

## **COLONIALISM AND GREEN SCIENCE: HISTORY OF COLONIAL SCIENTIFIC FORESTRY IN SOUTH INDIA, 1820-1920**

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Major focus has been devoted in the last three decades to administrative and economic aspects of colonial forest policies in south India, but scientific aspects received little attention. Consequently scientific dynamics of British forestry remained a less focused domain in the literature on colonial forest history. By examining the history of forest policies in south India this paper proposes that scientific forestry was even though aimed at harnessing resources for economic exploitation, due attention was paid for the requirements and demands of forest dependent communities. It was this process that facilitated colonial state to perpetuate resource exploitation without serious confrontation with forest dependent communities. This paper suggests that colonial science adopted a pragmatic approach by systematically incorporating the demands of forest dependent communities into policy process.

**Key words:** Colonialism, Conservation, Forestry, Plantations, Science, Sylviculture, Tribes

### **INTRODUCTION**

Environmental history writings attempted to address impact of colonial modernity in the spheres of political, social, economic and cultural fields. The efforts have been made to understand administrative and economic aspects of colonial forest policies, but scientific aspects received little attention. Consequently scientific dynamics of British forestry remained a less focused domain in the literature on colonial forest history. By examining the history of forest policies in South India, this paper proposes that scientific

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forestry was even though aimed at harnessing resources for economic exploitation, due attention was paid for the requirements and demands of forest dependent communities. It was this process that facilitated colonial state to perpetuate resource exploitation without a serious confrontation with forest dependent communities. This paper suggests that colonial science adopted a pragmatic approach by systematically incorporating the demands of forest dependent communities into policy process.

This paper has been organized into three sections: first section propose methodology of study and a brief review of literature; second section documents the operational process of colonial scientific forestry in south India and final section shows the limitations of scientific forestry and its implications in south India.

The concept of colonial scientific forestry denotes the process of application of scientific forestry practices by colonial state in order to enhance the productivity and regeneration of forests potential. This process is perceived by the existing literature as either exploitative or conservative oriented. The paper suggests that scientific forestry is used not for exclusive purpose of exploitation and conservation rather adopted a pragmatic approach of exploitation of forest resources with minimum confrontation with forest dependent communities. It also proposes that colonial forestry operated not only in dense and hill forests but also in management of wastelands and village common lands. Hence, the implication of scientific forestry is much more complicated than the existing studies suggest. In order to document this process, sources such as Board of Revenue proceedings, annual administrative reports and working plans of forest department, reports of various committees and books by colonial foresters are used. This article documents the history of scientific forestry during the period of 1800-1920. The importance of this period is that scientific forestry took birth, expanded and consolidated. The evolutionary trajectory of colonial forestry shows the changing nature of colonial rule and its adaptability in Indian conditions.

#### **REVIEW OF LITERATURE**

In the last three decades, historical writings on colonial forest policies proliferated phenomenally in India. Three broad historical approaches exist to study scientific forestry. The first is generally referred to as nationalist

Marxist approach to study modern Indian history. According to this approach scientific forestry is an exploitative instrument devised and executed by colonial state to exploit the forests of India. It is argued, scientific forestry not only exploited forests but also unleashed the process of alienation of forest dependent communities from nature. And it is this process that is perceived as reason for depletion of forests and poverty among forest dependent communities in India (Guha, 1985; Gadgil, 1992).

The second is an antithesis to the aforementioned approach spearheaded by the historians who subscribe to neocolonialist approach to Indian history. Scientific forestry, according to this approach was introduced in India for the following reasons: moral conviction of colonial scientific community to save fragile eco-systems of colonies on which the existence of the Empire was depended upon, colonial notion of progress of humanity to be brought with scientific forestry and finally scientific forestry in India constitutes an essence of origin of modern environmentalism (Dryton, 2005; Grove, 1995; Barton, 2002). According to this approach, scientific forestry is an intervention by colonial rule to enhance the regeneration potential of ecological systems in India and economic exploitation of forests was secondary.

