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# Making resettlement work: The case of India's Bhadra Wildlife Sanctuary

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ABSTRACT

The relocation and resettlement of people from nature reserves is a controversial issue in the conservation community. The perceived poor success rate of resettlement efforts, combined with availability of few well-documented studies, warrants a detailed examination of this issue. I have analyzed a relocation and resettlement project in India's Bhadra Wildlife Sanctuary. I examine the relocation experience of 419 households who moved to two villages located outside the reserve. I interviewed 61% of relocated households in 2002 and 55% relocated households in 2006. In 2002, 71% of households were satisfied with the relocation effort and their quality of life. In 2006, 52% of households were satisfied with their quality of life. Four years after relocation, all households have access to electricity, water, schools, health care, transportation, and communication facilities. Many households have increased their income and assets. Yet, there were differences between the two different-resettlement villages, with one of them faring better in terms of economics, hardships, and uncertainty. This paper draws out insights important for improving conservation practices related to resettlement efforts. It documents short to mid-term successes and challenges that affect the communities involved. I submit that in specific contexts, relocation may be a viable conservation tool. Successful conservation resettlement requires substantial financial support to meet people's socio-economic needs, active consultation of the people involved, and partnerships of committed non-governmental and governmental organizations.



## 1. Introduction

Nature reserves protect a mere 12% of the world's land surface (Rodrigues et al., 2004). They are located disproportionately in remote, cold, or very dry places, and protect only 2% of biodiversity rich tropical forests. Moreover, people who live in the tropical forests of Asia do so at high densities, either within or near nature reserves (Sanderson and Redford, 2003). In India, 5 million people live inside nature reserves, and 147 million depend on resources that these reserves provide according to one source (Kutty and Kothari, 2001). Human densities around these nature reserves often exceed 300 people per km$^2$ (Rodgers et al., 2003). Despite laws that prohibit hunting, fishing, collection of forest products, agriculture and livestock grazing, these practices are widespread in many Indian reserves (Kothari et al., 1989; Forest Survey of India, 2000; Madhusudan and Karanth, 2000; Karanth, 2002; Karanth and Madhusudan, 2002; Madhusudan, 2004; Barve et al., 2005; Das et al., 2006; Karanth et al., 2006; Kumar and Shahabuddin, 2006). Consequently, conflicts between people and wildlife resulting in livestock loss, crop damage, and injures to people are widespread (Madhusudan and Mishra, 2003; Treves and Karanth, 2003).

In India, village resettlements to promote conservation date back to the 1960s (Rangarajan and Shahabuddin, 2006).

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To reduce human pressures on reserves, the Indian government has relocated or tried to relocate people (Shahabuddin and Shah, 2003; Sharma, 2003; Ganguly, 2004; Shahabuddin et al., 2005; Kabra, 2006; Rangarajan and Shahabuddin, 2006; Karanth and Karanth, 2007). Such relocation is highly controversial, is widely perceived to be ineffective, and documented case histories are few. This paper's objective is to provide one.

Authorities have sometimes forcibly evicted 'illegal' settlers in some cases, whereas in other cases, people have voluntarily moved out of nature reserves. Where and if relocation of people is appropriate are questions subject to intense debates in the conservation community. Conservation related resettlement has been widely practiced in Africa, South, and South East Asia, and in North America (Brockington and Igoe, 2006). There is criticism of such efforts because of their perceived negative impacts on relocated people (Sato, 2000; Brechin et al., 2002; Wilshusen et al., 2002; Brockington, 2003; Chatty and Colchester, 2003; Schmidt-Soltau, 2003; Brosius, 2004; Rangarajan and Shahabuddin, 2006).

Relocated people appear to have lost connections to their culture, history, and identity (Schama, 1996; Karisson, 1998; Jacoby, 2001). They often face loss of economic security and social injustice (Shyamsundar and Kramer, 1997; Brockington, 2002; Wilshusen et al., 2003; Bolaane, 2004). Other dominant social groups often overpower relocated people (Bolaane, 2004; Rangarajan and Shahabuddin, 2006). Governments and non-governmental organizations involved in resettlement efforts rarely consult the people to be moved (Chatty and Colchester, 2003; Shahabuddin et al., 2005; Brockington and Igoe, 2006). These agencies often lack the experience and the expertise to facilitate such major projects, leading to poor planning and hasty execution. Following relocation, governments and non-governmental organizations fail to assess the long-term impacts on relocated people, and people are left to fend for themselves (McLean and Straede, 2003; Rangarajan and Shahabuddin, 2006).

