

# The El Dorado of Forestry: The Eucalyptus in India, South Africa, and Thailand, 1850–2000\*

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**SUMMARY:** This article argues that because of the perceived and real biological characteristics of the different species of the genus *Eucalyptus*, imperialists and settlers, and later governments and the elites of developing nations, planted eucalypts widely and created new socio-ecological systems that encouraged and reinforced divergent patterns of economic, social, and ecological development. Planting eucalypts changed local ecologies and encouraged a movement towards market-based capitalism that benefited settlers, large landowners, urban elites and middle classes, and capital-intensive industries at the expense of indigenous groups living in and near forests. This article analyses the globalization of eucalypts in four broad phases: first, an enthusiastic expansion and planting from 1850–1900; secondly, failure in the tropics from 1850–1960; thirdly, increased planting and success rates in the tropics from 1960–2000, and fourthly, a growing criticism of eucalypts that began in the late nineteenth century and blossomed in the 1980s during an intense period of planting in India and Thailand.

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## INTRODUCTION

The different species of the genus *Eucalyptus* should be considered the fountain of youth and the El Dorado of forestry: for over 150 years people believed eucalypts could cure tropical diseases while also providing a source of continuously renewable wealth. Eucalypts were planted in a variety of climates in Australia, Asia, Africa, Europe, South America, and North America. Foresters and botanists were impressed by their quick growth, hard wood, and ability to grow quickly where other trees cannot. Governments, industrialists, and large landowners sought to grow the trees for fuel, poles, pulpwood, and, more importantly, profits. Yet the

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social and ecological effects caused by 150 years of eucalyptus planting reveal that the initial beliefs that encouraged people to create vast forests of eucalypts are as much myth as reality.

The initial hope that eucalypts would be a wonder wood was dampened when people living in and near newly made eucalyptus plantations began complaining about their negative ecological effects and inability to grow in tropical areas. Over the next 150 years many rural people, scientists, and environmental activists tried to stop the planting of eucalypts for a variety of ecological, social, and cultural reasons. Today, there is considerable opposition to the planting of eucalypts, although the size of eucalyptus plantations continues to expand across the developing world.

This essay provides a historical analysis of the globalization and the socio-ecological effects of eucalyptus plantations in India, South Africa, and Thailand. It argues that the widespread planting of eucalypts during the nineteenth and twentieth centuries caused immense social, ecological, and economic changes among peoples living in the regions of India, South Africa, and Thailand where eucalypts were planted extensively.

Because of the perceived and real biological characteristics of eucalypts, imperialists and settlers, and later governments and the elites of developing nations, planted eucalypts widely and created new socio-ecological systems that encouraged and reinforced divergent patterns of economic, social, and ecological development. Planting trees changed local ecologies and encouraged a movement towards market-based capitalism that benefited settlers, large landowners, urban elites and middle classes, and capital-intensive industries at the expense of indigenous groups living in and near forests. This larger process of social and ecological change also encouraged the rise of regional criticisms of eucalypts which were linked through global scientific and environmentalist networks. In effect, the massive plantings of eucalypts, and the responses against them, helped to create a more common social, economic, and ecological system spanning the greater Indian Ocean region.

Since the mid-nineteenth century the planting of eucalypts has been part of a broader global development where humans have manipulated and homogenized the natural environment in order to encourage economic growth and facilitate social control.<sup>1</sup> Certain ecological, social, and economic patterns have been reinforced as a response to the attempt to create a more homogenized world – the planting of eucalypts being one of them.<sup>2</sup> *Eucalyptus* is a ubiquitous genus because its various species developed

1. Historians are beginning to see the trend towards developmentalism as a more general feature of the modern world. See Kenneth Pomeranz, "Introduction", in Edmund Burke III and Kenneth Pomeranz (eds), *The Environment and World History* (Berkeley, CA, 2008).

2. Donald Worster calls these new ecological patterns "agro-ecologies"; Donald Worster, "Transformations of the Earth: Toward an Agroecological Perspective in History", *Journal of American History*, 76 (1990), pp. 1087–1106.

biological characteristics that allow them to grow throughout much of the world.<sup>3</sup> But eucalypts succeeded not merely because of their unique biological traits. In fact, the long-term success of eucalypts in the tropical world is a result of a century of testing and experimentation that led to better species selection and the creation of hybrids that prospered in tropical climates. Thus, the cultural and economic desire to plant these trees, coupled with a century of scientific experimentation, meant that eucalypts became the tree that many initially wanted them to be.

This article analyses the globalization of eucalypts in four broad phases: first, an enthusiastic expansion and planting of eucalypts from 1850–1900; secondly, a failure of eucalypts in the tropics from 1850–1960; thirdly, a period of scientific, social, and industrial change that allowed for the increased planting and success rates of eucalyptus species planted in the tropics from 1960 to the present; fourthly, a growing criticism of the ecological and social effects of eucalyptus plantations which began slowly in the late nineteenth century and blossomed in the 1980s during an intense period of eucalyptus planting in India and Thailand.

This does not mean that eucalypts had the same histories in South Africa, India, and Thailand. The justification for planting eucalypts and the social reception and ecological effects of their planting depended on a number of historically and regionally contingent factors. Yet support for and criticisms against eucalypts usually required access to global networks of science and environmental activism. In this sense, the history of the eucalyptus, while encompassing specific nations and regions, is truly global.

### GLOBALIZING EUCALYPTS

Eucalypts are trees that live on photosynthesis, water, and nutrients from soil. *Eucalyptus* is a genus of trees in the *Myrtaceae* family that includes around 700 species, almost all of which evolved in Australia. Eucalypts evolved a specific adaptation to Australia's peculiarly nutrient poor and dry conditions which botanists call sclerophyll, in which leaves are small, tough, waxy, and have less nutrition.<sup>4</sup> Mammals in Australia evolved mechanisms to digest and live on the low nutritional, often toxic, and tough qualities of eucalyptus leaves and bark. But most mammals outside

3. Alfred Crosby, *Ecological Imperialism: The Biological Expansion of Europe, 900–1900* (Cambridge, 1986). In the second edition of *Ecological Imperialism*, Crosby cited the genus as the one example of species from the “Neo-Europes” that successfully spread and colonized Europe. This account places the ecological success of the tree in the context of its biological ability to flourish in a variety of locations and climates. See Prologue and p. 166.

4. For a discussion of the larger evolutionary history of Australia and its plants see Eric Rolls, “The Nature of Australia”, pp. 35–45, and Tim Flannery, “The Fate of Empire in Low- and High-Energy Ecosystems”, pp. 46–59, in Tom Griffiths and Libby Robin (eds), *Ecology and Empire: Environmental History of Settler Societies* (Edinburgh, 1997).

Australia cannot eat vegetation with such low nutritional content. In ideal growing conditions, many species of eucalyptus thrive. Yet, as this article shows, over the past 150 years people often failed to find these ideal conditions. Even when ideal environmental conditions could be found, the social and ecological consequences of their planting often offset any economic gain.

Despite these biological characteristics, it is almost impossible that eucalypts would have colonized the lands surrounding the Indian Ocean during the nineteenth and twentieth centuries without the help of humans. The history of the spread of eucalypts, then, is also profoundly social. Human desires to improve the productivity of nature dovetailed with the perceived characteristics of the genus. Despite the destruction of Australia's native eucalyptus forests by an expanding frontier of settlers, botanists in Australia during the nineteenth century enthused about the characteristics of the genus and its individual species.<sup>5</sup>

Ferdinand von Mueller, the state botanist for Victoria for most of the mid to late nineteenth century (1853–1896), and Joseph Maiden, director of the Sydney Botanic Gardens and Herbarium from 1896–1924, helped to popularize the genus during that period by sending hundreds of thousands of eucalyptus seeds to private individuals and botanical gardens throughout the British Empire and the rest of the world.<sup>6</sup> From botanical gardens in Melbourne and Sydney, eucalypts spread to gardens in Mauritius, Cape Town, Durban, Pietermaritzburg, Grahamstown, Calcutta, Ootacamund, and Bangkok and then throughout India, southern Africa, and Thailand.<sup>7</sup> Once diffused from these gardens, foresters, farmers, and villagers all planted eucalypts through individual and state-sponsored programs.

