

Research Need on Environmental Gains in Conservation-Induced Relocation

Surendra Singh Rajpoot and M.S. Chauhan

Abstract Relocations are made for developmental- and conservation-induced scenario. Conservation-induced relocations are different from developmental-induced relocations, in the sense that site is vacated due to it is environmentally improved. There are a lot of studies on social impact of conservation-induced relocation, but very few studies have been undertaken on environmental gains through it. With more emphasis on maintaining ecological balance and sustenance of biodiversity, nowadays conservation-induced relocation is taking place, specially, within the protected areas. Therefore, research to assess ecological and environmental gains is needed, so as to judge objectively very aim of such relocation. Studies related to pros and cons, need and necessities, and areas of existing studies about relocation for biodiversity conservation with reference to protected areas have been dealt in this paper. Based on the above studies, broader fields are assessed, in which further research and study are required, toward environmental gains through such relocation.

Introduction

Protected areas are considered to be biodiversity hub of planet earth. Protected areas, which today accounts for only 1.4% of the Earth's surface, are home to almost half of the plant species and more than one-third of all vertebrates (Heltberg 2001). Ever since the publication of Hardin's articles 'The Tragedy of the Commons', there has been a growing debate on common pool resources, property rights, and resource degradation. The concept has been used to explain

S.S. Rajpoot

Narmada Valley Development Authority, Narmada Bhawan, Bhopal, MP, India
e-mail: ssrajpoot@hotmail.com

M.S. Chauhan (✉)

Department of Civil Engineering, Maulana Azad National Institute of Technology,
Bhopal 462003, India
e-mail: mschauhan@manit.ac.in

overexploitation of forests and fisheries, overgrazing, air and water pollution, abuse of public lands, population problems, extinction of species, and other problem of resource misallocation (Stevenson 1991). Due to overexploitation of natural resources, of the protected areas, voluntary conservation-induced relocation is used as a management tool.

The fragile nature of biodiversity in many nature reserves, ongoing conflicts, and the demand from people for better living standards necessitate the conservation community to examine relocation as a possible conservation solution (Karanth 2002; Karanth and Karanth 2007). There are two opposite sides of conservation-induced relocation; first socialists and second biologists. Both have almost antagonizing views over the subject. There is a dearth of studies about conservation-induced relocation, especially environmental gains of such relocation. This paper deliberates about the need for research and studies about environmental and ecological gains of conservation relocations, so as to have a more qualitative assessment of the issues.

Relocation

Relocation of the people is broadly classified into two categories, i.e., development-induced relocation (DIR) and conservation-induced relocation (CIR). Conceptually development-induced and conservation-induced displacements are indistinguishable, either from the perspective of the state (both are due to state management of resources as part of plans to increase prosperity and well-being) or from the point of view of people evicted (for whom the precise cause of eviction is of little importance) (Brockington and Igoe 2006). Although DIR and CIR have above similarities, they differ in nature, as ecologically and environmentally the land vacated due to relocation undergoes change. The characteristic change in DIR is totally different from original land use, e.g., in construction of irrigation dam, the land is submerged and has adverse environmental impact, whereas in CIR the vacated site is environmentally improved.

Protected Areas

A protected area is a clearly defined geographical space, recognized, dedicated, and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values (IUCN Definition 2008). Protected areas—national parks, wilderness areas, community conserved areas, nature reserves, and so on—are a mainstay of biodiversity conservation, while also contributing to people's livelihoods, particularly at the local level. Protected areas are at the core of efforts towards conserving nature and the services it provides us—food, clean water supply, medicines, and protection from the impacts of natural disasters. Their role in helping mitigate and adapt to climate

change is also increasingly recognized; it has been estimated that the global network of protected areas stores at least 15% of terrestrial carbon. Protected areas are considered to be biodiversity hub of planet earth. Protected areas, which today accounts for only 1.4% of the Earth's surface, are home to almost half of the plant species and more than one-third of all vertebrates (Heltberg 2001).

India also has ten biogeographic realms and is one of 17 mega-diversity countries that together support two-thirds of the world's biological resources (Rodgers and Panwar 1988; Briggs 2003). Thirty-three percent of the country's 49,219 plant species are endemic (MoEF 1999). Although India covers just 2.4% of the Earth's area, it harbors 7.3% of the world's terrestrial vertebrate species and 89,451 faunal species (MoEF 2000). India has several charismatic mammal species, including 40% of the world's tigers, and most of the world's Asian elephants. Overall, some estimates suggest that 20% of Indian mammal species face imminent extinction, and several have already disappeared from over 90% of their historic range (Madhusudan and Mishra 2003). India has less than 5% under-protected areas, but harbors more than 50% of its biodiversity. This calls for better protection and management of these sanctum sanctorum areas for conservation of biodiversity and sustainable use of natural resources.

