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Threatened Forests of India: Our Future Dilemma?

The need to review the situation and to evolve, for the future, a new strategy of forest conservation has become imperative. Conservation includes preservation, maintenance, sustainable utilisation, restoration, and enhancement of the natural environment.

National Forest Policy of India 1988

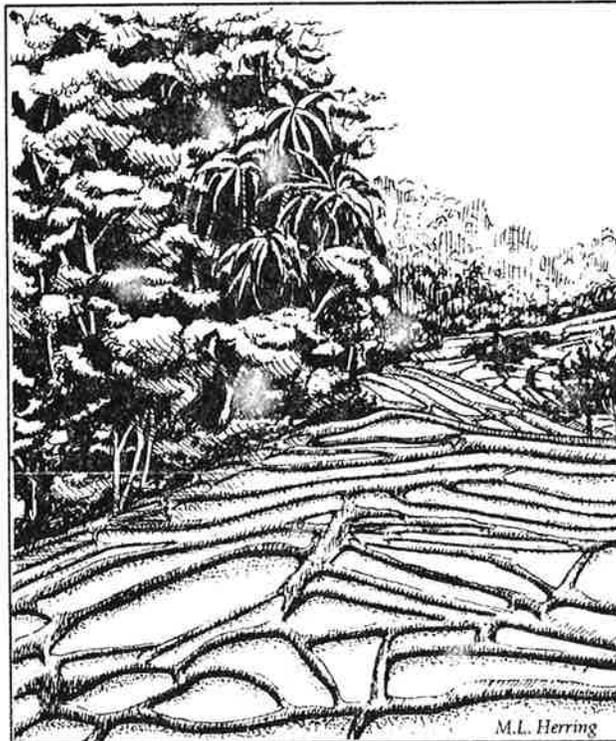
What would conservation of native forests be like in the U.S. if the human population were nine times as dense? What if daily survival of rural human communities depended on converting heavily fragmented native forests to croplands, or depended on daily use of local forests for fodder, fuelwood, and sustenance?

Such an alternative future exists now. It is India.

As part of a 9-person team from USDA Forest Service, we have been assisting the Wildlife Institute of India in developing a new wildlife conservation strategy for all forestlands of the country. The project is entitled "Wildlife in Managed Forests of India" and encompasses a 3-year commitment to train Indian scientists and managers in management of wildlife habitat and biological diversity. This new training would enable India to craft management strategies to meet mandates of their new National Forest Policy. In this article, we briefly review the classes and status of forests of India and discuss the role of natural forests in the current dilemma and future vision.

THREATENED FORESTS OF INDIA

In India, maintaining productivity of the land is more than an esoteric goal of a small class of forest managers. Productivity is life. Some 70 to 80 percent of Indians depend directly on agricultural and forest yields from the land, whereas nearly 80 percent of U.S. citizens live in urban areas (Salwasser 1991). Nineteen percent of India is forested, as compared to 32 percent



Indian forest abutting rice fields

of the U.S. Whereas the U.S. has allocated some 7.5 percent of the land, including native forests, to highly protected status, only about 3.9 percent of India's lands are in protected status of national parks, sanctuaries, and preservation plots. And India is only a third the size of the U.S.

The array of products that Indians derive from their forests is staggering. They include medicines, resins, cosmetics, timber, fuelwood, game, fish, shelters, fodder, forage, and a list of other products that fills a 6-volume catalog.

Many of the native forests of India are gone, and little if any of what remains can be considered virgin forest. Much forest has been replaced by plantations of sal (*Shorea robusta*) in the north or teak (*Tectona grandis*) in the center and south, and even by exotic species such as eucalyptus. A long, convoluted history of forest exploitation dates back even to

Aryan civilizations (Lal 1989). Early efforts by local rulers, the British, and the independent Indian government to preserve some commercial forests and game parks have at times been thwarted by rampant population growth coupled with subsistence and commercial exploitation of resources. All this has culminated in two centuries of forest depletion under both British and Independent rule.

The widespread reduction and fragmentation of the native forests, as well as formerly unrestricted hunting, have left a wake of threatened species. These include the great Indian one-horned rhinoceros, blackbuck, gaur, Asian elephant, Asiatic lion, tiger, leopard, a long list of primates, and many more, including more than just a few local human tribes.

