

Insights from a Cultural Landscape: Lessons from Landscape History for the Management of Rajiv Gandhi (Nagarahole) National Park

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National Parks like the Rajiv Gandhi (Nagarahole) National Park can be seen as cultural landscapes that embody and reflect the historical, social and economic relationships between people and place. This article highlights that complex social relationships and processes of change underlie contemporary park management issues, such as conflict over the future of forest dwelling communities, resource dependent populations on the forest fringe and crop raiding by wildlife from the park. The article suggests that a cultural landscape framework, based on recognition of historical, social and economic relationships in the landscape, can provide a deeper understanding of these issues and needs to inform discussion on future management directions. Specifically, a historical approach highlights the changing situation of tribal communities in the context of changing management paradigms, and the need for management approaches to go beyond highly localised actions to work with wider government policies and processes that influence land use and markets outside the park.

INTRODUCTION

PARKS LIKE THE Rajiv Gandhi (Nagarahole) National Park¹ in Karnataka, southern India have a long history of human interaction. Yet, the historical dimensions of people–landscape ties, in and around parks, are not often recognised in contemporary management approaches. This article considers how a historical understanding of interactions between society and the physical landscape, can contribute

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to contemporary management of parks like Nagarahole. It highlights the critical social relationships that must be addressed in the move towards effective and equitable modes of park management where there are close linkages between resident and neighbouring communities and park resources. This article does not specifically comment on wider approaches to managing people–park conflicts in India, although the management issues highlighted at Nagarahole parallel those in numerous other parks around the country (see Agarwal et al. 1999; Kothari et al. 1998a).

The specifics of the social and biophysical features that comprise the Nagarahole landscape are discussed later in this article. However, a brief snapshot of the area and contemporary issues is provided here to give the reader an introduction to the area.

Nagarahole: Contemporary Management Issues and Approaches

The Wildlife Wing of the Karnataka Forest Department has statutory responsibility for managing Nagarahole, and the agency faces multifaceted ecological, social and economic issues in this management task. Environmentally, they are faced with a landscape that is diverse, fire prone in some seasons and has been shaped by years of timber exploitation and commercial forest product use. Socially and economically, management intersects the lives of forest dwelling tribal communities and surrounding villagers, and these groups justifiably demand a voice in management decisions.

Nagarahole straddles a range of rainfall zones, forest types and elevations (700–960 m), extending from the foothills of the Bramhagiri range in the west to the Deccan Plateau on the east. The forest types found within the park follow the decreasing elevation and level of precipitation from west to east. The dominant forest type is southern tropical moist deciduous forest, covering an estimated 60 per cent of the park area, and occurs in the western and southern reaches of the park. Key upper storey species include teak (*Tectona grandis*), rosewood (*Dalbergia latifolia*), honne (*Pterocarpus marsupium*), nandi (*Lagerstroemia lanceolata*), kindal (*Terminalia paniculata*), noga (*Cendrella toona*) and bamboo (*Bambusa arundinacea* and *Dendrocalamis strictus*). Other forest types in the park include southern tropical semi-evergreen forest in small pockets along the western boundary of the park, southern tropical dry deciduous forest and scrub forest to the eastern and north-eastern sides of the park. Swampy areas (known as *hadlus*) occur in low-lying patches, with grassy cover and scattered tree cover; some are naturally occurring while others remain after the stopping of cultivation and relocation of tribal settlements. The park also includes around 87 sq. km. of teak plantation, and some small areas of Eucalyptus (most likely *Eucalyptus tereticornis*), which were established between the early 1900s and the 1970s (Appayya 1999).

Some of the larger mammals for which Nagarahole is particularly valued and known include: tiger (*Panthera tigris*), leopard (*Panthera pardus*), various deer and monkey species, gaur (*Box gaurus*) and elephant (*Elephas maximus*). Wildlife protection was a major objective in the designation of the original wildlife sanctuary at Nagarahole in the 1950s, and continues to drive management today. The management of the park as an ecosystem has received relatively little attention, which has been problematic in some respects. For example, a management emphasis on wildlife does not provide the answers to contemporary debates such as how to manage the monocultural timber plantations left by Nagarahole's colonial legacy, the management of invasive weeds, or analysis of the implications of extracting dead and dying trees, an option supported by the Karnataka Forest Department (statement by Forest Minister of Karnataka, 24 June 2002).

Nagarahole has been the site of intense conflict over the future of resident tribal² communities, a conflict involving tribal organisations and supportive non-governmental organisations (NGOs), the Karnataka Forest Department and pro-wildlife protection organisations. The park supports an estimated resident tribal population of between 6,000 and 7,000 (Indian Institute of Public Administration 1994; World Bank 1996). The future of these communities, and their right to live in and use the Nagarahole forests, is passionately debated by these groups, in the context of recent attempts by the Forest Department to 'voluntarily resettle' forest dwelling communities. Such moves are supported by conservation NGOs, and opposed by a number of tribal organisations and supportive NGOs, who argue for the rights of these communities to live in and use the Nagarahole forests.

The population of villagers on the park fringe, and how to manage their dependence on park resources is another key issue occupying contemporary managers. Villages fringing Nagarahole have steadily increased in population and, according to the 1991 Census figures, are home to more than 105,595 people. These villagers rely on the park forests for cattle grazing, fuelwood and timber collection; conversely, they suffer from crop damage by elephants, bison and wild pig. The current approach to managing this relationship between park and villagers comes in the form of the India Ecodevelopment Project, which involves the Union Government and the World Bank (the key donor agency). Nagarahole is one of the seven Indian parks implementing the India Ecodevelopment Project, which aims to promote sustainable livelihoods as a basis for improved conservation of the park. The Ecodevelopment project has been discussed in detail elsewhere (Mahanty 2002a, 2002b). Briefly, the project aims to reduce the dependence of villagers on park resources through a range of income generating and resource substitution measures.