#### SOUTH AFRICA 1850–2000

The introduction of eucalypts into South Africa is intrinsically bound up with settler colonialism. Only in the broadest sense can their initial planting be considered as being directly related to the processes of

5. Tom Griffiths, *Forests of Ash: An Environmental History* (Melbourne, 2001), pp. 32–87; John Dargavel, *Fashioning Australia's Forests* (Melbourne, 1995), pp. 16–59.

6. For Mueller see A.M. Lucas, "Baron von Mueller: Protege Turned Patron", in R.W. Home (ed.), *Australian Science in the Making* (Sydney, 1988), pp. 133–152. For Maiden see Jodi Frawley, "Botanical Knowledges, Settling Australia: Sydney Botanical Gardens, 1896–1924" (unpublished Ph.D., University of Sydney, 2009).

7. See Robin Doughty, *The Eucalyptus: A Natural and Commercial History of the Gum Tree* (Baltimore, MD, 2000), pp. 24–59, 189–191. Key works on botanical gardens include Richard Drayton, *Nature's Government: Science, Imperial Britain, and the "Improvement" of the World* (New Haven, CT, 2000); Donal McCracken, *Gardens of Empire* (London, 1997); and Lucile Brockway, *Science and Colonial Expansion* (New York, 1979).

capitalism or a market-based economy. Its proponents at first sought eucalypts for agricultural and economic sustainability, not for export. Capital-intensive and market-based plantations of eucalypts became popular beginning in the late nineteenth and early twentieth centuries, especially following the two world wars. Plantings of eucalypts were, nonetheless, common features of the South African landscape by the late nineteenth century. Describing South Africa to British readers, the Liberal British politician and historian, James Bryce, noted that any visitor to South Africa

[F]inds them [eucalypts] now everywhere, mostly in rows or groups round a house or a hamlet, but sometimes also in regular plantations. They have become a conspicuous feature in the landscape of the veldt plateau, especially in those places where there was no wood, or the little that existed has been destroyed. Kimberley, for instance, and Pretoria are beginning to be embowered in groves of eucalyptus; Buluwayo is following suit; and all over Matabililand and Mashonaland one discovers in the distance the site of a farm-steading or a store by the waving tops of the gum-trees.<sup>8</sup>

European settlers planted exotic trees because the few indigenous forests in South Africa became increasingly scarce resources. The desire to plant fast-growing exotic species of trees became more pressing as British migration to southern Africa in the nineteenth century expanded the European population in the Cape and Natal, and some groups of Afrikaners moved into the interior to found new settlements.

The first eucalyptus species planted widely in South Africa was the *E. globulus*, the “blue gum”. It came via an Indian Ocean network, from Australia to Mauritius to the Cape Colony, likely in 1828.<sup>9</sup> By the mid-nineteenth century the *E. globulus* had established itself throughout most of Southern Africa, from the Cape all the way into the Transvaal.<sup>10</sup> Eucalypts found many champions in the mid to late nineteenth century. One of the genus’s most outspoken advocates, John Croumbie Brown, a Scottish-born colonial botanist who worked in Cape Town from 1862–1866, recommended planting eucalypts because of their supposed superior biological qualities: eucalypts were seen as the “fittest” trees because they so easily grew where other native trees would not.<sup>11</sup> As in

8. James Bryce, 1st Viscount Bryce, *Impressions of South Africa* (New York, 1897), pp. 29–30.

9. See John Noble, *History, Productions, and Resources of the Cape of Good Hope* (Cape Town, 1886), p. 150.

10. Its first recorded entry into Natal was in 1846. See *Bulletin of Miscellaneous Information (Royal Gardens, Kew)*, vol. 1900, no. 157/168 (1900), pp. 12–15. Soon after, “[T]he growth of these exotics became a prominent feature in the Colony. Every farm had its plantation, which embraced numerous species”, pp. 13–14.

11. Richard Grove, “Scottish Missionaries, Evangelical Discourses and the Origins of Conservation Thinking in Southern Africa 1820–1900”, *Journal of Southern African Studies*, 15

India, some advocated the planting of *E. globulus* to stave off malaria, especially in areas such as the north-eastern Transvaal and Mashonaland.<sup>12</sup>

For a time, the blue gum became synonymous with the expansion of European settlements and trade in South Africa.<sup>13</sup> Settlers hoped that they would provide health for Europeans and rough timbers and poles for housing, trade, the railways, and mining. Like elsewhere in the British Empire in the nineteenth century, the popularity of *E. globulus* declined as the trees died from premature dieback because of drought and fungus. Other species of eucalyptus, such as *E. grandis*, *E. saligna*, *E. maculata*, and *E. paniculata*, increasingly replaced *E. globulus* in the twentieth century.

Planting trees was part of the mid to late nineteenth-century European mindset of conservation: trees supposedly brought rain, agriculture, and civilization.<sup>14</sup> As elsewhere in Africa, many European settlers thought that any landscape devoid of trees was the result of wanton destruction by Africans, not a result of natural ecological processes.<sup>15</sup> Throughout South Africa, Europeans generally criticized the timber usage of Africans. In Lesotho, British missionaries and foresters blamed the Africans for deforesting the landscape, even though it is likely that much of Lesotho's ecology was not suited to vast forests.<sup>16</sup>

(1989), p. 184, as cited in William Beinart and Peter Coates, *Environment and History: The Taming of Nature in the USA and South Africa* (London, 2002), p. 41.

12. This belief continued in some circles until the end of the nineteenth century. Missionaries hoped eucalypts would render Mashonaland healthy. See William Brown, *On the South African Frontier: The Adventures and Observations of an American in Mashonaland and Matabeleland* (New York, 1899), p. 309; William Parr Gresswell, *Geography of Africa South of the Zambesi* (Oxford, 1892), p. 363. For the Transvaal, see M.A. Carey-Hobson, *At Home in the Transvaal* (Aberdeen, 1896), p. 51.

13. The South African forest research officer R.J. Poynton suggested in the 1950s that the *E. globulus* "was at one time perhaps the most ubiquitous exotic tree in South Africa". See his *Notes on Exotic Forest Trees in South Africa* (Pretoria, 1957), p. 35.

14. For a description of how desiccationist narratives helped create forestry legislation and state control in South Africa, see Gregory Barton, *Empire Forestry and the Origins of Environmentalism* (Cambridge, 2002), pp. 99–104; William Beinart, *The Rise of Conservation in South Africa: Settlers, Livestock, and the Environment 1770–1950* (New York, 2003), pp. 95–98. For a discussion of early conservation efforts in the Cape Colony, see Richard Grove, "Early Themes in African Conservation: The Cape in the Nineteenth Century", in David Anderson and Richard Grove (eds), *Conservation in Africa: Peoples, Policies and Practice* (Cambridge, 1987), pp. 21–38; Richard Grove, "Scotland in South Africa: John Croumbie Brown and the Roots of Settler Environmentalism", in Griffiths and Robin, *Ecology and Empire*, pp. 139–153.

15. This process has been covered by a number of studies. For North Africa, see Diana Davis, *Resurrecting the Granary of Rome: Environmental History and French Colonial Expansion in North Africa* (Athens, OH, 2007); for west Africa, see James Fairhead and Melissa Leach, *Misreading the African Landscape: Society and Ecology in a Forest-Savanna Mosaic* (Cambridge, 1996); for southern Africa, see Kate Showers, *Imperial Gullies: Soil Erosion and Conservation in Lesotho* (Athens, OH, 2005).