The third category is that of post-structuralist approach to study colonial forestry. Influenced by Foucault notion of knowledge and power, this approach perceives scientific forestry as codified and hegemonic knowledge practice evolved by colonial state for various purposes. In case of Bengal, it is argued that discourse on scientific forestry enabled the colonial state to execute its objectives of control over forest resources (Sivaramkrishnan, 1999). Studies focusing on history of pastoralist communities in the Himalayan region suggests that desiccationist discourse was invoked by colonial bureaucracy to control the grazers in reserved forests (Aleam, 2008). Some studies propose that imposition of hegemonic control of colonial over forests and forest people was facilitated by discourse on scientific forestry (Guha, Sumit, 1999). By examining the policy and practice of colonial forest policies in Canara district of the Madras Presidency, it was proposed that scientific forestry was ill equipped to bring about environmental conservation (Buchy, 1998). It was proposed that scientific forestry is also used to not only to control forests but also to control the forested tribes in order to make them useful labour pool required for operation of scientific forestry (Philip, 2003).

In spite of aforementioned rich literature, following gaps that exist on colonial scientific forestry, operational process of scientific forestry and dynamics which shaped its nature remained as a less focused domain; everyday forms of scientific forestry were not being adequately explored; interaction of scientific forestry with forest dependent communities has not been brought out and finally south India wherein origins of scientific forestry fashioned initially, received an inadequate attention in the existing literature. This paper attempts to address these gaps by focusing history of scientific forestry in south India.

#### **BEGINNINGS OF SCIENTIFIC FORESTRY**

It is being generally viewed that forests of India contributed immensely for maintenance of the British Empire. It was in two ways: Indian wood was used in building ships which were used in conquering rival European powers and expansion of the empire in India (Rangarajan, 1996) and secondly the railways which have used enormous quantum of forest resource were used in transport of resources essential for functioning of colonial rule (Ravi Kumar, 2010). Such important resources naturally received the serious attention of the British. In the beginning, the nineteenth century, the perception of Western European countries in general and the British in particular on forestry was that application of scientific methods perceived as essential for high and speedy regeneration of forest resources (Rajan, 1998). This as backdrop, scientific forestry practices were imported and executed in India. It was expected to perform two functions: to ensure the supplies of forest resources to infrastructure projects and bringing forest landscape under techno-bureaucratic management regimes to assert symbolic power of colonial state over subjects.

History of scientific forestry can be divided into three stages in south India: in the first stage focus was devoted to plantations of valuable timber trees from 1800-1870; in the second stage, scientific forestry mostly focused on natural conservation of fuel wood plantations for the requirements of the railways from 1870-1890 and in the final stage the attention of scientific forestry was devoted to conservation of grazing grounds during the period 1890-1920.

#### **BEGINNINGS OF NATURAL AND ARTIFICIAL CONSERVATION**

Colonial science evolved and institutionalized to cater to the needs of the British Empire. Objective science was perceived as a potential agency

to ensure the resource requirement of colonial system. During the period of 1800-1870, scientific forestry focused on three simultaneous processes: evolving institutional establishment for governance of forests; exploration of teak and other valuable timber trees and application of scientific methods in silviculture plantations to ensure the timber supplies to infrastructural requirements of colonial state. In the initial stage, forest conservation measures were undertaken in the form of imposing restrictions on the access of the natives to certain timber trees. Having exhausted oak forests in their own country (Marsh, 1884) and losing supplies from American colonies (James, 2007) the British were compelled to depend upon wood supplies from India. By way of pursuing this policy, early exploitative and conservation measures were initiated in the West Coast. The notion of clamping restrictions on customary users emanated from three traditions: the British traditions of assertion of royal rights over forests (Thompson, 1977); secondly scientific forestry in Western European countries perceived restrictions as necessary means to achieve maximum productivity of forest resources and finally colonial state followed the foot steps of native rulers who declared timber trees as royal trees (Rebbentrop, 1986).

Systematic intervention of colonial state in forest management took place in 1800 with the declaration of 'royal rights' over teak and sandal wood trees. This measure was consolidated by appointing a conservator of forests in 1807. The demand for teak wood from the Bombay Dockyard was so pressing that the Company government was compelled to formulate certain regulations for management of forests in 1815. Accordingly restrictions were tightened on public access to forests. But due to opposition from revenue department and the native society this establishment was abolished in 1823.<sup>1</sup> However, attempts were made to regulate the public use of forests by local officials. The demands of the Bombay Dockyard for teak wood was so pressing that the East India company establishment compelled to look for various options to secure teak wood. Accordingly attempts were made to procure teak from different sources.

