A landscape approach to conservation and development in the Central Indian Highlands

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The Central Indian Highlands is a microcosm that illustrates the intertwined challenges of conservation, development, and social equity in a rapidly emerging economy. In this special issue, we seek to apply the academic discourses of landscape-level management (Sayer et al. 2013) and conservation–development debates (Fisher et al. 2014) to the ground-level realities of this globally important landscape. As in many places around the world, the unresolved question of how to simultaneously improve local livelihoods, meet national-level development needs, and achieve conservation goals takes on urgency as current decisions are paving the future pathway for people and biodiversity in this landscape.

The late-nineteenth century British forest officer and avid hunter and explorer, James Forsyth, identified the Central Indian Highlands as the biogeographic region “in the very centre of India” where “several of the great rivers of India have their first sources ... and pour their waters into the sea on either side of the peninsula” (Forsyth 1871). Gajbhiye and Mandal (2000) define the central highlands as an Agro-Ecological Region covering approximately 25 million hectares or 7.6 % of the total land area of the country (Fig. 1). The region spans 34 administrative districts across three states (Madhya Pradesh, Maharashtra, and Chhattisgarh). It is home to 54 million people (Government of India 2011): tribal groups with a deep history of forest-dependent cultures, small-scale farmers,

and growing urban populations. About 70 percent of the population is rural with high dependency on forests for fuelwood, fodder, and income from forest products.

Tigers are an iconic feature of the landscape. Their conservation is the primary goal for the network of 32 protected areas, some connected by corridors of remaining forest. The network enables tigers to persist amidst expansion of infrastructure, forest degradation, and other human pressures. The landscape supports about 30 % of the total tiger population in India (Jhala et al. 2011) and has been identified as a Global Priority Landscape for tiger conservation (Sanderson et al. 2010).

While much of the previous research in this landscape has focused on ecology and conservation within protected areas, e.g., (Schaller 2009), this special issue takes a holistic view of the landscape by focusing on areas outside protected area boundaries. The landscape provides livelihoods for local people, land for agriculture, habitat for wildlife, timber, and water for human consumption downstream. These demands on the landscape often compete. As is the case elsewhere in the world, there is no clear pathway to reconcile different priorities for the landscape or to manage the landscape as a whole unit.

Papers in this special issue collectively address several themes that reflect the challenges confronting this landscape. One set of papers addresses human interactions with forests and wildlife outside protected areas. Agarwala et al. (2016) show that human use of forests alters long-term forest composition and structure. Miller et al. (2016) confirm high rates of livestock predation outside a protected area and map high-risk areas. Awasthi et al. (2016) conclude that ungulate densities in the core of a protected area are higher than in multiple-use buffers outside. Borah et al. (2016) identify the importance of prey densities and human disturbance for tiger presence in a corridor between

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Fig. 1 Location of Central Indian Highlands and major rivers

protected areas, while Dutta et al. (2016) map the opportunities for connectivity between protected areas throughout the landscape despite high human presence. Two additional papers assess the provisions provided by the landscape for agricultural production (Mondal et al. 2016) and water supply for irrigation, urban areas, and other downstream uses (Clark et al. 2016). Another set of papers examines participation of local communities and social equity. Kashwan (2016) and Sekar (2016) survey local communities and illustrate the historical legacies of unbalanced power structures in resettlement of villages from protected areas. Macura et al. (2016), Read (2016), and Fleischman (2016) analyze effectiveness of existing management efforts and forest governance to address these difficult challenges and enable local communities to participate in and benefit from conservation. Seidensticker (2016) synthesizes possible solutions to reconcile conservation and development, including the development of future landscape scenarios with participation from multiple stakeholders, smart green infrastructure, and scaling-up from local interventions to achieve landscape-scale impacts.

This diverse collection of papers points toward several considerations for protected area managers, conservation practitioners, the research community, and others working toward a promising future for wildlife and people of the Central Indian Highlands:

- The goals and aspirations from multiple perspectives—including wildlife conservationists, historically marginalized communities, and those working toward economic development—need to be inclusively integrated in a future vision for the landscape. All of these perspectives are valid, and each has priorities that need to be accommodated for a bright future.

- Landscape-level processes, for example the movement of water from the headwaters to downstream users and the movement of wildlife across forested corridors, are essential to maintain functions that support people and wildlife. Effectiveness of development decisions and conservation actions depends on maintaining these landscape functions. Such a goal is complicated by the reality that landscape-level management does not mesh with the jurisdictions of those with authority to make decisions.
- Finally, a framework that integrates social, economic, and ecological viewpoints is fundamental for decisions that affect people and wildlife. While integrated frameworks are popular in the academic literature, e.g., (Tallis et al. 2008), implementation on the ground is exceedingly difficult and often runs counter to management structures. An integrated framework depends on including a broad range of expertise and multiple viewpoints at all levels of management in government, non-government entities, and research.

These three considerations apply particularly to the Central Indian Highlands where people and wildlife coexist in close proximity, and India's economic development is proceeding at a rapid pace. The same considerations, in different contexts, likely apply to the management of many landscapes throughout the world.

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