16. See the argument of Showers, *Imperial Gullies*.

Part of the desire to plant eucalypts arose simply from a need for timber. The expansion of eucalyptus plantations was fuelled by the desire of foresters and the state to continue a supply of cheap, fast-growing wood for mining, firewood, poles, sleepers, and other industrial products. There was also a strong cultural desire to remake Africa in the image of Europe. To European settlers, South Africa was to be a country of farms, with trees and forests dotting the land.<sup>17</sup> Europeans claimed their farms and cities by embowering them with eucalypts. Throughout the nineteenth and twentieth centuries, the eucalyptus was used as a common motif in literature, scientific discussions, and political prose that equated eucalypts with a Western style of civilization, society, economy, and even nature.<sup>18</sup>

Throughout the nineteenth and early twentieth centuries the search for land pitted white settlers against Africans, with Africans losing out to an expanding frontier of agriculture, ranching, and man-made forests. Foresters in the Cape Colony pioneered the creation of plantations of eucalypts in the late nineteenth and early twentieth centuries.<sup>19</sup> Although in the late 1900s foresters and farmers called for afforestation of white settlements in Natal and lower Zululand with “large plantations of eucalyptus”, black wattles (*Acacia mearnsii*) expanded at a faster rate because most species of eucalyptus, except *E. saligna*, did not thrive in KwaZulu-Natal.<sup>20</sup> The trees were popular in Lesotho and Swaziland, with the British government promoting their planting.<sup>21</sup> To fulfill the requirements for the growing white and African populations, eucalyptus plantings expanded across South Africa, especially in the Cape and the Transvaal.<sup>22</sup>

State forestry programs expanded in the wake of the unification of South Africa in 1910. Foresters sought to “wean” Africans from using

17. Beinart, *The Rise of Conservation*, p. 96. For a description of how “noble” eucalypts lined the farms of Natal, see Henry Brooks, *Natal: A History and Description of the Colony* (London, 1876), p. 278.

18. For example, see the romantic discussions of eucalypts and farming in Leonard Flemming, “The Romance of a New South African Farm”, *Journal of the Royal African Society*, 21 (1922), pp. 115–128, 123–124. Flemming said that on his farm alone he planted 40,000 trees.

19. See Brett Bennett, “‘Fit the Tree to the Climate’: Australian-South African Botanical Exchange and the Origins of the Climatic School of Silviculture in South Africa c. 1880–1950”, in “Creating an Indian Ocean Rim Ecosystem: Forestry, Science and the British World 1864–1963” (Ph.D., University of Texas at Austin, 2010).

20. Thomas Sim, *Tree Planting in Natal* (Pietermaritzburg, 1905), pp. 139–140. For a discussion of exotics in Natal see Harald Witt, “The Emergence of Privately Grown Industrial Tree Plantations”, in Stephen Dovers, Ruth Edgecombe, and Bill Guest (eds), *South Africa’s Environmental History: Cases and Comparisons* (Athens, OH, 2002), pp. 90–112, 93.

21. Gertrude Rachel Hance, *The Zulu Yesterday and To-day: Twenty-Nine Years in South Africa* (London, 1916), p. 78. Alice Balfour, *Twelve Hundred Miles in a Wagon* (London, 1895), p. 46.

22. By 1941, around half of all afforestation projects in the Union were in the Transvaal. See *Division of Forestry Annual Report for the Year Ended 31st March, 1941* (Pretoria, 1941), p. 11.

indigenous trees by planting and marketing exotics, such as eucalyptus and pine.<sup>23</sup> Foresters in the Eastern Cape and the Transkei wanted to limit free access to forests and to create a market economy for exotic and indigenous timber. Magistrates and other state officials often rejected this because of a fear of rural protest. A similar management shift occurred in the High Commission Territories. Foresters in Lesotho planted eucalypts to stop soil erosion and to “replant” what the British thought were deforested lands.<sup>24</sup> The Transvaal implemented a large plantation program guided initially by D.E. Hutchins’s recommendations of 1903.<sup>25</sup> The efforts represented a larger legal and management shift in government forestry departments encouraged by the Native Land Act (1913) and the Forest Act (1913), which allowed the forced dispossession of Africans for the creation of forest reservations and state plantations.<sup>26</sup>

Of all the British colonies surrounding the Indian Ocean, South Africa took the lead in creating large eucalyptus plantations. These plantations were often planted on native lands formerly grazed by the pastoral animals of Africans. The process of making a plantation itself changed the ecology and thus required economic and social changes. Foresters created plantations by ploughing the soil or burning the existing grasses and then planting seed or transplanting trees grown in a nursery. If the grasses were not uprooted, they crowded out the sun required by young eucalypts and thus retarded the growth of the trees.<sup>27</sup> Foresters in British India and Australia looked with favor upon the plantation techniques in South Africa, where more labor and capital was devoted to their creation than in Australia or India.<sup>28</sup> Leading South African foresters, such as Hutchins, advocated the use of cheap African labor for the creation and maintenance of plantations.<sup>29</sup> Hutchins suggested, using the Cape Colony as his example, that foresters employ minority “races” or “tribes” to guard forest plantations from theft by the majority groups in the area.<sup>30</sup> Laborers made little money. Foresters in the Transkei commonly gave plantation workers only wood or low wages in exchange for their labor.<sup>31</sup>

23. Jacob Tropp, *Natures of Colonial Change: Environmental Relations in the Making of the Transkei* (Athens, OH, 2006).

24. Showers, *Imperial Gullies*, pp. 60–61.

25. D.E. Hutchins, *Transvaal Forestry Report* (Pretoria, 1903).

26. See *Statutes of the Union of South Africa* (Pretoria, 1913).

27. Poynton, *Notes on Exotic Forest Trees in South Africa*, p. 14.

28. R.N. Parker, *Eucalyptus Trials in the Simla Hills* (Calcutta, 1925), p. 1.

29. Hutchins, *Transvaal Forestry Report*, pp. 6–7.

30. *Ibid.*, p. 7.

31. See Jacob Tropp, “Roots and Rights in the Transkei: Colonialism, Natural Resources, and Social Change, 1880–1940” (unpublished Ph.D., University of Minnesota, 2002), pp. 326–328. I would like to thank Jacob Tropp for this citation.





Figure 1. Eleven-year-old *Eucalyptus resinifera* at Klutjes Kraal Plantation, Western Cape, 1910. *Appendix of Report of the Chief Conservator of Forests for the Year Ending 31 December 1911 (Cape Town, 1912).*

Eucalyptus plantations expanded rapidly in the 1940s and after. Private plantations grew much faster than state plantations, although both expanded in size. Large corporations began creating plantations and industrial pulp mills in the interwar years, often with the legal and financial support of the government. By 1960, 73 per cent of forest plantations were owned by private companies and individuals, with 27 per cent owned by the state or union governments.<sup>32</sup> These plantations included 397,961 acres of eucalyptus.<sup>33</sup> Outside South Africa, in the High Commission Territories and independent Swaziland, private corporations developed large plantations of eucalypts.<sup>34</sup>

An interventionist state forestry policy combined with the expansion of white ownership of land – in some areas over 90 per cent of the land – and the forced removal of Africans hastened social change in South Africa.<sup>35</sup> The commodification of land and resources on a local and global scale changed the values of nature and human society in Southern Africa.<sup>36</sup> Africans slowly became integrated into South Africa's wage-labor economy, often with the men remitting monies back home to their families from cities or mines. Forestry laws provided the Nationalist government (elected in 1948) with the legal framework to remove people from lands and replant those lands with exotic species of trees. The forced removal of local communities in the 1950s and 1960s, and the demarcation of state and private forests, meant that an increasing population of Africans had less access to a smaller percentage of South Africa's forests.<sup>37</sup> Whereas before, certain indigenous South African trees provided for African fires and kraals, newer exotic timbers, especially eucalyptus, proved more difficult to utilize through non-industrial techniques.<sup>38</sup>

Eucalypts also had a profound ecological effect on the land. By the early twentieth century eucalypts started to reproduce semi-spontaneously

32. Republic of South Africa Department of Forestry, *Investigation of the Forest and Timber Industry of South Africa: Report on South Africa's Timber Resources, 1960* (Pretoria, 1964), p. 7.