This article will highlight that a historical understanding of the relationships between society and landscape sheds important light on some of these significant management issues facing Nagarahole today—the emphasis on wildlife vis-à-vis biodiversity more broadly, conflict over tribal resettlement and tribal rights to the park forests, and dependencies between villagers and the park forests.

UNDERSTANDING HISTORY, RELATIONSHIPS AND CHANGE

The analytical framework for this article draws on the concept of cultural landscape in cultural geography, where the biophysical landscape is regarded as the locus of social, including economic, political and symbolic meanings (Cosgrove and Domosh 1993). The concept of cultural landscape is a way of seeing and understanding landscape in social terms, regardless of the values for which that landscape is protected and managed.

The cultural landscape framework highlights a number of important areas for analysis. First, landscapes are not just biophysical containers for human activity; but also reflect the material and non-material interactions of society (Cosgrove and Domosh 1993). Second, if landscapes are historical and spatial texts of social, political and economic relations and cultural predispositions (Ley and Duncan 1993), then the physical landscape can be studied for cues to these relationships, since social and landscape processes intersect and inform each other (Anderson 1999). Issues of power and voice in the creation of physical and symbolic landscapes are important dimensions to consider in these relationships (Anderson 1999: 8).

The process of reading a landscape and its social meaning is necessarily a process of interpretation on the part of the analyst rather than one of uncovering an objective reality (Ley and Duncan 1993). This does not diminish the value of a social analysis of landscape, but it highlights the need to be transparent and systematic in the interpretation process.

To summarise, the concept of cultural landscape provides a framework for understanding historical relationships between people and landscapes. The emphasis here is on economic activities in the landscape and relationships between key actors, both of which are critical issues in the contemporary park management context in India. Less emphasis is placed on symbolic meanings of the landscape from the perspective of various actors. This is a potentially important area for investigation in the future, but was beyond the scope of this research.

Methodology

This article draws on a wider study of the India Ecodevelopment Project in Nagarahole (Mahanty 2000). The methodology for the wider study included an 8-month fieldwork programme, where data on contemporary and historical relationships amongst key actors, and between society and the park landscape were collected through various means, including interviews with key informants, field observations and from contemporary and historical documentation on the area.

This article draws specifically on archival and historical research in India and the United Kingdom (UK). Key historical documentation targeted in this review include: historical maps of the Nagarahole region, Forest Department Working

Plans and progress reports for the Coorg and Mysore districts, and *Gazetteers*. These were analysed with an aim of understanding landscape change, to distil information on economic and management relationships between various actors and the landscape, and to gain background on historical relationships between key groups of actors in the area, such as the Forest Department, villagers and tribal communities.

A HISTORICAL PERSPECTIVE ON THE NAGARAHOLE LANDSCAPE

The temporal scale for this analysis starts with the active intervention of the British in the Nagarahole area in the mid-1800s, which environmental historians unanimously portray as an era of immense change in Indian forest management (Buchy 1996; Guha 1989; Gadgil and Guha 1992; Rangarajan 1996a). Box 1 summarises key events around the Nagarahole region since this time.

Box 1

Timeline of Events Around Nagarahole

- 1832—Coorg³ annexed and directly administered by the British (Rice 1908; Thornton 1857).
- 1831–81—period of direct British rule in Mysore, followed by ‘native’ rule in 1881 (Bhatt 1997).
- 1854—first European coffee plantation established in Coorg (Rice 1908).
- 1869—Mysore Forest Rules introduced; district system of forests established in 1872 (Stebbing 1926).
- 1871—Coorg Forest Rules introduced (Stebbing 1926).
- 1878—passing of the Indian Forest Act 1878.
- 1894–1901—reservation of forests in the current Nagarahole park.
- 1948—Coorg constituted as a separate (Class C) state of the Union of India (Bhatt 1997).
- 1955—Nagarahole constituted as a wildlife sanctuary covering 28,416 ha. by Coorg State (Alva 1978; Lal et al. 1994).
- 1956—Kodagu (formerly Coorg) redefined as a district of the former State of Mysore (now Karnataka) (Bhatt 1997).
- 1975—notice of intent to upgrade Nagarahole from a Sanctuary to a National Park in 1975 and extend area to 57,155 ha. (Alva 1978; Krishnegowda 1998; Lal et al. 1994).
- 1983—final notification to upgrade Nagarahole to a National Park (Alva 1978; Krishnegowda 1998).
- 1987—notification of intent to extend park area by 7,814 ha. to the south (Lal et al. 1994).
- 1992—name changes to Rajiv Gandhi National Park, but the park is still widely known as Nagarahole (Lal et al. 1994).
- 1998—commencement of Nagarahole Ecodevelopment Project.
- 1999—creation of Nagapura resettlement on the Nagarahole boundary and resettlement of 51 tribal families.

Broadly, the Nagarahole landscape since colonisation went from a commercially exploited landscape, to a landscape protected as a sanctuary for wildlife. The discussion that follows considers the nature and context of these transitions, and implications for resident and resource using communities.

The Nagarahole Landscape: Commercial Exploitation to Wildlife Protection

The history of Nagarahole reveals a landscape subject to extensive exploitation for timber and other forest products. This management emphasis was shaped by a range of factors, including: national policy and legislation; markets for various forest products in Europe and within India, such as the railways and mines in the Kolar district in south-east Karnataka; and the relative abundance of valued species in particular forest areas.

Commercial Exploitation A crucial stage in this journey of forest exploitation was the execution of the *Indian Forest Act 1878*, which enabled the definition, ownership and control of forest areas by the state as reserved, protected and village forests (Buchy 1996). The Coorg and Mysore forests constituting the current National Park were reserved at the turn of the century, with some minor amendments to boundaries in subsequent years (see Table 1).