#### **EXPLORATION OF TIMBER TREES**

Soon after the East India Company acquired political control over south India by the end of the eighteenth century, attempts were initiated to

explore forests and timber trees. This process was driven by timber requirements for shipbuilding. It was district collectors who actively took up this task. From 1830s regular reference on timber trees was reported to the government. The district collector of Malabar and Godavary reported upon the conditions of teak forests in 1938 (Stebbing, 1922). Besides this, some military officers were specially deployed to undertake this task. Major Cotton, a civil engineer of Coimbatore district was entrusted with the task of exploring teak trees in the Anamalai region of the West Coast. In 1848, Captain J. Michel of the Madras Native Infantry was deputed for eight months to investigate the condition of the teak forests.<sup>2</sup> In 1852, Captain Rundal extensively toured in the Nallamalai forests of the Eastern Ghats and reported upon the indiscriminate exploitation of forests by fuel wood contactors.<sup>3</sup> Subsequently, Dr. Cleghorn, first conservator of forests in south India toured in some locations of the Eastern Ghats.<sup>4</sup> These explorative expeditions provided a pool of knowledge on timber trees and forests. By 1850, most of the forests and timber trees were explored. The need of forest resources was further augmented on account of introduction of railways in 1854 and its massive timber requirements.

Colonial rule in India mainly focused on sustainable flow of resources to colonial economic process. Certain institutional systems were devised to ensure this process. This was coupled with the popularity of objective science which was perceived as main engine to propel human progress. Colonial bureaucracy perceived the forests in the tropics as capable of yielding good resources with the application of scientific forestry. The outcome of this process was the introduction of scientific forestry in the form of silviculture plantations in different parts of south India. The confidence of colonial state in manipulating nature could be seen in this measure. These plantations include teak, sandal wood, red sanders and Australian trees. It was these plantations that have witnessed the experimental based scientific forestry in India. Table 1 shows some of the important plantations in south India.

Silviculture plantations in different parts of south India became spaces for execution of scientific forestry practices. Experimental methods of scientific forestry in tropics were new experiences to European foresters. South India provided an opportunity for them to test the viability of scientific forestry. The main objective of silviculture plantations was to test the ability

**Table 1. Important plantations under supervision of Forest department in Madras Presidency**

S. No.	Name and place of the plantation	Nature of trees
1.	Nellumbore plantations, 1840	Teak trees
2.	Eucalyptus plantations, 1843	Eucalyptus
3.	Wynaad plantation, 1860	Teak
4.	Vyloor plantations, 1866	Sandal wood
5.	Beni plantations, 1871	Teak
6.	Bylur plantations, 1876	Sandal wood
7.	Coondoor plantations, 1876	Sandal wood
8.	Seegur plantations, 1877	Sandal wood

Source: Proceedings of Board of Revenue, 15<sup>th</sup> August, 1876, no. 2074, p. 7044.

of scientific forestry as resource generating mechanism. The Table 2 lists the conservation practices that were executed in silviculture plantations.

**Table 2. Conservation in practice**

S. No.	Name of the activity	Importance
1.	Seed technology	Two broad methods were used; Dr. Cleghorn preferred mild boiling of seeds for disinfestation. H. Morgan proposed a model of a mixture of lime, salt, and powdered tobacco for effective preservation of seeds and young plants. These two methods were used in plantations and expansion of forests.
2.	Seed budding	To nurture young trees, seed-bed of six inches were prepared and covered with grass for protection from danger.
3.	Pest control	Chemical process, using poisonous dust from motors were used for pest control.
4.	Fire protection	Two techniques were adopted: outer fire line around boundary of plantation, international fire lines dividing forests into blocks were prepared. Periodical cleaning of grass was adopted.
5.	Rearing trees	Nurturing tree was important aspect of silviculture system. Activities such as pruning, thinning, tracing, budding, watering, removal of weeds etc. were initiated for faster growth of trees.

Source: G. Cleghorn, *Forest and Gardens of South India*, H. Allan, London, 1861 and H. Morgan, *Forestry in South India*, Higginbotham, Madras, 1884.

Various methods of scientific forestry were pressed into action to enhance the productivity. In fact, it was imperative on the part of forest department to show financial viability of scientific forestry. The fact is that science projects in India were rigidly connected with two processes: safeguarding the material interests of the empire and revenue surplus. Thus, harvesting and preservation of timber also constituted an important part of scientific forestry. Table 3 provides the process of harvesting and preservation of timber.