33. *Ibid.*, p. 27.

34. T. Fair and G. Maasdorp, "Swaziland", in Harm de Blij and Esmond Martin (eds), *African Perspectives: An Exchange of Essays on the Economic Geography of Nine African States* (London, 1981), pp. 115–135, 120.

35. See Nancy Jacobs, *Environment, Power, and Injustice: A South African History* (Cambridge, 2003); Timm Hoffman and Ally Ashwell, *Nature Divided: Land Degradation in South Africa* (Cape Town, 2001).

36. There is a vast literature on the commodification of the South African economy and society. See William Beinart and Saul Dubow (eds), *Segregation and Apartheid in Twentieth-Century South Africa* (London, 2003).

37. The numbers of displaced people remain unknown owing to a lack of research. See Jacob Tropp's pioneering study of the forced removal of around 1,900 people in Gqogqora in the Tsolo District in the Transkei during the late 1950s and early 1960s; Jacob Tropp, "Displaced People, Replaced Narratives: Forest Conflicts and Historical Perspectives in the Tsolo District", *Journal of Southern African Studies*, 29 (2003), pp. 207–233.

38. Tropp, *Natures of Colonial Change*, pp. 102–109.

around plantations.<sup>39</sup> Animals could not eat the tough, low nutrition leaves of the gum tree, which evolved these characteristics in the low-nutrient Australian environment. One settler near Johannesburg in the late nineteenth century noted that even the locusts would not eat eucalyptus leaves.<sup>40</sup> Foresters in the Cape tried to use eucalypts to create fire barriers around forest plantations because they “kill out all the grass completely”.<sup>41</sup> According to conservationist ideas, trees should encourage rain and promote the flow of streams. Instead, some noted that eucalypts promoted increased aridness of the landscape. One forestry expert on South Africa, T.R. Sim, noted:

Eucalypts [...] which are quite vigorous while young, dry out the soil, and suffer or die before maturity is reached. [...] Africa as a whole has shown a marked advance of desiccation during the past twenty years [...] the planting of Eucalyptus and Acacias, however useful in other respects, does nothing towards checking this drying out [...].<sup>42</sup>

A commentator on Basutoland lamented the “great mistake made hitherto in [...] the universal introduction of the eucalyptus, with its known tendency to desiccate – in a country already too dry – and to poison all other vegetable growth in its vicinity”.<sup>43</sup> Eucalyptus plantations were prone to new pests and diseases, such as the Australian snout beetle, which took root in South Africa and plagued plantations there in the 1930s–1950s.<sup>44</sup>

Twentieth-century criticisms of eucalyptus plantings in South Africa took two main forms: a nationalist critique and an environmentalist critique. Both positions could blend into one another. As ecologists discovered the uniqueness of the Cape and South African flora, nationalists began decrying the use of exotics such as the eucalyptus. Jan Smuts, the international statesman and Prime Minister, hated the planting of exotics such as eucalyptus and pines in the Western Cape because they destroyed the Cape’s unique flora.<sup>45</sup> White farmers also worried about the desiccating effects of eucalypts.

The South African government responded to constant criticisms of the trees from farmers and some foresters. In 1935, at the Empire Forestry Conference, criticisms of eucalypts became so strong that the Minister of Agriculture and Forestry appointed a committee to look into the

39. Joseph Davy, “Transvaal”, *South African Association for the Advancement of Science/Suid-Afrikaanse Tydskrif Vir Wetenskap* (Johannesburg, 1904), p. 275.

40. Maryna Fraser (ed.), *Johannesburg Pioneer Journals 1888–1909* (Cape Town, 1986), p. 80.

41. “Eucalyptus Screens as Fire Protection Belts”, *Indian Forester*, 31 (1905), p. 297.

42. Sim, *Tree Planting in Natal*, pp. 10–11.

43. R. Crawshay, “Basutoland and the Basuto”, *The Geographical Journal*, 21 (1903), pp. 645–655, 651.

44. See National Archives of South Africa Pretoria [hereafter, NASAP], CEN 151, E/5/3/10.

45. W.K. Hancock, *Smuts: The Fields of Force, 1919–1950* (Cambridge, 1968), p. 411.



Figure 2. Botanists and indigenous plant advocates have called for the removal of this old and famous grove of eucalypts at the Pietermaritzburg Botanic Gardens.  
*Photograph by the author.*

hydrological effects of eucalypts plantations.<sup>46</sup> The South African government opened research stations to test the effects of exotics on water supply. A movement against the tree gained steam in the 1950s–1970s.<sup>47</sup> By the 1950s and 1960s, foresters had quit planting eucalypts in Lesotho. Kirstenbosch Botanical Gardens began leading a national movement against exotics by eradicating eucalypts and other non-native species, starting in the 1960s.<sup>48</sup> Currently, the government of South Africa officially defines a number of species of eucalyptus as being invasive. Remaining stands of eucalypts are increasingly under threat from those who seek a more “native” South African ecology.

Yet even with this criticism and individual decisions not to plant eucalypts, the tree continued to grow in popularity because of an expanding export and domestic economy of pulpwood. By the 1980s, South Africa was

46. NASAP, FOR 336, A1054/7/18. See the final publication, Department of Agriculture and Forestry, *Forests in Relation to Climate, Water Conservation and Erosion* (Pretoria, 1935).

47. See, for example, the work of the forest researcher C.L. Wicht during the 1940s–1960s.

48. Sally Argent and Jeanette Loedolff, *Discovering Indigenous Forests at Kirstenbosch* (Cape Town, 1997), p. 8.

exporting 30 million rand of pulpwood per year.<sup>49</sup> This increased the size of ecological disturbances and provided a bridgehead for eucalypts to begin advancing slowly beyond the formal boundaries of plantations. The expansion of private plantations also had consequences for African labor – Africans were often put into single-sex housing and the labor force was distinctly gendered, with women often taking the more difficult and less lucrative jobs such as planting and weeding.<sup>50</sup> Yet with a scarcity of employment in South Africa, working in plantations and pulp mills provided the cash required for a capitalist economy.

The eucalyptus remains a controversial subject in present-day post-apartheid South Africa. Many see the trees as a legacy of European dominance, although some see eucalyptus plantations as a way to increase African employment and economic growth. There is an immense amount of research on eucalypts. South African scientists study the effects of eucalypts on local ecologies, hydrology, and on the lives of Africans who work on and live near plantations. Yet even with this present-day interest, a broader historical examination is required to understand South Africa's eucalypts today.

The present article has suggested that the introduction and effects of eucalypts in South Africa cannot be understood merely in economic terms; the widespread planting of eucalypts should also be understood as the legacy of a desire by European settlers to make a healthy, aesthetically pleasing, and self-sufficient African landscape. Rejections of eucalypts are often an inversion of the same colonial conservation ideology – instead of stressing a cosmopolitan, global ecology, many criticize the eucalyptus from a desire to restore the “natural” ecology to South Africa, a position that can be described as “ecological nationalism”. Jan Smuts, who politically differed from modern-day South African critics of eucalypts, would nonetheless have agreed that eucalypts do not belong in most of South Africa. Yet with the existence of powerful timber plantation and pulpwood businesses in South Africa and an economy with high unemployment requiring ever more jobs, it seems unlikely that ecological nationalists will succeed in removing eucalypts from South Africa any time soon.