As a result, in some cases people have objected to resettlement, sometimes violently, and occasionally moved back into the reserves (Brockington, 2004; Brockington and Igoe, 2006). In many reserves, there are efforts to prevent relocation. This issue has left the conservation community deeply divided, and many people are hesitant to promote resettlement as a conservation tool (Chatty and Colchester, 2003; Sanderson and Redford, 2003; Brosius, 2004; Rangarajan and Shahabuddin, 2006). However, the fragile nature of biodiversity in many nature reserves, ongoing conflicts, and the demand from people for better living standards necessitates that the conservation community examine relocation as a possible conservation solution (Karanth, 2002; Karanth and Karanth, 2007).

This paper examines resettlement of people out of Bhadra Wildlife Sanctuary, a biodiversity rich nature reserve in southern India (Karanth, 1982; Karanth et al., 2006). People living inside this reserve faced intense wildlife conflicts: animals raided crops, killed livestock, injured and killed people (Karanth, 1982, 2003; Madhusudan, 2003). They also lacked basic amenities (no access to electricity, and running water, quality health care, and schools, transportation, and communication). Reserve management policies and construction of a reservoir limited infrastructure development and services in the villages. In the 1970s, some people voluntarily asked the state governments for help to settle outside the reserve, leading to the initiation of a voluntary resettlement program (Sreekantaiah and Subramanya, 1992; Karanth, 2005). As a result, people from 11 villages moved outside the reserve by 2002.

In 2002, I interviewed relocated households, and key individuals from the government and non-governmental organizations about their experiences. In 2006, I conducted a second follow-up survey to examine changes in people's lives after relocation, and assess the project's overall impact. The literature on resettlement has few case studies, they provide limited details, and show a poor understanding of the relocation process (Brockington and Igoe, 2006). This case study provides an opportunity to understand how relocated people cope, the role of governments and non-governmental organizations, as well as the costs and time involved.

## 2. Materials and methods

### 2.1. Study site

Bhadra Wildlife Sanctuary (Bhadra from here onwards) is located in India's Western Ghats (75°15′ to 75°50′E and 13°25′ to 13°50′N), and covers an area of 492 $km^2$ (Fig. 1). Vegetation includes dry and moist deciduous forests, evergreen forests, and *Shola* grasslands that are unique to this biodiversity hotspot (Karanth, 1982). The reserve has >300 bird species and several threatened mammals: tigers (*Panthera tigris*), leopards (*Panthera pardus*), and elephants (*Elephas maximus*).

An early British record describes one village in the reserve with 88 people and 186 cattle, occupying an area of 4.19 $km^2$ (Anonymous, unpublished report 1917). During 1956–1966, a major irrigation reservoir was constructed. The reservoir limited access and provision of basic amenities to some villages (Karanth, 1982; Sreekantaiah and Subramanya, 1992). During the monsoons, several bridges and roads would be washed away leaving many villages isolated for months. Schools did exist in a few villages but with teachers who were rarely present (Sreekantaiah and Subramanya, 1992). There was no hospital or functional primary health center. In the 1970s, faced with many hardships some families wanted to move voluntarily outside the reserve (Sreekantaiah and Subramanya, 1992).

### 2.2. Village surveys (2002 and 2006)

I interviewed households in the local languages Kannada and Tulu. The survey questions were semi-structured and mainly close-ended. The surveys compiled demographic data, obtained people's attitudes, and opinions about their relocation experience. The survey also questioned households on livelihood activities (such as collection of forest products, grazing, fishing, and hunting), along with wildlife conflicts that they experienced. This paper presents responses by male and female respondents from the resettled households.