**Table 3. Scientific Forestry and Timber Harvesting**

S. No.	Name of the activity	Execution process
1.	Rotation of tree removal	A system of 30 years for rotation was followed. Plantation is divided into blocks and a cycle of tree cutting was devised to ensure sustainable supplies of timber
2.	Introduction of saw machinery	Instead of axe cutting followed in India, different kinds of saws for cutting trees was introduced. It expected to save the time and reduce the damage to timber. Particularly circular saw was found to be useful for effective cutting of trees.
3.	Establishment of wood depots	For storage purpose several wood depots were created for proper storage of valuable timber in the West Coast.
4.	Transport of timber	Two methods were used: elephant dragging, and floating timber through downstream of river.
5.	Preservation of timber	Chemical process was used to preserve timber for long period.

Source: G. Cleghorn, *Forest and Gardens of South India*, H. Allan, London, 1861 and H. Morgan, *Forestry in South India*, Higginbotham, Madras, 1884

Before the intervention of colonial state in management of timber forests, attempts were made by native rulers to manage timber trees. However, scientific forestry marked a significant departure from such tradition by way of application of scientific methods to enhance the productivity of forests. Sylviculture plantations became laboratories of experiments of scientific forestry to test the ability of objective science in manipulating the nature. The execution process of scientific forestry in south India also questions

certain prevailed notions on this subject. Generally three board arguments exists on the nature of scientific forestry: firstly it is assumed that scientific forestry was an agency to exploit forests by alienation of forest dependent communities, (Saravanan, 1998) secondly, scientific forestry was a part of expansion of continental forestry traditions to colonies (Rajan, 2006) and finally scientific forestry is a form of governance with which the British attempted to manage its subjects (Beinart & Hughes, 2009). However, these studies are basically narrated from the macro level prescriptive and micro level studies which testify the everyday interaction of colonial polices have not adequately been brought out. This paper suggests that the British has adopted a pragmatic approach in forest policy. Though the basic objective of scientific forestry was to enhance the productive capacity of forests to yield more resources and revenue, it was not done by massive displacement of forest dependent communities. In fact, tribes were employed in various conservation operations.

Colonial scientific project was executed with the help of natives in India. In case of scientific forestry, tribes in different parts of south India were employed in scientific forestry. They were employed in various aspects of silviculture plantation. Cleghorn, described the importance of tribes to forest department in the following reflection: ‘This tribe (the Malsar) has been very useful last seasons, as I could not otherwise have procured axe men for this work’<sup>5</sup> The Table 4 shows the employment of tribes in forest conservation operations.

**Table 4. Colonial Policy towards Tribes**

<b>Chronology of policy</b>	<b>Nature of policy</b>	<b>Implementation process</b>
Malabar teak plantations of 1842.	Over hundred acres leased by government and teak saplings were planted by employing local tribes.	Local tribesmen ( <i>khader</i> ) were employed in conservation operations as wage labour.
Sylvicultural plantations in Annamalai, Nelgiris, Wellington (1850-70)	Plantation of teak, eucalyptus were initiated with the objective of supplying wood to railways and Nelgiris Barracks.	Local tribes mainly of the <i>Toḍās</i> were employed in of Tribes were employed in conservation of plantations as wage labour.

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Chronology of policy	Nature of policy	Implementation process
Fire wood plantations 1865-75	Responsibility of supplying firewood to government establishments was assigned to forest department.	Tribes in the settled agriculture region of Andhra region the Yanadis and the Koyas were employed in procuring firewood for forest department.
Reservation after passing the Madras Forest Act of 1882	Employed as helpers in creation of reserved forests.	Employed as guides, watchers, manual works for conservation of trees etc.
Forest protection works, after 1890	Employed in plantations works and natural conservation works.	Fire-patrolling, helping forest staff in conservation operations.
Collection of minor forest products after 1900	Concessions were granted to tribes in several parts of south India for collection of minor forest products in reserved forests.	It was done to gain their confidence as their labour was required in conservation operations.
Forest reservation policy in tribal areas, 1885-1900	Districts populated mainly by tribes were not brought under rigorous control of forest department. <sup>6</sup>	The fear of tribal revolts was main reasons for non-implementation of forest reservation policy.
Employment of the <i>Chenchu</i> tribesmen in conservation operations from 1910	The <i>Chenchu</i> tribes possess good knowledge on topography of dense forests of Andhra regions know as the Nallamala.	They were employed as watchers, fire traces and conservation works by forest department.
<i>Chenchus</i> development policy 1919	Establishment of separate section for development of the <i>Chenchus</i> such as education, health etc.	Youngman of the <i>Chenchus</i> were regularly employed by forest department.