#### INDIA 1850–1980

The history of eucalypts in colonial India is one of enthusiasm, failure, and then a steady decline of interest. Eucalypts flourished in India only after independence in 1947. The East India Company slowly gained more

49. Robert Rotberg, *Suffer the Future: Policy Choices in Southern Africa* (Cambridge, MA, 1980), p. 124.

50. Ricardo Carrere and Larry Lohmann, *Pulping the South: Industrial Tree Plantations and the World Paper Economy* (London, 1996), p. 145.

power and land in India during the eighteenth and early to mid nineteenth centuries. After the Indian Mutiny of 1857, Britain took over the formal rule of India in 1858. Many officials of the East India Company, and after 1858 the Government of India, hoped that species of eucalyptus could improve the health of Europeans while also providing useful timber required for fuel and the sleepers for railways. Many boosters of eucalypts enthusiastically offered studies showing the efficacy of the *E. globulus* in promoting health and curing diseases such as malaria, the “Sind sore”, and the “Delhi boil”.<sup>51</sup> Yet, more often than not, these cures worked less effectively than hoped.<sup>52</sup> The *E. globulus* and other eucalypts fell into this category: they smelled nice but could not ward off diseases.

At the same time that the ostensible medical benefits of eucalypts waned, state forestry flourished in the subcontinent. State forestry developed in British India out of a complex set of actors and forces. Many botanists, doctors, and missionaries throughout the tropical world, and especially in India, had witnessed the massive ecological destruction of forests in the early to mid nineteenth century, and they argued that deforestation led to decreased rainfall, increased erosion, and lowered water tables.<sup>53</sup> At the same time, capitalists in London financed a massive railway expansion in India during the 1850s and 1860s.<sup>54</sup> These booming railways needed large trees to create sleepers for the rail tracks. The East India Company and the Government of India also had larger strategic and military interests in protecting a large supply of timber for India’s large population and the navies and armies of the British Empire. It was out of this broad milieu that India-wide state forestry developed in the 1850s–1870s.

Foresters and botanists in India during the mid- to late nineteenth century imported and planted many different tree species from around the world. Some of the most hopeful candidates for plantations were Australian eucalypts, especially *E. globulus*. Out of all regions of India,

51. Edward Waring, *Pharmacopœia of India: Prepared Under the Authority of Her Majesty’s Secretary of State for India in Council* (London, 1868), p. 71. See also the discussion of Lord Kerr’s ideas by Surgeon-Major E. Morton in “Arboriculture in its Relation to Climate”, *Indian Forester*, 1 (1875), pp. 142–155.

52. See James Sykes Gamble, *A Manual of Indian Timbers: An Account of the Structure, Growth, Distribution, and Qualities of Indian Woods* (Calcutta, 1881), p. 189.

53. See Richard Grove, *Green Imperialism: Colonial Expansion, Tropical Island Edens and the Origins of Environmentalism, 1600–1860* (Cambridge, 1995), for colonial forestry before 1860, and Barton, *Empire Forestry and the Origins of Environmentalism* for 1855 to the present.

54. For an overview of the capitalist policies of the British in India see P.J. Cain and A.G. Hopkins, *British Imperialism 1688–2000* (London, 2001). State forestry, in many ways, arose as a reaction to gentleman capitalists. See Gregory Barton and Brett Bennett, “Environmental Conservation and Deforestation in India 1855–1947: A Reconsideration”, *Itinerario: International Journal on the History of European Expansion and Global Interaction*, 38 (2008), pp. 83–104, 83–89.

the Nilgiri Hills, a highlands region in Madras, proved to be the most efficacious site for the growth of *E. globulus*.<sup>55</sup> There, foresters created plantations of “Australian” trees of acacia and eucalyptus. Foresters grew these trees to provide fuel for an expanding European community in the hills. Between the 1860s and 1880s, state foresters planted around 1,000 acres of state eucalyptus plantations.<sup>56</sup>

Plantations were seen as a way of creating a wage-labor and land-revenue system for the indigenous people living in the Nilgiri Hills. Many of these plantations were often on or near “waste lands” claimed near *Badaga* villages in the eastern half of the Nilgiri Hills plateau.<sup>57</sup> In 1871 the *Badagas* had over 13,922 houses in the district.<sup>58</sup> British foresters blamed the *Badagas* for killing trees illegally for timber, and many revenue officials complained that *bhurty*, a form of shifting agriculture, impoverished the soil.<sup>59</sup> There were British foresters and revenue officials who justified *Badaga* practice by arguing that the *Badagas*’ shifting lifestyle was a result of low soil fertility and that it encouraged the clearing of swamps.<sup>60</sup> But in the end, anti-shifting cultivation policies won out. During the late nineteenth century Madras foresters and revenue officials sought to use revenue settlements and plantations to encourage the *Badagas* to become sedentary farmers and grazers.<sup>61</sup> The *Badagas* worked as laborers on plantations starting in the 1860s; sometimes they worked

55. Edward Balfour, *The Timber Trees, Timber and Fancy Woods, as also, The Forests of India and of Eastern and Southern Asia* (Madras, 1862), pp. 111, 179; Hugh Cleghorn, *Report upon the Forests of the Punjab and the Western Himalaya* (Roorkee, 1864) p. 125; W. Francis, *The Nilgiris* (Madras, 1908), pp. 201–221. For official discussions of eucalyptus plantings in Madras in the mid to late nineteenth century see *Report of the Conservator of Forests for the Official Year 1860–61* (Madras, 1861), p. 8; *Report of the Conservator of Forests for the Official Year 1862–63* (Madras, 1863), pp. 13, 25, 64–65; *Report of the Conservator of Forests for the Official Year 1865–66* (Madras, 1867), pp. 3, 7–8, 65–68; *Report of the Conservator of Forests for the Official Year 1868–69* (St George, 1870), p. 19; *Annual Administration Report of the Forest Department. Madras Presidency for the 12 Months Ending 30th June 1898* (Madras, 1899), p. 33.

56. W. Francis, *Madras District Gazetteers: The Nilgiris* (Madras, 1908), pp. 215–216. This figure does not include private plantations and plantings, which were also extensive.

57. *Annual Administration Report of the Forest Department 1898*, p. 33. Anthropologists tended to view the growth of eucalypts around the regions where hill tribes lived with approbation.

J. Shortt, “An Account of the Tribes on the Neilgherries”, *Transactions of the Ethnological Society of London*, 7 (1869), pp. 230–290, 234.

58. Francis, *Madras District Gazetteers: The Nilgiris*, p. 130.

59. Hugh Cleghorn, *The Forests and Gardens of South India* (London, 1861), p. 177; Madhav Gadgil and Ramachandra Guha, *This Fissured Land: An Ecological History of India* (Oxford, 1992), pp. 123–134.

60. Kativa Phillip, *Civilizing Natures: Race, Resources and Modernity in Colonial South India* (New Brunswick, NJ, 2003), pp. 95–96.