Table 1
Reservation Details of Forests in the National Park

Name of Forest	District	Year Reserved	Category (At Time of Reservation)	Area (ha.)	Approx. % of Park Area [†]
Veeranahosalli	Mysore	1901	State Forest	4,890	7
Kakankote	Mysore	1896 (extended 1907)	State Forest	14,619*	25
Metikuppe	Mysore	1896 (extended 1907)	State Forest	14,262*	21
Kachuvanahalli (Kachchonahalli)	Mysore	1900	State Forest	1,695	3
Arkeri	Coorg	1894	Reserved Forest	7,390	11
Hatghat	Coorg	1894	Reserved Forest	11,119	17
Nalkeri	Coorg	1894	Reserved Forest	10,522	16

Sources: Alva 1978 and Kadambi 1944.

Notes: [†]the figure generally cited for park area is 64,339 ha., but the sum of reserve forest areas is 65,904 ha. Percentages are calculated on the latter figure.

*areas submerged in Kabini and Taraka reservoirs are included.

The reservation process defined boundaries of control, access and use, and set up a conceptual distinction between forest and other land use. In Mysore, such forests were formerly the common property of neighbouring villagers, subject to subsistence grazing, timber and fuelwood collection and NTFP use, as well as some *kumri* (swidden) cultivation. Concessions to neighbouring villagers following reservation included rights of way, access to water, grazing on payment of a fee per head of cattle and removal of timber and building materials for domestic use. In exchange, villagers were required to assist the Forest Department to fight forest

fires and undertake other works for two weeks a year, or lose their concessions (Kadambi 1944).

In Coorg, reserved forests were quickly brought under a regime of working plans formulated by the Coorg Forest Department, with stringent restrictions on *kumri* and resource use by forest dwellers and neighbouring villagers (Brand 1933). Rights and concessions in these areas were limited to rights of way, and the collection of 'minor forest produce' on a licensing basis (Tireman 1914). Seasonal grazing by farmers was also permitted on a controlled basis, with a fee per head of cattle (Brand 1933).

Ideas on how timber extraction and stand 'improvement' might best be promoted shifted over time and space. Management in the Coorg forests started with a selective felling approach (Dickinson 1888; Tireman 1914), and later moved to clear felling with plantation establishment through a system referred to as *kumri* (Brand 1933). The *kumri* method allowed tribals to plant food crops (particularly *ragi* or millet) alongside teak in young plantation areas. Trials commenced as early as 1892 (Proust 1894), but the system expanded mainly in association with increased clear felling in the early 1900s.

The Mysore forests were managed under differing regimes according to forest type and target species. Practices included clear felling to establish teak plantations in the Kakankote area, which was rich in teak, and selective felling in mixed deciduous areas where large teak trees existed and in 'miscellaneous' areas with stunted teak and other species such as dindiga (*Anogeissus latifolia*) (Kadambi 1944).

Management regimes in both Mysore and Kodagu districts specifically promoted the establishment of valued species such as teak after harvesting, with monocultural plantations of teak eventually covering about 17 per cent of the current park area (see Figure 1). Such harvesting regimes, together with fire management and the gradual spread of invasive species such as lantana (*Lantana camara*) and eupatorium (*Eupatorium odoratum*), have shaped the current floristic composition of the Park forests.

Wildlife Protection Under colonial management, wildlife was not targeted for special management; indeed it constituted a resource for exploitation in its own right. Elephants were trapped, used and sold by the Forest Department, deer horn was a commonly marketed product and bounties were placed from early days on predatory species such as tiger and cheetah (Richter 1870; Tireman 1914). Reservation brought attempts to limit hunting by local farmers and tribals, for reasons such as fire control, and generally restricting local rights of access (McKee 1890). At the same time, *shikar* (hunting) by British and elite Indians continued as a legitimate form of wildlife exploitation as in other parts of India (Rangarajan 1996b). Hunting was more prevalent on the Coorg side of the Park, a pattern continuing to the present day. This was associated with high rates of gun ownership in the district stemming from the exemption of the people of Coorg from the *Arms Act 1861*, which uniquely granted them the right to bear arms (Richter 1870).

managing the park, and highlight the limitations of a frame of reference defined only around wildlife.

In addition to this, the need to address ongoing human relationships with the landscape has been flagged by several Indian commentators (Agarwal et al. 1999; Gadgil et al. 1998; Kothari et al. 1998b), and is supported by the discussion below.

Production to Protection: The Implications for Forest Dwellers

Since reservation, the Forest Department has, at a formal level, dominated the definition and management of the Nagarahole landscape. However, its views coexisted with those of other actors, regarding what constituted the valued resources in the Nagarahole landscape. These differing perceptions have surfaced in various challenges to the protection regime, for instance with the continuation of informal resource use by neighbouring villagers and forest-dwelling tribals, and legal actions to contest the notification process for the park.

Historical documentation and informants from tribal organisations refer to three key tribal groupings in the Nagarahole area: the *Jenu Kurubas*, *Betta Kurubas* and *Yeravas* (see Box 2 for further detail). These groupings are accepted for the purpose of discussion in this study, while recognising that such categorisations are a combination of self-definition and classification by other actors like the state (Baviskar 1995; Karlsson 1997).

Box 2

Key Tribal Groupings in Nagarahole

According to early documentation, *Jenu Kurubas* and *Betta Kurubas*, the two dominant tribal groups in Nagarahole, formerly followed a nomadic way of life. The *Jenu Kurubas* subsisted on hunting and gathering, while the *Betta Kurubas* engaged in swidden (*kumri*) agriculture, as well as basket weaving. They are described as culturally and linguistically distinct groups (Richter 1870; Singh 1994; Rao and Lokesh 1998). Historical reports note that the *Betta* and *Jenu Kurubas* moved through and used the forests of the Nilgiri and Wyanad region, which includes the current Nagarahole area (Thurston and Rangachari 1909). These groups are also reported to have a long-standing role as agricultural labour for coffee estates in the Kodagu area (Aiyappan 1973), and as casual labour for the Forest Department within Nagarahole (Misra 1994).

The *Yeravas*, another distinct tribal group which resides in the Nagarahole area, were believed in early records to be originally from the Wyanad (Kerala/Nilgiris) area, and held in slavery to Coorgi farmers (Richter 1870). They are still reported to earn their livelihoods primarily from agricultural labour in Kodagu (Singh 1994).