Source: Annual administrative reports of forest department and Board of Revenue Proceedings of relevant years.

Initially the attitude of colonial state toward tribes was hostile and consequent upon which series of tribal revolts took place in different parts of south India. However, colonial forestry remarkably shaped the attitude of the colonial state toward tribes. Tribes were perceived as a valuable asset to the forest department. The tribal labour in various forest conservation activities were so critical that the British were compelled to adopt a liberal approach towards tribes. This trend also shows nature of colonial rule in India that direct control of India was achieved with the liberal discourse. But at the same time every effort was made to harness the resources of India. Scientific forestry shows the ability of colonial state in harnessing human and material resources for tapping their optimum utility for fulfilling its basic objective i.e., institutionalization of resource for tapping mechanisms.

#### **EXPANSION OF SCIENTIFIC FORESTRY**

Economic compulsions guided the nature of scientific projects in British India. Resource requirements of the British were mediated by objective scientific traditions which were used as an agency to maximize the resource requirements of the empire. This trend is explicitly visible in case of forest sector. After 1870s forestry in India was assigned a bigger role of supplying wood to the grand colonial project i.e., railways. Expansion of railway network was critically depended upon the availability of forest resources. Railways initiated a shift in the focus of scientific forestry from silviculture plantations to natural conservation of forests. It was essential as railways required a massive quantum of forests in a quick succession. The Table 5 shows the territorial expansion of jurisdiction of forest department in south India.

Phenomenal expansion of territorial jurisdiction of forest department took place between the years 1870-80. This trend shows how scientific forestry was connected to resource requirements of the British. Having acquired control over forests, the following logistical process were initiated: areas were protected with fencing, forests were divided into different blocks and depending upon maturity levels trees were harvested, fire protection measures were initiated and finally labour was employed to protect forests from animals and theft. The main objective of this category of conservation is to ensure supplies of wood to railway companies. This objective was seriously followed. The Table 6 shows the pattern of forest resource use by railway companies.

**Table 5. Area brought under Conservation of Forest Department**

S. No.	Name of the district	Extent of areas brought under conservation (in acres)
1.	Cuddapah	15,830
2.	North Arcot	6,400
3.	South Arcot	40,550
4.	Trichinipoly	1267
5.	Madhura	10,240
6.	Tinnevelly	5,570
7.	North Coimbatore	1,010
8.	Salem	16,804
9.	Palghaut	4,002
Total extent of areas brought under conservation		113,833

Source: Board of Revenue Proceedings, 7<sup>th</sup> December, 1876, Board No. 3,096, forest no. 105, p.9778.

**Table 6. Fuel Wood Consumption Pattern by the Railway Companies in Madras Presidency in tons**

Item	Madras Railways		Great Southern of Indian Railway		Conjeveram Railways		Total	
	1867	1868	1867	1868	1867	1868	1867	1868
Coke	1,488	1,909	23	32	–	–	1,511	1,941
Coal	5,191	3,584	3,513	2,791	167	43	8,871	6,418
Patent	364	3,259	–	462	–	1	364	3,722
Fuel-wood	49,235	48,068	1,923	5,923	14	367	51,172	54,358

Source: E.P. Stebbing, *The Forests of India*, Vol. II. p.103

Western experimental science has always been result oriented. Particularly financial viability was the main function it was expected to perform. Forest establishment in India was not only expected to undertake experiments but also consistently forced to show revenue surplus. Revenue surplus was one of the important criteria on which survival of forest department was depended upon. Hence, hard work was gone into the careful execution of scientific forestry in order to extract best output from forests. Initially forestry was perceived as science mainly to deal with timber trees and its preview was focused on supply of timber to government departments. But from 1880 onward forestry became a part of the empire discourse of progress. After suppression of the 1857 mutiny, colonial rule invoked the

discourse of progress as a means to derive legitimacy for its existence. Forestry as a science was linked to this process. This means that forestry was expected to act as a catalyst for the development of people in India. Scientific forestry as progressive discourse was used by colonial state to expand its control over vast areas of wastelands and forests.