61. Deborah Sutton, *Other Landscapes: Colonialism and the Predicament of Authority in Nineteenth-Century South India* (Copenhagen, 2009), pp. 134–135.

without payment because *monigars*, villagers chosen by the British to collect revenue and to find labor, forced them to work without payment.<sup>62</sup>

With a third of the forests on the Nilgiri Hills reserved, an expanding plantation frontier, and new laws in 1863 that required all unclaimed lands to be auctioned, it became more difficult for the demographically expanding *Badagas* to acquire new lands.<sup>63</sup> The landscape of the Nilgiri Hills became a haven for plantations of coffee, tea, cinchona, and eucalyptus, while traditional *Badaga* lifestyles became more difficult to sustain. By the twentieth century, the *Badagas* integrated more effectively into settled, mixed agriculture than most hill tribes in India, although they were forced into this lifestyle by expanding plantations in the Nilgiri Hills. But they succeeded in spite of, not because of, eucalyptus plantations and other forest reserves. They lost many lands that they had formerly claimed and were hemmed in by plantations and state-forest reservations.

Even with the success in the Nilgiri Hills, many foresters complained about the failure of *E. globulus* and other species of eucalyptus in the Himalayas, the hotter climates of the plains of central and north-west India, and in humid Bengal. Active experiments continued throughout the late nineteenth and early twentieth centuries, and many smaller plantations grew throughout India. Except in the Nilgiri Hills, however, most eucalyptus species grew poorly and earned little profit. Even in the most successful areas of Madras, resistance to the eucalyptus arose: the Government of Madras, fearing the tendency of eucalypts to dry out the landscape, issued an order in 1881 stating that eucalypts should not be planted around water springs.<sup>64</sup> Foresters continued to plant eucalypts, but there were worries by British officials about the trees' ecological effects, their aesthetics, and the economic costs of plantations.<sup>65</sup>

The failure of eucalypts in most of India led foresters to research the successes and failures of the genus. One of the problems of early introductions was the failure to recognize the climatic zones in which eucalyptus species could grow. The Government of India forester, R.N. Parker, showed in 1925 that most of the eucalyptus species planted in India came from the cooler parts of Australia, not its tropical north.<sup>66</sup> He noted that the most successful plantings of eucalyptus were in the Nilgiri Hills and parts of South Africa – areas with cooler climates. Eucalyptus species that did grow in these areas failed to thrive; they did not naturally regenerate, remaining only along

62. *Ibid.*, pp. 94–96.

63. *Ibid.*, pp. 101–105.

64. Sutton, *Other Landscapes*, pp. 138–139.

65. Part of the criticism of eucalypts was that they “overgrew” in Ootacamund and dominated the landscape. See Edgar Thurston, *The Madras Presidency with Mysore, Coorg and the Associated States* (Cambridge, 1913), p. 266.

66. R.N. Parker, *Eucalyptus in the Plains of North West India* (Calcutta, 1925), pp. 4–5.



the roads or in the plantations where they were planted. Another of his studies on eucalypts in the Himalayas suggested that they would not naturally reproduce and thus could be maintained only through a costly program of continued replanting. Additionally, eucalypts grew well only in the Himalayas on prime agricultural land, little of which was available for plantations. Compared to South Africa, a country that had a more powerful white-settler population and a less populous and prosperous indigenous population, it remained financially and socially infeasible to make eucalypts a successful plantation tree in India. By the end of British rule, eucalypts had helped push certain hill tribes in the Nilgiri Hills off their original lands, although the effect of the genus elsewhere in India remained negligible.

The Indian Forest Service (IFS) continued to manage the state forests of India after the transfer of power in 1947. While the organizational structure of the IFS remained similar to its colonial form, the ethos of the department changed as the new Nehru government sought to industrialize rapidly through Five-Year Plans. The Second Five-Year Plan aimed to bring India into modernity by emphasizing technology to overcome underdevelopment. The National Forest Policy of 1952 strictly defined the protection of forests in terms of the state, not in terms of local communities.<sup>67</sup> As Madhav Gadgil and Ramachandra Guha have noted, this was a turning point in transforming the IFS into a service oriented towards industrial policies.<sup>68</sup>

Silvicultural experiments and enthusiasm for eucalypts in India increased from the 1950s to the 1970s.<sup>69</sup> Foresters sought to fix the “problem” of eucalypts: for a century foresters around the world had sought to plant eucalypts successful in tropical climates. In India, the most promising eucalyptus were the *E. hybrid*, or the Mysore gum, which could grow in subtropical and tropical climates, and the *E. tereticornis*. Plantations of eucalypts, especially *E. hybrid* and *E. tereticornis*, began to be planted more extensively in the 1950s and 1960s. Plantings expanded almost threefold. In Uttar Pradesh there were 31,000 hectares of eucalyptus in 1962, and 82,000 hectares in 1969.<sup>70</sup>

In the Western Ghats, foresters destroyed less economically important rainforests in 1975 and replaced them with eucalypts, many of which died in the high rainfall areas.<sup>71</sup> These failed forests were largely abandoned. Most of the remaining eucalypts (around one-third to one-half of the

67. As cited in Gadgil and Guha, *This Fissured Land*, p. 194.

68. *Ibid.*, pp. 183–189.

69. The most prominent work published by the FAO in the 1950s was André Métro, *Eucalypts for Planting* (Rome, 1955). Australians also played a prominent role in increasing yields of eucalyptus in India. See Doughty, *The Eucalyptus*, pp. 163, 133.

70. *Ibid.*, p. 134.

71. Madhav Gadgil and Ramachandra Guha, *Ecology and Equity: The Use and Abuse of Nature in Contemporary India* (London, 1995), pp. 50–51.

species of trees in forests) created new forests with invading trees that are not of the same diverse types as existing forests.<sup>72</sup> Problems quickly arose with the trees that did succeed in India, as eucalypts colonized farms surrounding plantations, dominated the canopy, and deprived crops of sunlight. The best success rates for the Mysore gums were only 36 per cent of expected yield.<sup>73</sup> Instead of helping to produce cash for farmers, afforesting the landscape, and advancing India's economy, eucalypts proved to be far less successful than hoped.

By the 1980s, the Indian government began promoting a policy of massive afforestation because of the continuing loss of forest cover. Indian foresters also developed strategies of social forestry that encouraged participation in forest management by local communities. Foresters encouraged villagers to plant eucalyptus trees as a fast-growing tree that could be sold for cash and used for firewood. Oftentimes, foresters gave seedlings of eucalypts for free, as in Karnataka in the 1980s.<sup>74</sup> Plantations and small plantings of eucalyptus flourished in the 1980s. Over half a million hectares of man-made eucalyptus plantations stretched across India at the beginning of the decade.

The expansion of eucalyptus plantations and small plantings created a highly politicized debate among scientists, politicians, and activists about the benefits and detriments of eucalypts.<sup>75</sup> The "Great Eucalyptus Debate", as it became known, exposed the ecological and social problems caused and exacerbated by eucalyptus planting. Critics argued that eucalypts destroyed local biodiversity, used more water than other crops, crowded out crops that could be consumed locally, and lowered soil fertility. At the social and economic level, eucalypts took longer to grow than traditional agricultural crops, created higher rural unemployment, promoted absentee landlordism, and raised the price of grains.<sup>76</sup> The planting of eucalypts promoted divergent economic and social patterns: the already wealthy farmers gained from planting eucalypts, but the poor,

72. S.J. George, B. Kumar, and G.R. Rajiv, "Nature of Secondary Succession in the Abandoned Eucalyptus Plantations of Neyyar (Kerala) in Peninsular India", *Journal of Tropical Forest Science*, 5 (1993), pp. 372–386, 377.

73. Doughty, *The Eucalyptus*, p. 134.

74. Vandana Shiva, J. Bandyopadhyay, and N.D. Jayal, "Afforestation in India: Problems and Strategies", *Ambio*, 14 (1985), pp. 329–333, 331.