While it is difficult to establish the former ranges of the main tribal groups in any detail, early documentation indicates that in all likelihood, the *Betta* and *Jenu Kurubas* would have moved through and used the forests of the region, including the current Nagarahole area. It is likely that some additional labour was encouraged into these forests, while those people already there underwent social change with an increased dependence on wage labour and a more settled way of life.

Under the British regime, these communities were able to maintain a relationship with the Nagarahole forests, albeit in restricted ways, because of their value as a labour force. Their activities were restricted, for instance with bans on *kumri* cultivation and hunting. However, the Forest Department depended strongly on the tribals, with their detailed knowledge of the forest, and as a willing workforce in seemingly inhospitable terrain. This is aptly summarised in a statement by one Divisional Conservator of Forests:

I do not think that sufficient importance has been attached to the absolute necessity of doing everything in our power to conciliate the jungle denizens of our forests; all of whom, more especially the Kurubars, can use their axes most effectively, thoroughly know the jungles, and are not afraid of elephants and other wild animals. In South Coorg, such men are invaluable and without their aid we could not properly work the forests (Provost 1893: 21).

The nucleated form of tribal settlements seen in the park today were promoted by the British, to manage newly established teak plantations and provide a more settled and accessible labour force than would otherwise have been available (Lowrie 1897). The social and ecological implications of this changed pattern have not been discussed in historical documentation on the area, but, together with restrictions on *kumri*, would presumably have increased the dependence of forest dwellers on wage labour compared with subsistence activities.

Thus, the management regime for the Nagarahole forests in the late 1800s and the first part of the twentieth century, whether in Kodagu or Mysore, did restrict existing use and access rights for local residents. However, it also valued continued residence by tribal communities in the Nagarahole forests as a valued labour force for commercial timber production.

The Changing Role of Tribal Communities The transition from a commercial production to a wildlife protection-oriented regime had important implications for tribal communities that were previously valued as a source of forest labour. As productive activity ceased in Nagarahole, tribals came to be seen by the Forest Department as a management liability, in spite of their continued dependence on casual tribal labour for road maintenance, fire fighting and forest watching. The resettlement of tribals from Nagarahole started after the declaration of a National Park in 1975, together with the reign of a zealous Range Forest Officer (RFO) in Nagarahole Range known for his commitment to strict protection, who began the process of relocating tribal settlements to the park periphery (Interview with Conservation NGO leader, 27 August 1998).

The current Nagarahole resettlement programme overlays these previous initiatives of the 1970s and 1980s (MYRADA 1994). Implementation of the current initiative began in 1999, with the 'voluntary' relocation of 50 *Jenu Kuruba* families from Nagarahole and Kallhalla Ranges to a newly established settlement, known

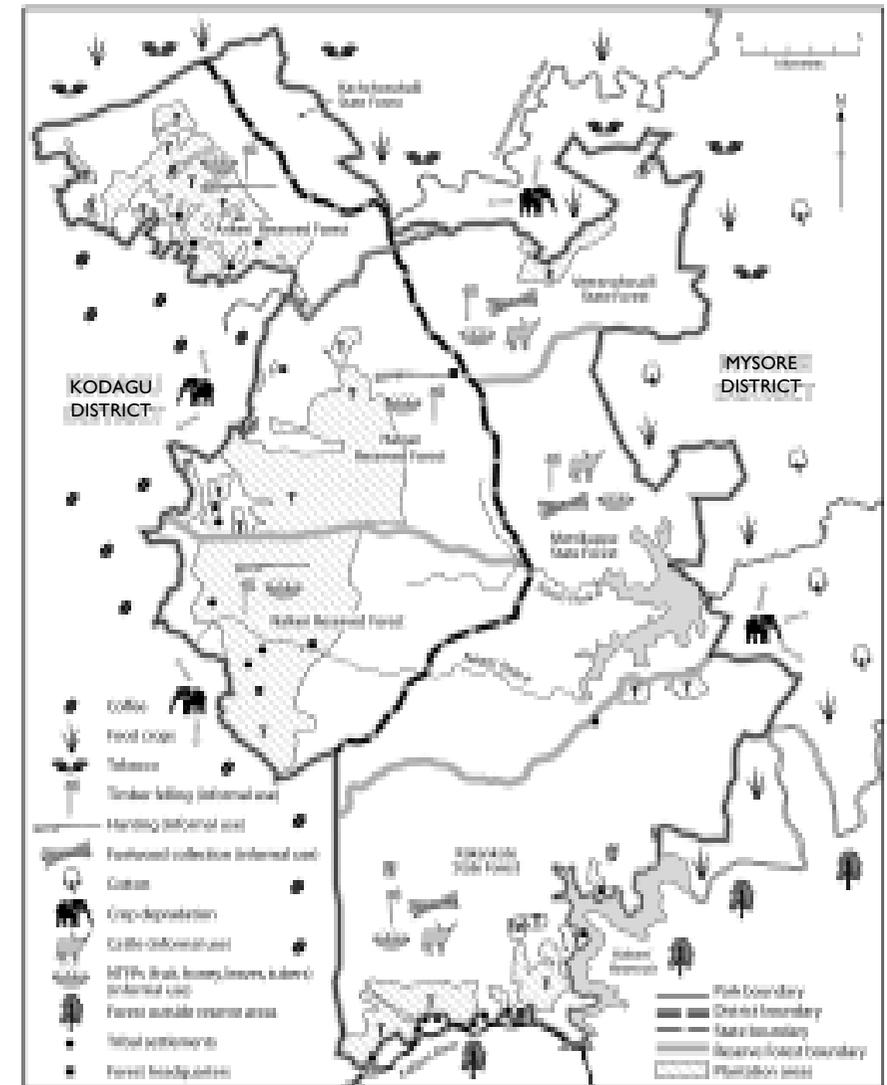
as Nagapura, outside the northern boundary of the park. The scheme was funded under the Central Government's Beneficiary Oriented Tribal Development Scheme, which is specifically designed to support relocation initiatives in protected areas. The Nagarahole scheme allowed for 2 ha. of land to be allotted per family, housing, water supply and common fuel and fodder reserves, at a total cost of Rs 500,000 (approximately US\$ 10,500) for 50 families (Karnataka Forest Department 1997). Senior forest officials saw this as a model or pilot scheme, which would hopefully encourage other families to follow suit.