#### SCIENTIFIC FORESTRY AS DISCOURSE OF PROGRESS

From 1880s a major policy shift took place in the realm of scientific forestry. Attempts were made to expand its scope by way of connecting with agriculture. The transfer of India from the Company to Crown brought about certain changes in governance pattern. Assertion of the state power became an imperative for effective control of India. It was in this context colonial state attempted to enhance the symbolic power by way of declaring itself as owner of forest landscape which constituted the second largest land management system in India after agriculture. This trend was justified with the articulation of discourse of progress of rural population. This trend can be captured from the reflection of government of India on this subject as follows:

The inconvenience which is temporarily occasioned to the agricultural population is due to their own action in diminishing the efficiency of their grazing lands by an improper use of them. The Government proposes to do more than restore, and if possible, to increase the efficiency which has been lost. The measure contemplated will, it is believed, result in a future supply of fodder which will be far larger and far more certain than that of which the owners of the cattle have been deprived.<sup>7</sup>

The aforementioned quote reflects the paternalistic attitude of colonial state which was articulated through the discourse of progress. Forestry in India was expected to be an engine of progress in the countryside. This also shows the perception of the British who perceived themselves as superior by virtue of scientific temper and native society incapable of achieving progress due to lack of scientific sense. In this context colonial science is represented as an agency for emancipation of Indians from darkness. However, one needs to see to what extent this conviction was executed and what are the dynamics that guided this trend?

After 1885, scientific forestry was integrated with agriculture. Strong advocate for this trend was none other than the father of Indian forestry Dr.

D. Brandis. Having realized the immense potential of revenue from grazing, he pressed for policy intervention in management of wastelands as fodder reserves. The Madras Presidency quickly responded to the trend and promulgated the Madras Forest Act of 1882. Under this Act, about 20000 square miles of forests were reserved as state property. This land constituted about 40% of total wastelands in the Madras Presidency. This massive takeover of forests and wastelands by the state was justified by the discourse of progress by way of application of science and technology for the betterment of agriculture. Two reasons were cited to be tackled by forest department for prosperous agriculture: provision of fuel and fodder to rural population and secondly, protection of climate for controlling famines in India. Thus, forest department became the owner of about one third of landmass of India. Now the question arises who gained and who lost? Certainly it was the colonial state who benefited by the upsurge of revenue head due to revenue from grazing. The Table 7 shows the pattern of revenue from grazing.

My argument here is that colonial science prepared to undertake experiments in India without proper understanding of socio-economic implication. Consequently, scientific projects were forced to recede back. History of forest policies in the Madras Presidency shows that the native society forced the colonial state to modify nature of policies. The unprecedented intervention of colonial forestry in the everyday life of rural population was a miscalculated intervention of colonial state. Consequently heavy price was paid by the British as its image drastically diminished in the countryside of south India. The discontent was visible by sharp increase in illegal grazing, crime related to breach of forest rules etc. Table 8 shows the crime rate related to violation of forest rules.

Within the span of twenty years, colonial authorities realized the fact that the experiment of scientific forestry in grazing management was unsuccessful. The risk of keeping forests under control inflicted heavy damage to colonial rule. The discontent forest dependent communities were further fueled by raising tide of nationalism. However, the main misconception, many studies possess on colonial forestry is that colonial forest policies are perceived as static process of either exploitation or conservation and changing nature of them remained unaddressed. The fact is that scientific forestry consistently underwent changes for two reasons: to explore strategies for

**Table 7. Revenue on grazing fees from Reserve Forests in Madras Presidency**

<b>Year</b>	<b>Revenue from Grazing (in rupees)</b>	<b>Total forest revenue</b>	<b>% of grazing share in total forest revenue</b>
1886-87	81,203	12,46,738	6.5
1887-88	1,05,811	13,74,920	7.6
1888-89	1,29,855	15,15,006	8.6
1889-90	1,43,845	15,57,627	9.2
1890-91	92,621	17,95,408	5.00
1891-92	1,15,794	16,94,215	6.80
1892-93	1,75,589	15,77,212	11.13
1893-94	2,66,891	19,43,75	13.70
1894-95	3,28,293	N A	N A
1895-96	3,40,496	21,67,630	15.70
1896-97	3,76,354	21,88,917	17.19
1897-98	3,63,905	21,51,144	16.91
1898-99	3,76,354	20,75,254	18.13
1899-00	4,89,765	23,13,507	21.16
1900-01	5,10,451	24,43,773	20.88
1901-02	5,40,068	24,96,494	21.63
1902-03	5,78,500	25,92,779	22.31
1903-04	6,07,400	26,90,571	22.57
1904-05	6,27,474	28,30,542	22.61
1905-06	6,62,837	30,36,892	21.82
1906-07	6,78,537	34,50,733	19.66
1907-08	7,27,343	38,58,026	18.85
1908-09	7,82,510	38,86,296	20.13
1909-00	7,69,770	41,84,633	18.39
1910-11	6,31,643	N A	N A

*Source:* Compiled from Annual Administrative reports of Forest department, Madras for relevant years.