75. In the 1980s, the *Economic and Political Weekly* hosted a number of articles debating the pros and cons of eucalyptus planting. For a sampling of these rich and spirited debates see Mahasveta Devi, "Eucalyptus: Why?", 18 (6 August 1983), pp. 1379–1381; V.J. Patel, "Rational Approach Towards Fuelwood Crisis in Rural India", 20 (10 August 1985), pp. 1366–1368; J. Bandyopadhyay and Vandana Shiva, "Eucalyptus in Rainfed Farm Forestry: Prescription for Desertification", 20 (5 October 1985), pp. 1687–1688; D.M. Chandrashekhar, B.V. Krishna Murti, and S.R. Ramaswamy, "Social Forestry in Karnataka: An Impact Analysis", 22 (13 June 1987), pp. 935–941; and Shyam Sunder and S. Parameswarappa, "Social Forestry and Eucalyptus", 24 (7 January 1989), pp. 51–52.

76. For example, see the works of Jayanta Bandyopadhyay.

subsistence farmers and laborers did not benefit. These criticisms and protests gained national and international attention through media and academic networks.<sup>77</sup> Protests against eucalypts in Thailand and elsewhere in Asia in the late 1980s and early 1990s drew on the rhetoric the scientific and media networks created and used during the Great Eucalyptus Debate.

Today, eucalypts form part of the ecological and economic mosaic of India. Despite popular criticism, scientists, the state, and businesses continue to plant eucalypts. The criticisms raised by environmental activists in the 1980s continue to be heard. The demographic, cultural, and economic realities of modern India portend a continuity of policies. With an expanding urban Indian population demanding higher living standards, it seems unlikely that eucalyptus plantings will decline in the immediate future.

#### THAILAND 1900–2000

Eucalypts exist today in Thailand because of continued attempts by state foresters, government officials, and private industry to grow them in community forestry programs and as plantations for export earnings. Eucalypts are not a result of Thailand's "colonial" forestry relationship with Britain a century ago, except insofar as eucalypt plantings are a legacy of the entrenched central power given to Bangkok and the Royal Forest Department (RFD) during that period. Thailand's state forestry program started in the late nineteenth century when the Bangkok monarchy and the Ministry of the Interior created the RFD in 1896 to appease British business and Foreign Office officials, stop excessive deforestation in northern Siam, and, more importantly, gain control of the lucrative teak trade dominated by the Chiang Mai chiefs who paid vassalage to Bangkok.<sup>78</sup> Thai forestry laws drew on British Indian and European models that gave the state immense power in the creation and management of state forest reserves.

The French planted the first known eucalyptus trees in Bangkok in 1905.<sup>79</sup> Yet those trees made no noticeable ecological or economic impact for the entire first half of the twentieth century. Teak dominated the

77. See Ramachandra Guha, "Chipko: Social History of an 'Environmental' Movement", in *idem*, *The Unquiet Woods: Ecological Change and Peasant Resistance in the Himalaya* (Oxford, 1989), pp. 152–184.

78. See Gregory Barton and Brett M. Bennett, "Forestry as Foreign Policy: Anglo-Siamese Relations and the Origins of Britain's Informal Empire in the Teak Forests of Northern Siam, 1883–1925", *Itinerario: International Journal on the History of European Expansion and Global Interaction*, 34 (2010), pp. 65–86. See also Peter Vandergeest and Nancy Peluso, "Empires of Forestry: Professional Forestry and State Power in Southeast Asia, Part 1", *Environment and History*, 12 (2006), pp. 31–64.

79. Doughty, *The Eucalyptus*, p. 190.

forestry economy of Thailand throughout the first three quarters of the twentieth century.<sup>80</sup> Attempts to encourage eucalypts in the early and mid-part of the century failed. Sukhum Thirawat, the forest conservator for the central region of Thailand, noted, “to tropical foresters Eucalyptus is something of an enigma; a genus so versatile and yet despite considerable attempts at introductions over long years, not one species can be cited as a success anywhere”.<sup>81</sup> More than any person, Thirawat helped to introduce eucalypts into Thailand. He experimented with the different types of eucalypts that could be planted in Thailand, presenting some of his results at the Second World Eucalyptus Conference in 1956 in Rome. From his experiments in Thailand he concluded that the *E. camaldulensis* grew best throughout Thailand. Other experiments with international agencies during the 1960s–1980s encouraged foresters throughout Thailand to continue testing and planting fast-growing eucalypts. Still, teak remained the dominant focus of planting and extraction until the 1980s.

Changes in the political economy of Thailand in the 1950s–1970s ushered in a new phase in Thai forestry that emphasized the nationalization of forest leases, increasing timber yields, and expanding the size of state-forest reserves. Starting in the early 1950s, the Thai government began nationalizing many of its forest leases, effectively taking them back from European, especially British, corporations. Government forestry policies did not stop deforestation, which continued at about 10 per cent per year in the late 1970s.<sup>82</sup> Deforestation increased in Thailand from the 1960s onwards, especially in the densely populated north-eastern part of Thailand, where rural landlessness, expanding population, shifting cultivation, and illegal logging – often allowed secretly by corrupt government officials – chipped away at the remaining forests. With help from the FAO and foreign donors, the RFD and the Thai government tried to persuade shifting cultivators and other villagers in the north and north-east to participate in *taungya*, a program “to reforest areas of the forest estate which have been degraded by over-exploitation or shifting cultivation”.<sup>83</sup> These programs provided a model for community eucalyptus plantations in the 1980s.

In the 1980s foresters and government officials began promoting more widely the planting of the fast-growing *E. camaldulensis* in the *taungya* programmes. These trees grew in three to five years, could be turned into

80. See James Ingram, *Economic Change in Thailand* (Stanford, CA, 1971).

81. Sukhum Thirawat, *The Eucalypts for Tropical Climates: Based on Experiences Gained from the FAO Eucalyptus Study Tour in Australia 1952* (Bangkok, 1952), p. 1.

82. Sathit Wacharakitti, Pairote Pinyosorasak, and Prasong Sanguantham, *Report on Forest Inventory of the Pilot Project Area for Development of Reforestation, Northeast Thailand* (Bangkok, 1980), p. 12.

83. *Forestry for Local Community Development*, FAO Paper No. 7 (Rome, 1978), pp. 85–86.

pulpwood for export to Taiwan and Japan, and supported the green rhetoric of the state.<sup>84</sup> In 1985 the government, under General Prem Tinsulanonda, implemented a partial logging ban to protect 15 per cent of the forests for parks and natural preserves. The government also wanted to use 25 per cent of the remaining forests for commercial forestry, including eucalyptus plantations. With the support of the FAO, the Thai government promoted a program of “community forestry” in 1985 that used private and local capital investment to create plantations of trees on “marginal” agricultural lands, for local subsistence, and also for export. On the face of it, this policy sought to increase local timber production while protecting the forests. Yet deforestation continued. In 1989 the RFD announced a logging ban on the forests of Thailand. Thailand would grow the trees they needed for export and domestic consumption.

Yet there were problems with the eucalyptus planting programs of the late 1980s and 1990s. Thai foresters analyzing the planting of eucalypts in north-eastern Thailand during the late 1980s found that rural Thais lacked information about the planting, care, and uses of *E. camaldulensis*, even though it remained by far the most popularly planted tree.<sup>85</sup> Instead of seeing this as a failure, foresters advocated extensive education programs that would then allow the private sector to take over the role of afforestation, leaving the RFD to “concentrate its direct efforts in reforestation in certain erosion sensitive areas, and make it easier for others to contribute to tree growing in other areas (within and outside reserved forests) for cash”.<sup>86</sup>

The planting of eucalyptus caused friction among the rural peoples who were supposed to benefit most from them.<sup>87</sup> Tinsulanonda’s community forestry policies implemented in 1985 were widely unpopular among rural Thais in the north-east, and protests against the laws broke out because the government forced farmers who had no title off lands that had been claimed for replanting. Forced government removals and protests culminated in the Kho Jo Ko resettlement plan in 1992 when the Thai military forcibly removed villagers out of forests, cut the forests down, and then replanted them with eucalyptus. After the 1991–1992 military junta had been overthrown, villagers and farmers in the north-east protested

84. For a discussion of “green capitalism” see Raymond Bryant and Sinéad Bailey, *Third World Political Ecology* (London, 1997), pp. 61–62.