I conducted the first survey in July to August 2002 at the time of relocation. I interviewed 42–70% of all households in the 11 villages in Bhadra, and the resettlement villages of M.C. Halli and Kelaguru. These two resettlement villages are

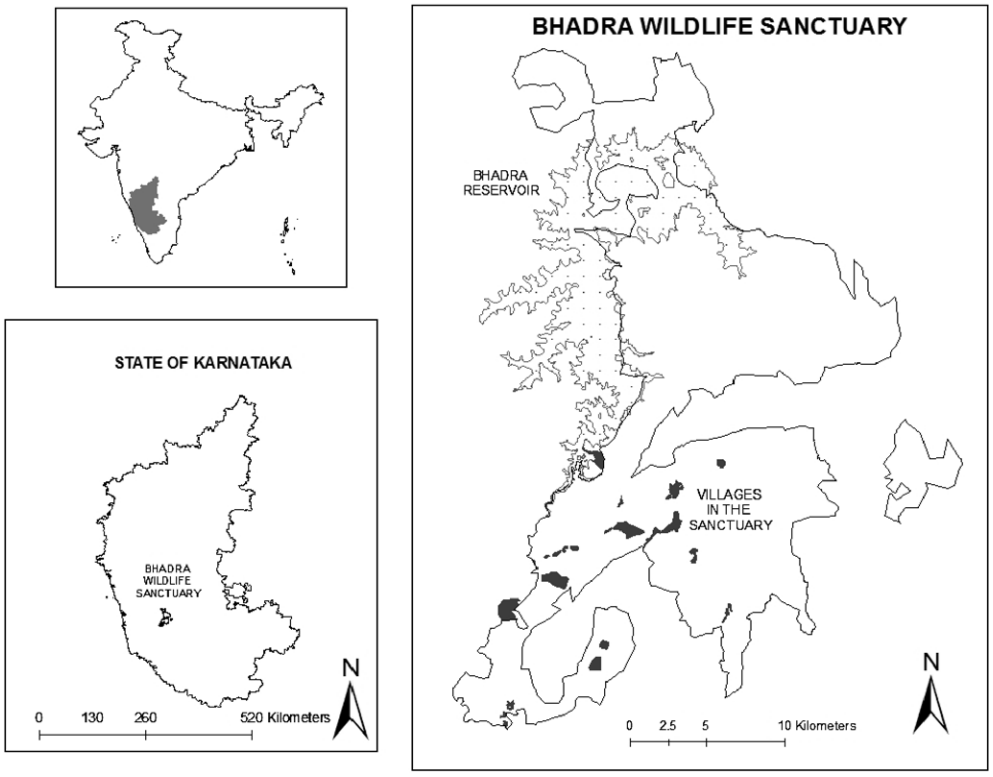


**Fig. 1 – Location of Bhadra Wildlife Sanctuary in India.**

in rural areas located 30–50 km from Bhadra. In 2002, I interviewed 257 of 419 (61%) relocated households, and interviewed individuals from the government and non-governmental organizations involved in the resettlement effort. Repeated attempts were made to interview all relocated households, but the transitional period in 2002 prevented us from interviewing households that were temporarily missing in the reserve and resettlement villages. Two villages in the reserve, Pardeshappanamatta and Muduguni, were not part of the relocation effort. I conducted a second survey from March to April 2006, and interviewed 232 of the 419 (55%) relocated households. In 2006, I found that 75 households were absent in M.C. Halli during the follow-up survey. In 2002, the average time households had lived in M.C. Halli was 95 days and Kelaguru was 23 days. In 2006, the average time households had lived in M.C. Halli was 4.6 years and Kelaguru was 4.7 years.

## 3. Results

### 3.1. *Villages in Bhadra prior to relocation*

In 2002, approximately 4000 people lived in 13 villages inside Bhadra, and 63% of households from all villages were interviewed (Karanth, 2003; Karanth et al., 2006). These villages were remarkably homogeneous across several major socioeconomic and demographic characteristics with few significant differences among them (Table 1; additional details in Karanth, 2003; Karanth et al., 2006). Some households had legal status but many had occupied forestland illegally, converting it to agricultural fields and plantations (Karanth, 2003). Households harvested crops, grazed livestock, and collected forest products in the reserve (Karanth, 2003; Karanth et al., 2006; Table 1). There were intense confrontations between people and wildlife. Tigers and leopards killed 12% of livestock (Sreekantaiah and Subramanya, 1992; Madhusudan, 2003). Crop raiding elephants and ungulates destroyed 15% of crops annually (Karanth, 2003).