In response, India has taken some bold conservation moves. During the 1970s a network of wildlife sanctuaries was set up under Operation Tiger primarily to

protect the few remaining tigers in the country. As of 1988, all clear-cutting of forest lands was prohibited throughout the country until more ecologically acceptable forest management methods could be devised. Timber or other harvest has not been allowed without a current management plan. Except for subsistence needs, all hunting and fishing has also been banned country-wide to help conserve the wide array of threatened and endangered wild species. And under the new forest policy, a strategy is being crafted for managing and conserving all forests for biological diversity and sustainable resource production.

CLASSES OF FORESTLANDS IN INDIA

Indian forests are divided into management units called forest circles and these into forest districts, similar to our

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Threatened Forest of India, continued

national forests and ranger districts. Also within the jurisdiction of the forest department are the national parks and wildlife sanctuaries, which often consist of "core areas" and "buffer areas." Management of core areas, also called *sanctum sanctora*, explicitly excludes any human habitation, development, or direct resource exploitation. Bordering the core areas are buffer areas in which timber harvest, livestock grazing, and other human uses of the forest are allowed through legal permits or rights. Rights are guaranteed allotments given to specific tribes, usually to ensure that they can continue their traditional use of local forest resources for sustenance, in much the same way that Native Americans in the U.S. are given rights for traditional subsistence fishing of salmon in rivers of the Pacific Northwest or hunting of caribou in interior Alaska.

All forestlands in India are managed by the federal Indian Forest Service but are locally administered by individual states through a complex hierarchy of field, regional, state, and federal offices. This array of allocations at times leads to jurisdictional disputes over management authority for timber, wildlife habitat, and local tribal use of resources.

In addition, Village Wastelands, Village Pasturelands, and Village Forests constitute other land allocation classes. Some of these lands are no longer forested and afforestation is being attempted through social forestry programs. These efforts are commendable, but carry a risk of introducing exotic plant and animal species that may create future problems.

WHAT IS NATURAL?

In India, the very concept of "natural forest" requires redefinition. There are no forests or wildlife habitats in India whose composition and structure have not been greatly influenced by several millennia of human intervention. Such intervention includes shifting cultivation, nomadic grazing, and human-caused fire (Champion and Seth 1968). Many forests are the result of teak and sal selective timber harvest or plantations created within the last 150 years.

In contrast to how we often use the term in the U.S., "natural" in India means not directly altered in recent decades. But even that is not entirely true as many protected forests are still regularly entered for harvest of bamboo and extraction of many other forest products. Our New World concepts of ancient forests and of potential, natural, and climax vegetation must be revised here in light of the pervasive human element. Successional stages of forest development are themselves heavily influenced by local site histories of human use.

For example, when clearing a forest it is common to leave standing a few of the bigger trees because they were difficult to fell, or for fruit or shade, for religious reasons (such as with *Ficus* species) (Champion and Seth 1968). Livestock grazing and fire greatly alter plant species composition. Highly disturbed areas are colonized by lush understories of *lantana* (*Lantana camera*), a weedy shrub from the Neotropics.

As another example, in the Satpura Hills of central India, forests of tiwas (*Ougeiania oogeinensis*) occur in sites with long histories of shifting cultivation with generations of tilling. As a result, tiwas forests are often stunted and contain lush understories of *lantana*.

Effects of long-term use are graphic when one compares areas within 5 km of villages to more distant core areas or steep slopes. In central India, dense expanses of *Sorghum* grasses grow seven feet tall where human impact is low. Such grasses are virtually absent in the more heavily-used buffer areas within several kilometers of villages and along roads. Core areas also

have substantially less *lantana* cover and a greater diversity of fruit-bearing shrubs and trees which provide for a wide variety of wildlife. These habitat attributes can be fostered also in buffer areas and other so-called "revenue lands" by careful silvicultural and land-use planning at stand and landscape scales.

In recent years, as a sometimes desperate measure to conserve local forest ecosystems and biota, a number of forests traditionally managed intensively for timber production have been converted to wildlife sanctuaries or national parks. Some older forests are protected also in "preservation plots" which provide a benchmark for measuring changes in tree size, forest stand composition and structure, and tree species replacements (ecological succession), for younger growth forests. The preservation plot forests, however, are not devoid of influence from humans. Often small in size, they nevertheless serve a purpose similar to our Research Natural Areas in the U.S. National Forests. One purpose of RNAs is to protect the best examples of the oldest "climax" or near-climax forests and are often, but not necessarily, ancient old-growth forests. They are chosen to represent indigenous forest types and are selected mostly for scientific study. In contrast, in India an indigenous or old-growth forest is one that has escaped intensive exploitation for perhaps fifty years to a century or more, not necessarily one at a final, climax state of successional change.