Key issues in the debate so far have been the duration and nature of tribal ties to the area. Arguments for resettlement include the idea that tribals were brought into the forests solely as a labour force by the British, and therefore do not have a long-standing connection with the area. Historical data, however, suggests that the *Jenu Kurubas* and *Betta Kurubas* had a pre-existing relationship with the Nagarahole area. Tribals and supportive NGOs report the existence of ancestral graves and worshipping sites, but as yet there has been no detailed research on these. Indeed such research has been made more difficult by the highly politicised climate currently found at Nagarahole. In the interests of equity for these communities, one approach might be the negotiation of agreed reference points and legal frameworks for assessing indigenous claims along the lines of the Philippines and Australia. These frameworks recognise spiritual attachment through orally transmitted belief systems and the maintenance of traditional ecological knowledge (Cardinoza 1999; Smyth and Sutherland 1996). This kind of approach would require a radical shift in the thinking of park managers, beyond the current approach of state control in parks to the possibility of power sharing, and would need to be informed by careful monitoring and adaptive management to ensure ecological sustainability.

Negotiation around the details of resettlement proposals also seems important. For instance, a study of views on relocation amongst a sample of tribal settlements within the Park (MYRADA 1994), and my own interviews conducted in 1998, both identified that the location of resettlement sites was important. Many individuals and groups expressed an interest in moving to the Kodagu side of the Park if resettlement was to proceed. This stemmed from the current reliance of tribals on labour in coffee estates for their income and livelihood, and their greater familiarity with the land and climate in that region, since the majority of tribal settlements are concentrated to the west and south of the Park (as shown in Figures 1 and 2).

Finally, the Forest Department needs to take care that resettlement does not contribute to a resource needy population on the Park boundary. Already the land released for resettlement has come from reserve forests that were being used by local villagers for their fuel and fodder requirements. Future resettlement would entail conversion of further forests near the park, a measure which was justified by forest officials and conservationists as a necessity in order to protect the higher value forests of Nagarahole (Interviews 24 July, 30 July and 5 August 1999).

Figure 2
Nagarahole and Surrounding Land Use Today



Sources: Alva 1978; Appayya 1999; Krishnegowda 1998; Pascal et al. 1982; and Survey of India 1973a, 1973b, 1974, 1977a, 1977b.

However, such an outcome would not be realised if the depletion of alternative forest resources for fringing communities drives them into the park for their resource needs.

The historical analysis here has highlighted that the current debate over resettlement has emerged from a change in management paradigm in the Nagarahole area, from one focused on production, to one emphasising wildlife protection. Is a further paradigm shift possible, involving a framework to discuss and assess the nature and extent of ties to the landscape, and collaborative management approaches? As with previous management paradigms, this is unlikely to be played out in Nagarahole alone, but will depend on the wider social, political and economic arena.

Society and Landscape: The Complexity of Resource Dependence

The communities living adjacent to Nagarahole are a key locus of concern for park managers, with management documentation highlighting such issues as fuelwood collection, cattle grazing and increasing populations on the park fringe (Appayya 1999; Krishnegowda 1998), and they are the focus of the India Eco-development Project. This section considers the question of resource dependence around the park in a historical context, and highlights that government policy and land use planning decisions have played a key role in contemporary management issues such as crop raiding, and the existence of a resource dependent population on the park fringe.

Figures 1 and 2 summarise available historical information on land use in and around Nagarahole in the past and the present. The specifics of these transitions are discussed below.

Population Growth on the Park Fringe Forest officials and conservation NGOs point to population increase as a key reason why unrestricted use of park resources would lead to their rapid depletion. However, historical and spatial analysis presented here highlights that apart from natural rates of increase, there are complex issues underlying the size and resource dependence of these fringing populations, including government policies, regional planning processes and patterns of agriculture in these communities.

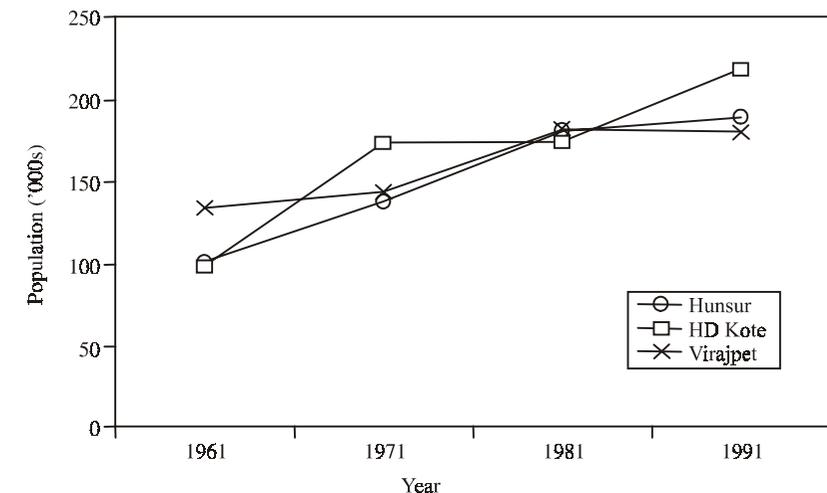
The areas around Nagarahole have seen a steady growth of population in recent decades, the establishment of new settlements and important changes to agricultural systems. Census data and topographic maps show that this population is not distributed equally around the park. The area to the east of the park is more densely settled, with small settlements having relatively higher populations. On the Kodagu side, townships register as having large populations, but these in fact represent a dispersed population from a surrounding region of coffee estates and farms.