**Table 8. Forest crime reported in Madras Presidency**

Year	Number of cases	Year	Number of cases
1885-86	2,269	1903-04	21,883
1886-87	2,443	1904-05	21,930
1887-88	3,358	1905-06	23,021
1888-89	3,377	1906-07	23,141
1889-90	3,088	1907-08	24,453
1890-91	5,577	1908-09	25,470
1891-92	8,124	1909-10	25,277
1892-93	10,905	1910-11	26,489
1893-94	10,007	1911-12	28,995
1894-95	9,883	1912-13	29,892
1895-96	9,610	1913-14	31,177
1896-97	11,638	1914-15	32,541
1877-98	14,993	1915-16	30,885
1898-99	18,295	1916-17	28,087
1899-00	20,450	1917-18	27,091
1900-01	22,130	1918-19	26,160
1901-02	23,750	1919-20	27,537
1902-03	23,125	—	—

*Sources:* Compiled from the annual administrative reports of forest department of relevant years.

generation of revenue: to minimize the costs and maximize benefits. By way of realizing this policy, attempts were initiated to bring the scientific forestry back to basics. In south India, about 4500 square miles of forests were transferred to revenue department to be managed by forest panchayats.<sup>8</sup> At the same time the energies of forest department was diverted to silviculture operations. The following Table 9 shows the nature of wood extraction undertaken by the Forest department in the Madras Presidency.

**Table 9. Output of Timber Extracted by Forest Department in Madras Presidency**

Year	Tons of 50 cubic feet	Year	Tons of 50 cubic feet
1890-91	*329,414	1925-26	93,260
1900-01	+64,469	1926-27	94,140
1910-11	+60,829	1927-28	96,520
1920-21	+98,540	1928-29	100,480
1923-24	99,520	1929-30	96,920
1924-25	99,080	1930-31	85,580

*Source:* G. T. Boagh, *The Madras Presidency, 1881-1931*, Madras, 1933, p. 63.

At the same time several new projects were granted for exclusive attention of forest department. Those as follows:

- 1921-22 Russellkonda Saw Mill.
- 1922-23 Constitution of the Chenat Nair Exploitation division. Appointment of Chief Forests Engineer and Forests Utilization Officer.
- 1923-24 Chenat Nair Exploitation scheme Olvakkot Mill.
- 1923-25 Olavakkot Saw Mill and seasoning plant.
- 1923-26 Sanction of Anamalai sleeper project and creation of saw mill in Wynad,
- 1923-27 Forests utilization division and saw mills and extraction division.

The journey of scientific forestry experienced ups and downs and twists and turns and finally it settled as pure forest science. It also shows the nature of colonial rule in South Asia. It has undertaken consistent experimentation to push the efficiency and viability of policy systems for best desirable results of the Empire. It shows the nature of modern state toward science policies. Emancipatory project of science is merely a pretext and several other practical considerations are guiding forces of the scientific knowledge.

#### CONCLUSION

Contrary to the existing notion on static nature of scientific forestry, this article shows the dynamic nature of forestry by demonstrating its consistent changing character. The reason for this flux of changes is that scientific forestry was expected to deliver required resources and revenue. However, the execution of scientific forestry was not as exploitative as it is suggested by existing studies. Local forest dependent communities were incorporated into conservation process. Thus, colonial science projects were executed through the collaboration of the natives. The main argument of this article is that colonial state shaped the scientific forestry not as a classic scientific project but rather tried to make more of an economically sustainable enterprise. Consequently scientific forestry oscillated and compromised with its basic scientific character. Hence scientific interventions of colonial state were shaped by motives of resource imperatives at one level and expediency at another level.

**NOTES AND REFERENCES**

1. Board of Revenue Proceedings, Tamil Nadu State Archives, 21st March 1871, Number, 1222, p.1947.
2. Lovirie, M.V., 1919, p. 34.
3. Faujdar, A., 1993, p.186.
4. Krishnaswamy, V.S., 1937, p. 21.
5. Cleghorn, H., 1861, p. 54.
6. By 1895, the total extent of Godavari district of Andhra region is 7,857, and the areas brought under forest reservation was 1002square miles, the total extent of Ganjam district is 8,369 and the areas brought under the reservation was 576 and finally the total extent of Vizagapatnam district is 17,242 and the area brought under reservation was 576. This shows that negligible extent of forests was brought the control of forest department in the tribal districts of Andhra region.
7. Board of Revenue Proceedings, 14th July 1883, No. 1722, p. 5.
8. Government Order, No.1185, 1st June, 1931, Government of Madras, Revenue Department (Andhra Pradesh State Archives).