Classification of Protected Areas

Based on objects, purpose of constitution and level of protection, PAs are classified into various categories. The International Union for the Conservation of Nature and Natural Resources (IUCN) protected area management categories are a framework for organizing and understanding protected lands around the world. The categories came into being following many efforts to establish a "common understanding of protected areas" when countries had very different ways of looking at protected areas, used different terms, and assigned different meanings to similar or identical terms. There are six categories (IUCN published its revision of category definitions in 2008) into which protected lands can be sorted.

India has the following kinds of protected areas, in the sense of the word designated by IUCN:

National parks (IUCN Category II): India's first national park was Hailey National Park, now Jim Corbett National Park, established in 1935. By 1970, India had five national parks; today it has over 120 national parks. All national park lands then encompassed a total 39,919 km² (15,413 sq mi), comprising 1.21% of India's total surface area (MoEF website). **Animal sanctuary (IUCN Category IV):** India has over 500 animal sanctuaries, referred to as Wildlife Sanctuaries (MoEF website). **Biosphere reserve IUCN (Category V):** There are 18 biosphere reserves in India. **Reserved forests and protected forest (IUCN Category IV or VI, depending on protection accorded):** These are forested lands where logging, hunting, grazing, and other activities may be permitted on a sustainable basis to members of certain

communities. In reserved forests, explicit permission is required for such activities. In protected forests, such activities are allowed unless explicitly prohibited. Thus, in general reserved forests enjoy a higher degree of protection with respect to protected forests (Indian Forest Act 1927).

Conservation Reserve and Community Reserve (IUCN Category V and VI, respectively): These are areas adjoining existing protected areas which are of ecological value and can act as migration corridors, or buffer zone. Conservation reserves are designated government-owned land from where communities may earn a subsistence, while community reserves are on mixed government/private lands. Community reserves are the only privately held land accorded protection by the government of India (Indian Forest Act 1927).

Village and panchayat forests (IUCN Category VI): These are forested lands administered by a village or a panchayat on a sustainable basis, with the habitat, flora and fauna being accorded some degree of protection by the managing community (Indian Forest Act 1927).

Need for Conservation of Biodiversity

Why is there a need to conserve biodiversity? The reasons are neither obvious nor widely agreed upon. Environmental philosophers identify two very different sets of arguments, based on the utilitarian (or instrumental) versus the intrinsic (or inherent) value of nature. The utilitarian value of nature refers to the product or function that nature can provide, whereas intrinsic value inheres in the natural object or system itself, irrespective of whether it has any use. Arguments for conserving biodiversity that are based on the utilitarian value are often labeled anthropocentric (human-centered), whereas the arguments predicated on intrinsic value are often called bio-centric (or eco-centric) since the value exists independent of its use to human beings. The utilitarian value of biodiversity may be divided into four basic categories: goods, services, information, and spiritualism (Table 1) (Mulder and Coppolillo 2004). Intrinsic value is a much more subjective matter. While most people take the intrinsic value of humans for granted, the view that “Nature” (often personalized in this sense) has inherent rights and is as such subject to the same moral, ethical, and legal protection afforded humans is more controversial.

Table 1 Categories of utilitarian values

Category	Examples
Goods	Food, fuel, fiber, medicine
Services	Pollination, recycling, nitrogen fixation, homeostatic regulation, carbon storage
Information	Genetic engineering, applied biology, pure science
Psycho-spiritual	Aesthetic beauty, religious awe, scientific knowledge, recreation, tourism

Biodiversity is to be conserved for maintaining the following services:

Maintenance of ecosystem includes recycling and storage of nutrients, combating pollution, stabilizing climate, protecting water resources, formation and protection of soil, and maintaining eco-balance. Provider of biological resources includes provision of medicines and pharmaceuticals, food, ornamental plants, wood products, breeding stock and diversity of species, ecosystem, and genes.

Social benefits include recreation and tourism, cultural value, and education and research (Cardinale et al. 2012).

Need for Conservation-Induced Relocation

The importance of biodiversity conservation has been discussed as above. Most of the biodiversities in the present days are within the limits of protected areas. These protected areas account for less than 5% of the geographical area of the India. Globally, large terrestrial mammals are among the most threatened taxa in the world, with 25% of species facing extinction (Ceballos et al. 2005; Schipper et al. 2008). Recent studies suggest that South Asia harbors the most threatened terrestrial mammals (Schipper et al. 2008). For India, in particular, conservative estimates suggest that 20% of large mammal species may face extinction, and several species have already disappeared from over 90% of their original range (Madhusudan and Mishra 2003). The Indian subcontinent harbors more than 500 mammal species, but also has a ‘modern’ conservation history of regulating land uses to protect natural areas that date back over a century (Blythe 1863; Jerdan 1874; Russell 1900; Prater 1948; Stebbing 1920; Rangarajan 2001).