The farmers to the east of the park, according to reports by Forest Department informants and personal observations, have a higher demand for fuel and fodder. Higher population on this side is no doubt one contributing factor to this higher resource demand to the east, but patterns of agriculture also appear to contribute to this pattern. For instance, while cattle are still central to the village economy

on the Mysore side, many villages in HD Kote taluk in this district have no grazing lands for their cattle. Villagers must therefore seek fodder in remaining forest areas, including Nagarahole.

Population growth in the Nagarahole fringe results from a combination of factors, including natural growth, market influences and past government policies and decisions. High rates of population increase in the Nagarahole area appear to be a post-independence phenomenon, because prior to independence, disease caused elevated mortality rates. The 1931 Census reports heavy rates of malaria in the south-eastern Malnad areas bordering Kerala (Venkateshwara Iyengar 1932: 23), and natural rates of growth were therefore low. The post-World War II era, with strong demand for plantation products and the commencement of an anti-malarial programme, saw increasing rates of natural growth in Kodagu and Mysore to differing extents. This was supplemented by in-migration, particularly to the coffee estates in Kodagu district (Folke 1966). Growth trends for the last four decades in the three key taluks neighbouring Nagarahole (see Figure 3), show the relatively low current rate of growth in Virajpet (Kodagu) and Hunsur (Mysore) taluks, compared with HD Kote in the east.

Figure 3
Population Growth in Hunsur, HD Kote and Virajpet Taluks 1961–91



Sources: Extracted from Government of India Census data from 1964, 1973 and 1986; 1991 Census data provided on disk by the Directorate of Economics and Statistics, Government of Karnataka, Bangalore.

Government policies and planning decisions have also played a key role in population increase on the park fringe. The construction of the Kabini irrigation dam on the south-east edge of the Park, for instance, displaced around 27 villages from their former sites to the park boundary. Agricultural land as well as land for

housing was allocated by the state government for those who were resettled. Of this area, about 2,614 ha. were released forest lands (Government Order No. RD 113 LGM 72, Bangalore, 5 March 1973). The overall impact of this resettlement process has been to move several villages close to the park boundaries, where the people depend strongly on the park forests, particularly for fuelwood and fodder. The dam and associated reservoir have thus shifted and intensified the pattern of settlements on the south-eastern park boundary, contributing to a highly resource dependent population with limited lands.

Thus, resource-dependent settlements on the park fringe have increased in number, and are closer to the park boundary than they were at the turn of the century. Higher natural rates of increase post-independence were certainly a factor, but also important are such trends as the expansion of agricultural lands, for instance with the increasing attractiveness of coffee as a commodity (discussed further below); and resettlement schemes accompanying infrastructure works, including the construction of irrigation dams like the Kabini reservoir (see Figure 2). The residence of a highly resource-dependent population, particularly on the eastern fringe of the park where fuelwood and fodder requirements cannot be met from available lands, increases pressures for such resources within the park.

Contemporary programmes to deal with such resource dependence, such as Ecodevelopment, focus only on proximate communities and their resource use with their strategies to promote less resource dependent livelihoods. Examples of village-based activities in ecodevelopment include:

- Promoting non-resource-based livelihoods (particularly for landless villagers) with assistance for small businesses, such as tailoring, bicycle maintenance and small shops.
- Livestock programmes to generate income and reduce dependence on fodder from the forest, with improved cattle varieties and promotion of stall feeding, poultry farming, sheep and pig rearing.
- Agro-forestry programmes (particularly for landed villagers) to promote availability of fuel and fodder outside the park, involving distribution of seedlings for fuelwood, fodder and fruit species.
- Promoting fuel substitution and efficiency, through construction of household biogas plants, distribution of fuel-efficient stoves, LPG stoves and pressure cookers.
- Reducing crop damage by wildlife with solar electric fencing and improved elephant-proof trenching at the park boundary.
- General infrastructure activities such as construction of village halls, materials for improved housing, irrigation works and bore wells (World Bank 1996).

However, this analysis highlights that park managers also need to focus on wider factors influencing the distribution of surrounding populations and their increasing dependence on park resources. Furthermore, managers could use

information on spatial differences in the resource use of surrounding communities to differentially target communities in their intervention programmes. More detailed research on the differing patterns of resource use in the taluks of Hunsur and HD Kote in particular would be important in such initiatives.

Land Use Change and its Consequences As Figures 1 and 2 illustrate, land use around Nagarahole has undergone significant change over the last century, with the extensive conversion of forest for coffee and the growth of agriculture to the east of the park. This section will consider the impact of these changes on the management of the park, and the linkages with broader government policy.

Over the last century, forested lands to the west of the park have gradually been converted to coffee plantations. Coffee cultivation in the wet, mountainous and densely forested region of Coorg started in the mid-1800s (Folke 1966). Prior to this, Coorg was a sparsely populated rice-cultivating region (Richter 1870), with swidden agriculture being practiced in the mountainous areas (Moppert 2000). An early commentator notes that ‘Thousands of acres of the finest forest land fell under the planter’s axe’ (Richter 1870). The introduction and expansion of coffee estates paved the way for massive forest clearance continuing well into the 1990s (Elouard 2000; Moppert 2000), and an influx of labour to work on coffee estates (Folke 1966). The considerable expansion of coffee into forest areas has been observed in satellite imagery, with a near doubling in area under coffee since the 1970s (Elouard 2000).

The expansion of coffee occurred in waves, influenced by government policies and markets. There was a general rush by both Europeans and Coorgis to establish coffee during the 1860s, and a boom period for the Coorg coffee industry between 1878 and 1883 (Rice 1908). Falling prices, associated with pest attack and increased production of Brazilian coffee, brought a decline to the industry by the turn of the century (Folke 1966). This turned around after independence in 1947, with the establishment of the Coffee Board to develop coffee cultivation and marketing, and the subsequent expansion of coffee plantations onto forested lands.

