ensure successful conservation and regeneration of the species as well as sustainable development for local communities (though it might also have the danger of spreading bureaucracy and corruption to the village level). In this model, ownership and control could go to village *panchayats* rather than private individuals.

There is a Sanskrit proverb that speaks to the history of the endangerment of *Santalum* species all over the world: 'In sandal trees there are serpents. In the waters with lotuses there are also alligators—there are no unobstructed pleasures'. Though scientists have actually tested the age-old adage that serpents live in sandal trees and found it to be false, metaphorically it is all too true. Sandalwood has become an endangered and obstructed pleasure. The long history of colonial overexploitation, bureaucratic mismanagement and industrial scale devastation has reaped its toll on *Santalum* species the world over. Today's tough policy choices will determine the tree's future.

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⁷⁴ Agarwal, 'A Law Creates an Outlaw'.

⁷⁵ Agrawal, *Environmentality*.

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