### 3.2. *Relocation and resettlement history*

In the 1970s, faced with many hardships some villages wanted to move outside the reserve if offered adequate compensation (Sreekantaiah and Subramanya, 1992). The Karnataka government initially proposed the resettlement project in 1974 but no plans were outlined until 1987 (Y. Kumar, personal communication, 2002). From 1987 to 1992, the government initiated surveys to determine eligible households and outlined project details. There was a huge time lag by the time the government was able to outline plans and raise the funds required. The delay in execution required a significant increase in funds, and more land was required as the number of people, households, and villages in the reserve had grown. In 1996, the Karnataka government released funds, and requested additional funding from the Central government.

In the 20 years since the original request was made by Hebbe village much had changed inside the reserve. The number of villages and number of households had increased due to immigration and births (Karanth, 2003). At this time, relocation was welcomed by some villages, opposed by one village while the majority of villages adopted a wait and watch policy. In 1999, Madla village filed a case in Karnataka

**Table 1 – Bhadra Wildlife Sanctuary: history and household characteristics**

| | |
|---|---|
| History of establishment | 1. Reserved forest in 1912–1950<br>2. Jagara Wildlife Sanctuary in 1951 (area 200 $km^2$)<br>3. Bhadra Wildlife Sanctuary in 1974 (Shyamsunder (1974))<br>4. Project Tiger Site in 1998 |
| Villages | 11 out of 13 relocated |
| Cultural Composition | Hindu (97%) and Islam (3%). 12 castes (numerically dominant were Shettys, Gowdas and Schedules Castes, composition varied significantly between villages, chi-squared test $p < 0.0001$). |
| Households | Average time in reserve 42 years (Range 3–70 years, similar across villages, $p > 0.05$).<br>Average household size 5 people (Range 1–15, varied significantly among villages, $p < 0.03$).<br>Males headed 81% (Range 63–90%).<br>Household heads born outside the reserve was 62%. |
| Income | Agriculture primary source of income for 96% of households.<br>Other sources: wage labor, non-timber forest products, livestock (mainly cattle), home-gardens, hotels, and shops. |
| Land tenure | Households with legal land rights was 68% (varied significantly between villages $p < 0.005$).<br>Households renting additional land 35% (similar across villages, $p > 0.05$).<br>Households encroaching forestland 32% (varied significantly between villages, $p < 0.0000001$).<br>Encroachment was higher in remote villages, and in villages with no park guards (Karanth, 2003; Karanth et al., 2006). |
| Agricultural practice | Average time household had farmed 32 years (Range 1–90 years, varied significantly between villages, $p < 0.03$, $N = 222$).<br>Average distance to field 0.4 km (Range 0–3 km, differed among villages $p < 0.025$, $N = 219$).<br>Average plot size (owned and/or encroached) 1.3 hectares (Range 0.2–8 hectares, $N = 228$).<br>Crops grown rice, coffee, betal nut, and rubber. |
| Other major livelihood sources | Livestock were cattle, sheep, pigs, and goats (grazed in the reserve by 94–100% of households).<br>Cattle owned by 80% of households, and average per household was 8 (Range 1–50 per household).<br>Wildlife hunted Sambar (*Cervus unicolor*), muntjak (*Muntiacus muntjak*), wild pig (*Sus scrofa*), hare (*Lepus nigricollos*), giant squirrel (*Ratufa indica*), monitor lizard (*Varanus flavescens*), and jungle fowl (*Gallus lafayetii*). People hesitant to discuss gun ownership and hunting practice (as it is illegal inside reserves as per Indian law). Licensed guns owned by 7% of households and unlicensed guns hard to establish<br>Fishing pursued by 74% of households (using dynamite, traps, and nets). |
| Human–wildlife conflicts | Crop raiding affected 93% of households ($N = 230$).<br>Livestock predation affected 80% of households ($N = 201$). The average cattle lost was 2 per household/ year (varied between villages, $N = 201$, $p = <0.00001$). Livestock predation rate 12–25%. |

*Note*: $N = 257$ except where indicated.