85. See the report by Narinchai Patanapongsa, *Resources and Constraints of Forestry in Thailand: Guidelines for the Establishment of Forestry Extension in the Royal Forest Department, Thailand* (Bangkok, 1987).

86. *Ibid.*, p. 122.

87. Buddhists often spearheaded movements. See Kamala Tiyavanich, *Forest Recollections: Wandering Monks in Twentieth-Century Thailand* (Honolulu, HI, 1997), pp. 245–247; Amare Tegbaru, “Local Environmentalism in Northeast Thailand”, in Arne Kalland and Gerard Persoon (eds), *Environmental Movements in Asia* (Padstow, 1998), pp. 151–178. See also Carrere and Lohmann, *Pulping the South*, pp. 235–238.

this program vigorously, eventually winning concessions from the government that included the stopping of forced removals and the imposition of limits on the size of eucalyptus plantations.<sup>88</sup>

Rural landlessness was (and remains) a serious issue in Thailand, as millions of people who have no land titles live in the northern and north-eastern provinces of the country.<sup>89</sup> While foresters complained about how “landless farmers have converged on the area [north-eastern Thailand] from many parts of the Kingdom”, these farmers worried about making enough money and growing enough food to survive.<sup>90</sup> Rural people also complained that well-connected Thai elites and corporations illegally cut down forests that should have been protected under the Reserved Forests Acts and then replanted these areas cut down with fast-growing eucalypts for export.<sup>91</sup> Like in India during the 1980s, those who had the most power and wealth benefited from eucalyptus plantings, while their planting was not as helpful for the economic development of more marginal peoples.

Extension programs did work in expanding medium-size plantations of eucalyptus in the 1990s.<sup>92</sup> Much of the expansion occurred between 1994 and 1997 when the RFD gave out seeds freely. Large pulp exporters also had a hard time growing a sufficient amount of eucalypts because the Reserved Forest Act limited the size of plantations and companies were forced to contract out to private holders. This led to expanding rates of smallholder planting, which caused a glut of supply after the Asian currency crisis of 1997 led to a collapse in the south-east Asian economy. After the crash, private corporations pursued expansive land purchases from farmers who had borrowed money during the boom to grow plantations outside forest reserve areas. One scholar working in Thailand remarked that, “Displacement [...] resembles an ongoing process of poorly regulated land purchases by an industry, facilitated through smallholder debt and the economic imbalances of Thailand’s rural sector during the boom.”<sup>93</sup> This is an ongoing process.

Unlike in India or South Africa, in Thailand the eucalyptus is not of colonial origin. Thai foresters and elites became interested in the fast-growing tree in the 1950s–1980s. The late 1980s and early 1990s witnessed the peak of

88. Carrere and Lohmann, *Pulping the South*, p. 237.

89. M. Patricia Marchak, *Logging the Globe* (Quebec City, 1995), pp. 223–225. See also Andrew Walker’s discussion of the relationship between forestry tenure and agricultural tenure in “Seeing Farmers for the Trees: Community Forestry and the Arborealisation of Agriculture in Northern Thailand”, *Asia Pacific Viewpoint*, 45 (2004), pp. 311–324.

90. Wacharakitti *et al.*, *Report on Forest Inventory*, p. 12.

91. This criticism is documented by Carrere and Lohmann, *Pulping the South*, pp. 231–235.

92. Keith Barney, “Re-encountering Resistance: Plantation Activism and Smallholder Production in Thailand and Sarawak, Malaysia”, *Asia Pacific Viewpoint*, 45 (2004), pp. 325–339, 328–331.

93. *Ibid.*, p. 330.

plans for plantations, while criticism of eucalypt plantings remains popular among rural NGOs and academics. With strong financial incentives for the Thai elite, medium-size farmers and foreign corporations to encourage eucalyptus for export and domestic consumption, and an international network of scientists and activists arguing against the planting of exotic species of trees, eucalypts will likely remain a controversial, though widely grown, tree for the next decade or more.

### CONCLUSION

As this article has shown, the creation of eucalyptus plantations in South Africa, India, and Thailand caused socio-economic and ecological change that affected marginal groups who worked as part of plantation schemes or lived on or near plantations. Yet the genus remained popular, despite over 100 years of criticism and the continued failure of tropical eucalypts until the 1960s.

The success of the tree depended upon a number of changing economic, social, and cultural assumptions. Boosters of eucalypts came in many forms: those who believed that the tree could stop malaria, those who saw it as a wonder-wood that would grow quickly and easily in any climate, and those who thought that it might provide villagers with a cash crop. A common institutional framework supported eucalyptus plantings. Eucalyptus species thrived in a scientific framework based on a hybrid of European and imperial forestry models that promoted the creation of single-species forest plantations. Yet the decision by states and businesses to create plantations also resulted in increasing population growth and a culture of consumption, not merely as an imposition of European scientific imperialism.

However similar in its spread, the effects of eucalyptus plantings in specific countries and regions had different trajectories that depended on local social and ecological factors. In Southern Africa, European settlers used eucalypts to build up a self-sustainable nation in Africa. Eucalyptus plantations emphasized and, through the appropriation and demarcation of lands, encouraged ecological and social changes to the land and peoples of Southern Africa. Critics in South Africa today dislike the tree because of its hydrological effects on arid environments and its destruction of local species of flora and fauna. In India, initial attempts to plant eucalypts failed, except in the Nilgiri Hills, where plantations helped to justify the appropriation of lands from local tribes. After independence and continued research into the genus, IFS officials found a variety of eucalyptus species that they believed would grow quickly and provide an excellent cash crop for people living near forests. The same dream of finding a cash crop for rural peoples while reforesting a denuded landscape spurred the imagination of RFD foresters and government officials in Thailand.

Yet the realities of this vision never lived up to the initial desires either in India or Thailand: the perceived and real social and ecological problems caused by social forestry schemes and state afforestation programs have energized international non-governmental organizations into active opposition against the planting of eucalypts. While some small and medium-size farmers have gained, the expansion of plantations has led to continued displacement of farmers and people without land claims.

What can we learn about globalization and the modern world from the history of the eucalyptus? During past centuries humans – in democracies, empires, and dictatorships – sought to create a modern ecological world that reordered nature to fit larger economic and social visions of modernity. These visions of modernity emphasized only certain traits and attributes of plants and animals. Eucalypts are consistent with these visions, although the realities of their diffusion and growth rarely lived up to the initial hopes of their champions. In the desire to create the modern globalized world, humans attempted, often successfully, to create increasingly homogenous ecologies and economies. By the 1960s and 1970s, foresters found ways of manipulating eucalypts to gain higher yields, and industrialists found new processes to utilize the hard woods. The growth of the global economy provided large markets for pulpwood and other wood products.

Yet this reordering came at a socio-ecological cost, especially for groups – such as shifting cultivators and pre-capitalistic societies – who did not fit neatly into the conception of capitalist modernity. Most obviously, this global reordering failed to create a more egalitarian society for all, and instead reinforced divergent developmental trajectories. If they indicate the future, the social and ecological problems that arose when establishing an environment and economy created for global industry should give us pause for thought. The history of eucalypts, like many environmental histories of the modern world, reveals not the complete failure of modernization, but rather that the attempt to create a homogenous ecology and economy has failed to deliver egalitarian economic growth at the same time that the resulting environmental change destroyed much of the ecological and social uniqueness of the world.