The tiger (*Panthera tigris*) or the greater one-horned rhino (*Rhinoceros unicornis*) occupy just one to five percent of their historical range. Races of some species such as the Asian lion (*Panthera leo persica*) and the hardground barasingha (*Cervus duvauceli branderi*) are confined to single site, microscopic remnants of a once vast range (Divyabhanusinh 2005; Karanth 2006). In Sariska Tiger Reserve, adverse changes in vegetation structure and plant species composition were caused by chronic biomass extraction that was likely affecting forest avifauna as well (Kumar and Shahabuddin 2005). The Biligiri Rangan Hills Temple Sanctuary in southern India reports reduced recruitment of some extracted NTFP species and changing tree species composition of forests due to long-term use (Murali et al. 1996; Shankar et al. 1998). Studies in Pin Valley National Park in the Indian Himalaya indicate that there may be competition for pastures between domestic goats/sheep and wild ibex, given the coincidence of diet choice (Bagchi et al. 2004).

Ever since the publication of Hardin’s articles ‘The Tragedy of the Commons’, there has been a growing debate on common pool resources, property rights, and resource degradation. The concept has been used to explain overexploitation of forests and fisheries, overgrazing, air and water pollution, abuse of public lands, population problems, extinction of species, and other problem of resource misallocation (Stevenson 1991). When property rights to natural resources are absent and

unenforced, i.e., when there is open access, no individual bears the full cost of resource degradation. The result is 'free riding' and overexploitation, what Hardin termed the 'Tragedy of the Commons' (Hardin 1968).

Available reports suggest that between 50 and 100% of stricter protected areas in South America and Asia are used or occupied by people (Kothari et al. 1989; Amend and Amend 1995; Bruner et al. 2001; Rao et al. 2002; Bedunah and Schmidt 2004). Growing human population and shrinking natural resources have disturbed ecological balance in some areas. There are many studies which suggest it. An increasing number of scientific studies point to the habitat degradation caused by biomass extraction such as grazing, fuelwood collection, and commercial non-timber forest produce (NTFP) extraction inside areas, set aside for biodiversity conservation (Siebert 2004; Karanth et al. 2005).

Biologists therefore emphasize the fact that *some* amount of inviolate zone (strictly protected area) is required to maintain the entire spectrum of biodiversity as well as to minimize conflicts with large mammalian fauna (Terborgh et al. 2002; Ministry of Environment and Forests 2005). The fragile nature of biodiversity in many nature reserves, ongoing conflicts, and the demand from people for better living standards necessitates the conservation community and examines relocation as a possible conservation solution (Karanth 2002; Karanth and Karanth 2007).

It is evident that human activities in some parts of the protected areas have affected habitat and ecology adversely. People living within these protected areas for their economic well-being have also been opting to move voluntarily out of the area. Case of people willing to be relocated appears to be a win-win situation for the both park managers and people. The National Tiger Conservation Authority of India has come up with legal provisions for voluntary relocation from Tiger Reserves. The provisions therein incorporate willingness of people, social, and ecological studies to make the whole process transparent and people friendly.

Following are provisions made in section 38 V (5) Wildlife (Protection) Act 1972:

Save as for voluntary relocation on mutually agreed terms and conditions provided that such terms and conditions satisfy the requirements laid down in this subsection; no Scheduled Tribes or other forest dwellers shall be resettled or have their rights adversely affected for the purpose of creating inviolate areas for tiger conservation unless:

- (i) The process of recognition and determination of rights and acquisition of land or forest rights of the Scheduled Tribes and such other forest dwelling persons is complete;
- (ii) The concerned agencies of the State Government, in exercise of their powers under this act, establish with the consent of the Scheduled Tribes and such other forest dwellers in the area, and in consultation with an ecological and social scientists familiar with the area, that the activities of the Scheduled Tribes and other forest dwellers or the impact of their presence upon wild animals are sufficient to cause irreversible damage and shall threaten the existence of tigers and their habitat;

- (iii) The State Government, after obtaining the consent of the Scheduled Tribes and other forest dwellers inhabiting the area, and in consultation with an independent ecological and social scientist familiar with the area, has come to a conclusion that other reasonable options of co-existence are not available;
- (iv) Resettlement or alternative package has been prepared to provide the livelihood for the affected individuals and communities and fulfills the requirements given in the National Relief and Rehabilitation Policy;
- (v) The informed consent of the Gramsabha concerned, and of the persons affected, to the resettlement program has been obtained; and
- (vi) The facilities and land allocation at the resettlement location are provided under the said program, otherwise their existing rights shall not be interfered with (Wild life (Protection) Act 1972, Section 38 V (5)).