As an example, in Parambikulam Wildlife Sanctuary in Kerala state, south India, one preservation plot consists of an old tea plantation that is slowly being converted back to native, moist deciduous, tropical forest. The forester in charge of this inventive restoration project has prescribed silvicultural entries on 10-year cycles in which about 20 percent of the standing overstory trees are removed per entry. This prescription is helping the stand slowly recover to more natural conditions, although there is no undisturbed forest available for comparison. Much more needs to be learned about restoration of such "natural" forests and their successional pathways during stand development. Site potential may be predictable using a multifactor ecological classification system based on variables associated with topography, soil, and vegetation. Needed are broader analyses of such stands to more accurately study regeneration biology of noncommercial trees, to monitor seedset and seedfall, to test viability of seeds and naturally regenerated seedlings, and to track a sample of seedlings over time to monitor their fate and the effects of herbivory, particularly by sambar and elephant (Rodgers et al. 1988).

NEW FORESTRY IN AN OLD WORLD

Elements of what USDA Forest Service is calling "new forestry" have existed in India for some time. In older teak plantations in central India, local tree nurseries are now raising and underplanting a host of fruit trees that were once present but removed from the forests. The fruit trees provide essential foods for ungulates, primates, frugivorous birds, sloth-bears, jackals, and other wildlife. Trees for fodder, fruit, timber, and other uses are regularly planted along highways and rights-of-way and their use is regulated by local forestry officials. Although not specifically aimed at providing wildlife habitat per se, other management activities can also provide secondary benefits to wildlife. Trees with religious significance such as figs, and fruit trees such as mango, have been retained over the centuries. Today, magnificently canopied *Bulgoria latifolia* trees are grown as a scattered overstory in tea plantations for partial shade. This overstory provides nesting cavities for blossom-headed parakeets, crimson-breasted barbets, Indian plaintive cuckoos, and a host of other species.

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Threatened Forests of India, continued

The purpose of guiding a new era of forest conservation in India is not to restore all forests to primeval condition, even if that condition were known. Instead, it is primarily to provide for restoration of some elements of forest structure and composition to sustain endangered biota and concomitantly provide for sustainable human use.

IS THIS WHAT WE WANT?

There are lessons both harsh and admirable to be learned from India's forestlands. The harsh lessons pertain to avoiding the degraded nature of the native forests from centuries of shifting cultivation, burning, overgrazing, and silvicultural conversion to simplified plantations. As a result, many plant and animal species of many taxa are highly threatened by continual fragmentation and disturbance of the remaining forests. There are two ultimate culprits. First are problems associated with uneven distribution of resources to a burgeoning human population. Second is the lack of develop-

ing and enforcing long-sighted management of forest resources near villages and population centers. Both problems in turn stem from growing human densities.

But the admirable lessons are ones of bold new visions for the country. These include implementing a National Forest Policy of 1988 that calls for a nation-wide network of protected forest areas that ensures genetic connectivity among plant and animal populations. The policy also calls for providing for human needs with landscape planning and design and for ensuring the long-term productivity, biodiversity, and sustainability of all forestlands.

In the throes of political, environmental, and legislative turmoil over exploitation of ancient forests in the U.S., we might want to consider India's plight as one alternative future for us. We might then better realize that North America still has options for how to wisely manage its naturalized and native forests for future generations.

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LITERATURE CITED

Champion, H. G., and S. K. Seth. 1968. A revised survey of the forest types of India. Manager of Publications, Delhi. 404 pp.

Lal, J. B. 1989. India's forests myth & reality. Natraj Publishers, Dehra Dun, India. 304 pp.

Marcot, B. G. Submitted. Six weeks in India: a new conservation for an old world.

Rodgers, W. A., V. B. Mathur, and V. B. Sawarkar. 1988. Report on status of Parambikulam Preservation Plot. Unpublished report, Wildlife Institute of India, Dehra Dun.

Salwasser, H. 1991. Opening remarks: National Workshop on Integrated Forest Planning and Management for Conserving Biological Diversity. Presentation at a national conference, 21 January 1991, Pachmarhi, Madhya Pradesh, India.

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