**BIBLIOGRAPHY**

- Aleam, Aniket, *Becoming India: Western Himalayas Under British Rule*, Cambridge University Press (Foundation Books), New Delhi, 2008
- Barton, G.A., *Empire Forestry and the Origins of Environmentalism*, Cambridge University Press, Cambridge, 2002
- Beinart, W. and Hughes, L., *Environment and Empire*, Oxford University Press, New York, 2009
- Boagh, G.T., *The Madras Presidency, 1881-1931*, Madras, 1933
- Buchy, M., 'British Colonial Forest Policy in South India; An Unscientific or Un-adapted policy?', in R. Grove, V. Damoderan, and S. Sangwan, (ed.), *Nature and the Orient: Essays on the Environmental History of South and South-East Asia*, Oxford University Press, New Delhi, 1998, pp. 636-673
- Cleghorn, G., *Forest and Gardens of South India*, W.H. Allan, London, 1861
- Drayton, Ridhcard, *Nature's Government: Science, Imperial Britain, and the Improvement of the World*, Orient Longman, New Delhi, 2005
- Faujdar, A., *Management Working Plan for the Forests of Kurnool, Nandyal and Atmakur Forest Division, 1991-2005*
- Gadgil, Madhav. and Guha, Ramachandra, *This Fissure land: An Ecological History of India*, Oxford University Press, New Delhi, 1992.

- Grove, R., *Green Imperialism: Conservation and colonial Expansion, 1600-1860*, Cambridge University Press, Indian Prints, New Delhi, 1995.
- Guha, Ramachandra, 'Scientific Forestry in Uttarakhand', *Economic and Political Weekly*, Vol. XX, 1985, pp.1935-52:
- Guha, Sumit, *Ecology and Ethnicity in India, c.1200-1991*, Cambridge University Press, New Delhi, Indian Prints, 1999
- James, L., *The Rise and Fall of the British Empire*, ABACUS, London, 2007
- Krishnaswamy, V.S., *Working Plan for the North Cuddapah Forest Division (1936-46)*, Government Press, Madras, 1937
- Lovirie, M.V., *Revised Working Plan for the Mount Stuart Forests, South Nilambur Division*, Government Press, Madras, 1919
- Marsh, G.P. *Man and Nature: The Earth As Modified by Human Action*, Higginbotham, 1884
- Philip, K., *Civilizing Natures, Race, Resources and Modernity in Colonial South India*, Orient Longman, New Delhi, 2003
- Rajan, Ravi, *Modernizing Nature: Forestry and Imperial Eco-Development 1800-1950*, Orient Longman, New Delhi, 2006
- Rajan, Ravi, 'Imperial Environmentalism or Environmental Imperialism? European Forestry, Colonial Forests and the Agenda of Forest Management in British Empire, 1800-1900', in Richard Grove and other (ed.), *Nature and Orient: Essays on Environmental History of South and South East Asia*, Oxford University Press, 1998, pp.324-372
- Rangarajan, Mahesh, *Fencing the Forests; Conservation and Ecological Change in India's Central Provinces, 1860-1914*, Oxford University Press, New Delhi, 1996
- Ravi Kumar, V.M., 'Political Ecology of Deforestation: History of Railways and their impact on forests of South India (Andhra), 1850-1890', in *Soodh Srijan*, No. 2, vol. I, 2010
- Rebbentrop, B., *Forestry in British India*, Indus Publishing Company, New Delhi, 1986
- Saravanan, V., 'Commercialization of Forest, Environmental Negligence and Alienation of Tribal Rights in Madras Presidency: 1772-1882', *Indian Economic and Social History Review*, Vol.35, No.2, 1998, pp.125-146.
- Sivaramakrishnan, K., *Modern Forests, State Making Environmental Change in South West Bengal*, Oxford University Press, New Delhi, 1999
- Stebbing, E.P., *The Forests of India*, Vols. I, John Lane, London, 1922
- Thompson, E.P., *Wigs and Hunters: Origin of Black Act*, Penguin, Harmondsworth, 1977