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People within parks—forest villages, land-cover change and landscape fragmentation in the Tadoba Andhari Tiger Reserve, India

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Abstract

There has been extensive debate on the conservation impact of people located within protected areas. In a tiger reserve in central India, we find that the densely populated villages located outside the park boundary are better connected to regional markets by road networks, and are associated with greater deforestation rates and more forest fragmentation compared to the more isolated villages in the park interior. The park itself however appears well protected in terms of forest cover and connectivity. Instead of focusing on resettlement of forest villages, forest protection needs may be better served by working with these surrounding communities to develop alternate mechanisms for income generation.
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Introduction

Deforestation in the tropics is a major driver of global environmental change, with significant consequences in store for global climate, biodiversity, and the maintenance of a

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range of ecosystem services (Geist & Lambin, 2002; Rindfuss, Walsh, Turner, Fox, & Mishra, 2004). A variety of mechanisms have been put in place to curtail and manage these transformations, of which the establishment of protected area networks has been perhaps one of the most visible. By the end of the 20th century, over 100,000 protected area reserves had been established across the world, covering about 9% of the Earth's land surface (Green & Paine, 1997). This expansion has been especially rapid in the past few decades, with protected areas now viewed as one of the last remaining bastions of refuge against an almost unstoppable tide of deforestation.

In South Asia, where tropical forests coexist with some of the highest densities of human populations in the world, most forested areas are found in human-dominated landscapes, and most protected areas are embedded in landscapes that have been inhabited by humans for millennia (Gadgil & Guha, 1992). As with other regions of the world, the strict exclusionary policies that were adopted by most parks, when combined with a generally unsympathetic administration, exacerbated park–people conflicts—giving rise to problems for local communities as well as for park administrators (Agrawal & Ostrom, 2001; McLean & Straede, 2003). Biodiversity continued to be lost at a rapid pace despite extensive efforts to curtail habitat degradation.

By the early 1990s, awareness of these problems had led to a change in policies, with an increasing emphasis on involving local communities with forest management through community forestry and co-management initiatives (Agrawal & Ostrom, 2001; Poffenberger & McGean, 1996). These approaches, although strong on rhetoric, remain limited in practice (Agrawal, Britt, & Kanel, 1999). Joint forest management and community forestry initiatives have strengthened and expanded in nonpark forests, and protected area policies are attempting to involve communities located at the park periphery in eco-development initiatives (Dinerstein, 2003; Nagendra et al., 2004). However, there remains significant debate within the forest departments of the region and international conservation agencies on the necessity, and indeed the wisdom of allowing local communities to engage with forest conservation within protected areas (Chapin, 2004; Wilshusen, Brechin, Fortwangler, & West, 2002). This thinking is reflected in the current global debate on protected area conservation, with a number of recent publications arguing that the demands of conservation and people are difficult to reconcile, and need to be separated for maximum effectiveness (Brandon, Redford, & Sanderson, 1998; Oates, 1999; Terborgh, 1999). There is thus a growing demand for the return of strict protection-based approaches to management in selected protected areas, especially those areas that have been set aside for large mammal protection (Liu et al., 2002; Seidensticker, Jackson, & Christie, 1999).

The subcontinent of India exemplifies these tensions between conservation and development. Between 1975 and 1998, the number of national parks in India increased from 5 to 85, and the number of wildlife sanctuaries increased from 126 to 448 (Ministry of Environment and Forests, 1998). Five percent of the country's land surface is currently under protection, largely located in areas of dense human populations. Thus, areas that are set aside as parks frequently contain settlements located within their boundaries. These communities find themselves subject to strict restrictions on the harvest of forest products that are significant component of their traditional livelihood. The process of park creation further puts these, often tribal, low-income villages, out of the scope of most development agencies, since development and infrastructure activities are not permitted within the park. Thus, in a somewhat paradoxical situation, even while attention has been paid to creating

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