Need for Study of Environmental Gains Due to CIR

CIR even being a contagious issue has philosophers both for and against it, but there is hardly any complete and detailed study about the consequences. It has taken many months of burrowing through libraries, reading through back issues of journals and trawling through bibliographic databases to produce this list. Just as the literature is not well ordered, the activities of researchers examining relocation from protected areas have also not been systematic. Only recently, Schmidt-Soltau's work (2005a), there has been an attempt to build up a retrospective assessment of the patterns of eviction (Brockington et al. 2006). There is an extraordinary dearth of good information about the social impacts of protected areas. Protected areas have expanded threefold in recent years, and the stricter category 1–4 protected areas now some 49,000 and cover 6% of the land surface of the planet. One should expect this to have involved some evictions. Yet when two of us recently reviewed as much literature on protected area displacements as we could, we found just under 250 books and papers containing information on just over 150 protected areas. A significant proportion of reports and case material (nearly half) merely stated that people had been moved. There was no further discussion of these moves, let alone good investigation of their consequences (Brockington et al. 2006).

Only a few studies, that we are aware of, systematically use consistent methodology to assess involuntary resettlements and evictions from protected areas at the regional level (Cernea and Schmidt-Soltau 2003, 2006). We now review the main environmental, socioeconomic, and other impacts of the displacement of local communities from PAs in India. As far as possible, we do this for both the old and the new sites (before and after relocation). Unfortunately, the information is rather

incomplete, as we found a very few studies of post-relocation, and almost none have assessed the situation over a long-term period (Lasgorceix and Kothari 2009). In India, there is as yet no full-length study of conservation-related displacement that can compare with those in eastern or southern Africa. In Tanzania and South Africa, cases of forceful eviction of pastoral peoples from game reserves are becoming increasingly common (Carruthers 1995; Neumann 1998).

There could be two possible reasons for the paucity of cases. Either few cases have been reported because few have happened, or eviction has been ignored. The appropriate answer may well vary according to country and region. We will argue below that in some regions there is good evidence that eviction from protected areas has been substantially overlooked. Second, in many cases the quality of the information is poor. A significant proportion of reports and case material (nearly half) merely stated that people had been moved. There was no further discussion of these moves, let alone good investigation of their consequences. This sort of report might be found in conservation literature in which the movement of people was mentioned in connection with the establishment of a new protected area. But it also characterized a significant proportion of the literature about indigenous peoples. Much of this was protest literature, whose purpose was to alert the world to the losses of indigenous groups. The significance of such events for livelihoods and cultures is often not explored (and for good reason, the main impacts will be obvious) nor are methods made clear (again for good reason, these are not academic publications). Third, and most importantly, this literature is not (yet) a catalogue. These works are diffused and often hard to locate. It has taken many months of burrowing through libraries, reading through back issues of journals and trawling through bibliographic databases to produce this list. Just as the literature is not well ordered, the activities of researchers examining relocation from protected areas have also not been systematic. Only recently, Schmidt-Soltau's work (2005a), there has been an attempt to build up a retrospective assessment of the patterns of eviction, and this is only for one region, and, as we shall see, from an unusually complete coverage of protected areas in existence.

Countless workshops, lectures, and discussions delved into topics such as poverty alleviation, social injustice, indigenous peoples' rights, community management of protected areas, and gender equity in conservation. All these have their place in a global agenda but for me they dominated and drowned out the discussion of themes more directly related to conserving nonhuman life on this planet (Terborgh 2004). Detailed quantitative assessments of the consequences of displacement for conservation are few, the literature on the historical erasures and reinventions of place, people and landscape is rich (Carruthers 1995; Ranger 1999). This signifies that studies related to conservation-induced relocation are few and whatever has been taken place deals with social angle only and almost negligible about ecological point of view.

Conclusion

Biodiversity is an important issue and needs to be conserved. Globally protected areas are harboring bulk of biodiversity, which is in percentage terms is too large in comparison to the area of protected areas. In India too the scenario is similar to it. Therefore, efficient protection and management of these areas are of utmost importance. As a conservation tool, voluntary relocation of human population from such area has been on the agenda of biologist. This kind of conservation-induced relocation has two facets of it, namely social and ecological sides. Socialist and biologist have antagonizing views over CIR. As the review of literature reveals that there is paucity of enough literature on both the angles. Whatever studies are available are not comprehensive and focused on multilateral issues.

Among the available literature, focus has been mostly towards human-centric issues and no concrete study of ecological and environmental gains at vacated site has been taken up. The authors could not find any study/research which deliberates on this issue. It is therefore required to have ecological and environmental studies, taking into account pre- and post-relocation scenario of the vacated site and develop a model for future reference to assess environmental gains in similar cases.

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