Coffee was closely connected with the evolution of human settlements to the west of the Nagarahole area, since labour requirements for coffee cultivation were high. Workers were needed to carry out clearance of forest areas, planting, weeding, lopping shade trees, harvesting of the coffee crop and processing (Richter 1870), and migrated to Coorg from areas such as Mysore and Kerala (Folke 1966). Coffee estates are still reported by tribal informants to be an important income source in the western areas of the park, establishing an important interdependence between estate owners and tribals. The expansion of coffee estates has contributed to the current ‘island’ of forests constituting Nagarahole. Associated with this is the highly contested issue of crop damage as elephants stray from the park into estates, discussed further below.

In Mysore, agriculture centred on food production alongside cotton and tobacco (see Figures 1 and 2). However, the growth of tobacco as a crop has brought important repercussions for forest resources.

Cultivation of tobacco in this region took off over the last thirty to forty years, with an estimated near doubling of the area under tobacco cultivation since 1981 (Interview with staff of the Hunsur Tobacco Institute, 27 July 1999). Tobacco production is subject to strict control by the Central Tobacco Board, both in production, through licensing, and in marketing, through centrally administered buying points (Interview with staff of the Hunsur Tobacco Institute, 27 July 1999). This has given the state a major hand in the expansion of tobacco cropping. Since tobacco is rotated with *ragi* (millet), the expansion of area under cultivation does not necessarily imply an expansion into forest areas as has occurred with coffee. There has, however, been a general expansion of cultivation, including of tobacco, towards the eastern park boundary throughout the 1900s (see Figure 2), related to factors such as population increase and the establishment of new settlements in the area.

The expansion of tobacco has been associated with increased demands for fuelwood for processing of the tobacco leaf. Once harvested, the leaf must be cured, which requires significant labour and fuel inputs, and is a major cost for the smallholders that predominantly grow the crop. During curing, tobacco leaf is tied to poles and hung to dry in 'tobacco barrens', small rooms intersected with metal pipes that are heated by a furnace burning fuelwood or, amongst some farmers in recent times, coffee husk. Fuelwood may well have come from forests in the National Park in earlier times, but the scale of current fuelwood demand during harvesting season could not be met entirely from the park or even remnant forests in the Mysore region.

The debt cycles involved in tobacco growing, along with heavy annual price fluctuations driven by international markets, and differential pricing according to the grade of tobacco grown, make this a risky crop for farmers. Nevertheless, strong state support and the promise of profit in good years, have given tobacco a firm place in the regional economy.

Crop Raiding by Wildlife Land use change has been a key contributing factor to crop raiding by animals from the park. This is a key management issue for contemporary park managers, with the Hunsur Wildlife Office receiving over 700 crop damage claims in 1997–98 alone (Forest Department Files, Hunsur Wildlife Office). The issue does not feature in reports and working plans prior to 1978 (Alva 1978), and a monetary compensation scheme for crop damage and human injury was initiated only in the mid-1980s (Nath and Sukumar 1998). While crop damage can be caused by various species, including elephant, bison and wild pig, villagers and Forest Department staff alike refer most frequently to the 'elephant menace'. The strong terminology reflects both the severity of the issue, and the notion of wildlife leaving its legitimate terrain.

Crop raiding is a common flashpoint between forest officials and villagers. In a village meeting related to ecodevelopment, for instance, discussions reached fever pitch over the crop raiding question as villagers demanded that the Forest Department keep 'their elephants' within the park, while forest officials attempted

to place some responsibility for crop protection on villagers (Ecodevelopment village meeting, 20 July 1998). At the same time, villagers create crossing points across the 'elephant proof trenches' (or EPTs) designed to keep elephants within the park, in order to maintain continued access to forest resources (Nath and Sukumar 1998: 37). The boundary between agriculture, the domain of people, and forests, the domain of wildlife, thus remains permeable and contested, in spite of the Forest Department's attempts at strengthening this boundary.

The crop-raiding problem stems from broader processes of landscape change, leading to the degradation and fragmentation of elephant habitat. The expansion of agriculture has compressed elephant populations into smaller forest pockets and interrupted established migration routes (Nath and Sukumar 1998: 1). The highest incidences of crop raiding by elephants in Kodagu occur along established migration routes between the eastern deciduous and western evergreen forests, which now span agricultural lands with small pockets of forest (Nath and Sukumar 1998: 14). Elephants are also believed by some informants to show preferences for particular crops. For instance, in the Nagarahole area, elephants are reported to be less inclined to raid tobacco than *ragi* and cotton (Interview with senior forest official, 24 September 1998, also noted by Nath and Sukumar 1998), and more likely to enter coffee estates during the seasons for certain fruit such as jackfruit (Interview with coffee estate owner, 24 July 1998).

It is perhaps too late to address the cumulative and broad land use transitions that have contributed to the crop-raiding problem. Nevertheless, it is important for managers to take up the issue of how current government policies might contribute to influencing land use and forest conversion, as well as how to address the fuel demands of farmers growing crops like tobacco. Current management instead focuses on strengthening the park boundary through EPTs and solar powered electrified fencing, both of which have demonstrated mixed results. Other suggested strategies include building cooperation between the Karnataka Forest Department (KFD) and villagers to reduce the extent and impacts of the problem, and prompt settlement of compensation claims, which currently can take up to ten years (Nath and Sukumar 1998; Interview with forest official, 8 August 1998).

Markets for Illicit Park Products: Wildlife and Timber The continuing illicit removal of wildlife and timber from Nagarahole, and other Indian parks, has been attributed to lax enforcement and the attraction of external markets (Menon et al. 1997; Talwar 1996; Thapar 1996; Wildlife Protection Society of India 1998).

The historical markets for timber from the forests of the Western Ghats have been examined by Gadgil and Guha (1992) and Buchy (1996). These are not revisited in detail here, but were primarily for international consumption, as well as urban, regional and national markets for such end uses as ship building, the railways, fine furniture and mines in the Kolar district in south-east Karnataka (Gadgil and Guha 1992; Buchy 1996). The removal of teak, rosewood and

sandalwood from Nagarahole is a continuing issue in the park, and is attributed to local and neighbouring residents. While information on the current market for illicit timber from Nagarahole is sketchy, indications are that these networks encompass regional, statewide and interstate traders (Forest Department Files, Hunsur Wildlife Division).

In the case of markets for wildlife, a degree of hunting is for local consumption and local markets (Interview with forest official, 3 September 1998; Nath, pers.comm., 23 June 1998; Interview with conservation NGO member, 4 August 1999). However, Forest Department statistics indicate that a proportion of wildlife killed in the park is destined for international trade (elephant, tiger, panther), and that this appears to be on the increase. Elephant poaching in particular is regarded as a significant problem in the southern states of Karnataka, Kerala and Tamil Nadu, and Karnataka carries a significant proportion of nationally recorded cases (Menon et al. 1997). Much of the trade in wildlife parts is destined for international markets, including ivory from elephants and the bones, body parts and skin from tiger and leopard, which are valued for Chinese medicine (Menon et al. 1997; Wildlife Protection Society of India 1998).

Although contemporary hunting and timber extraction target different markets, there are parallels in the continuing links between local and wider spatial scales, similar to the colonial era of management. Management efforts tend to focus on policing, but the incentive structures promoting the harvesting of illicit products, and the policies and markets that contribute to these also needs to be addressed to achieve local conservation outcomes.

CONCLUSIONS: IMPLICATIONS FOR CONTEMPORARY PARK MANAGEMENT

The preceding discussion has highlighted the historical roots of many contemporary management issues in Nagarahole. While the past cannot be changed, an understanding of historical society–landscape interactions can provide a more informed basis for contemporary management. In practical terms, a number of important lessons emerge from this analysis.

First, a deeper understanding of the ties between society and landscape is important in park management as in other areas of natural resource management. This article has emphasised the multiplicity of historical and contemporary factors that combine to create such contemporary issues as the conflict over tribal resettlement, the ongoing use of park resources and crop raiding in surrounding lands. The park managers' understanding of these relationships determines the extent to which their management strategies might alter what they consider to be dysfunctional interactions between people and landscape. Initiatives like ecodevelopment and resettlement are in different ways attempting to alter the relationships between people and the park landscape, yet they are premised on a limited understanding of how those relationships are constituted historically and spatially; they focus on localised relationships, that are understood for what they are now; not where they have come from, or how they are enmeshed in wider networks. The danger in this

process is one of creating partial or inappropriate solutions to resource management problems.

The Nagarahole case highlights the fact that policy and planning processes and remote markets play a role in shaping the cultural landscape of the park. Managers, therefore, need to work more closely with key agencies and actors involved in wider policy and planning issues at the district, state and national level. If resources such as wildlife and timber are collected for lucrative regional, national and international markets, there is a need to address the wider incentives that makes participating in these markets attractive.

This article has initiated the process of looking at historical tribal relationships to the park landscape, but there is a need for more research, and an agreed framework to establish the dimensions of these connections. The current state of conflict between tribals and state agencies makes a dispassionate analysis of such ties more difficult. The discussion has highlighted the paradigm shift that took Nagarahole from a commercially exploited landscape to one targeted for wildlife protection. It may be that a further paradigm shift in management, which encompasses the possibility of less than complete state control, alongside monitoring and adaptive management systems, may be required before the tribal residents of Nagarahole can have their claims to the area equitably considered. In the interim, alternatives to forcible relocation could be developed, and those interested in relocating, which the Forest Department claims are significant in number, could be more closely engaged in developing resettlement plans, with a greater likelihood of sustainability and equity.

While the analysis in this article has concentrated on the economic and livelihood dimensions of social–landscape interactions, further research on attitudes to the park landscape could help to identify common ground in what has become a site of conflict between differing management agendas.

Finally, managers may need to face the possibility that cultural landscapes such as Nagarahole may not lend themselves to simple manipulation in a project framework. Scholars have already pointed out that processes of negotiation amongst the actors involved in implementation, and the dynamic and complex nature of people–landscape relationships, can obscure the pathway of an intervention as a linear means to a pre-specified end (Long 1992; Uphoff 1992). Post-positivist approaches to natural resource management have also highlighted the need to work with the complexity, uncertainty and non-linearity of human and natural systems in a flexible learning mode, rather than in a predictive mode (Checkland 1981; Funtowicz and Ravetz 1993; Uphoff 1992). Ecologists increasingly encourage practitioners towards 'ecosystem' or 'adaptive' management, based on a broad understanding of human–ecosystem interfaces, incorporating the issues of scale raised in this discussion, and an experimental approach to managing these interactions (Brussard et al. 1998; Folke et al. 1996; Holling 1996; Holling et al. 1998; IUCN 1999; Szaro et al. 1998; Wallace et al. 1996). These approaches advance on the linear models of landscape interaction underlying current programmes in parks like Nagarahole, such as ecodevelopment. But we

need to recognise that park ecosystems are also cultural landscapes, and ensure that historical and detailed social analyses are an integral part of the management equation.

Notes

1. Nagarahole National Park became the Rajiv Gandhi National Park in 1992. It is still commonly known, and referred to in this article, as Nagarahole.
2. The terms tribal and *adivasi* are applied in India to minority peoples who are socially, culturally and economically distinct from other sections of national society (*ILO Convention 169 Concerning Indigenous and Tribal Peoples in Independent Countries, Article I*). The Constitution of India contains a list of Scheduled Tribes, to which specific government policies regarding reservation and tribal development pertain. Debate exists over whether these peoples should be regarded as 'indigenous', 'tribal' or 'caste' groupings (Baviskar 1995; Karlsson 1997).
3. Coorg is the former name for the district of Kodagu. The name Mysore was formerly applied to the area now known as the state of Karnataka. Both Kodagu and Mysore are now districts of the present state of Karnataka. In this article, the term Coorg is used with reference to historical events and documents, while Kodagu is used to refer to contemporary events.

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