High Court opposing the relocation, and some people set fires that burnt 25 $km^2$ of the reserve. In 2001, the High Court dismissed the case and the judge recommended rapid completion of the project. At the same time, approval and consent for the project was gained from many households due to efforts of the local conservation non-governmental organizations (Bhadra Wildlife Conservation Trust, Wildlife First! and Nature Conservation Guild), the forest, and revenue departments. From 1998 to 2001, the non-governmental organizations made a concerted effort to improve their relationship with people, and build consensus for relocation among differing factions in the different villages. These organizations continually sought to address people's concerns, fears, and problems inside the reserve, and ensure that the forest-revenue departments continued to move forward with plans for resettlement. The forest department constructed and improved bridges, roads, and a better water supply system for villages inside the reserve (Y. Kumar, Divisional Forest Officer, personal communication 2002). Over time, the continued support from the local non-governmental organizations and forest-revenue departments convinced people, and many people who were unsure about relocating changed their minds (D.V. Girish, personal communication, 2002; Y. Kumar, personal communication, 2002). Households felt reassured when they received compensation for land and houses from the government and chose to move. Project implementation began with involvement of village representatives, and non-governmental organizations, and the forest and revenue departments of Chikmagalur and Shimoga districts. Despite a decade long delay in the execution of the project, the land and money remained available due to efforts of the Project Tiger steering committee (U. Karanth, personal communication 2002).

Official implementation began in October 2001, and households received land deeds in the two-resettlement villages M.C. Halli and Kelaguru. The government provided every household with land, and an individual housing site. Originally, 334 hectares of land were set aside for resettlement in the village of M.C. Halli. The delays in the project led to the encroachment of some of this land by people already living in M.C. Halli village. This required purchase of additional land

**Table 2 – Project costs for the Bhadra resettlement effort**

| Costs in crore rupees | Estimated in 1992 | Revised in 1999 |
|---|---|---|
| *Land acquisition* | | |
| 1. Value of land, buildings, trees and plants | 2.92 crores | 8.63 crores |
| 2. Solatium | 0.93 crores | 3.32 crores |
| 3. Contingency costs and administrative overhead | 3.17 crores | 1.19 crores |
| Total | 7.02 crores ($ 1.59 million) | 13.15 crores ($ 2.98 million) |
| *Resettlement costs* | | |
| 1. Payment for displaced families | 1.65 crores | 1.98 crores |
| 2. Site costs | 0.15 crores | 0.26 crores |
| 3. Infrastructure construction costs (schools, roads, community center, water, electricity, health center) | 1.46 crores | 3.03 crores |
| 4. Transportation costs | 0.11 crores | 0.40 crores |
| 5. Cash assistance for land development | 0.15 crores | 0.18 crores |
| 7. Contingencies and administrative overhead costs | 0.88 crores | 0.58 crores |
| 8. Environmental costs | 0.10 crores | 0.15 crores |
| 9. Monthly subsistence allowance per family (6 months) | 1.23 crores | 1.48 crores |
| Total | 5.74 crore ($ 1.30 million) | 8.07 crores ($ 1.83 million) |

at a second site, the village of Kelaguru. The first village, M.C. Halli, covering an area 304 hectares became home to 373 families (with 373 agricultural plots and individual housing sites). Many households in the reserve had encroached forestland, cultivating crops and constructing houses, and did not possess legal land deeds (Sreekantaiah and Subramanya, 1992; Karanth, 2003). Although these households were legally not eligible for compensation, the government decided to provide many of them land and houses in M.C. Halli. In M.C. Halli, the Rajiv Gandhi Housing Corporation constructed 203 houses (between November 2001 and June 2002) for poorer landless villagers at a cost of 42,000 rupees (~US $900) per house. Wealthier households were required to construct their own houses. The second village Kelaguru consisted of 186 hectares of revenue land allocated to the remaining families.

Land provided in M.C. Halli was best suited for growing crops such as sugarcane and rice, while in Kelaguru land was best suited for coffee. Therefore, households in Kelaguru received more land compared to the households in M.C. Halli. Households received financial compensation for dismantling their houses in the reserve, and transportation costs to the resettlement villages. All households received a free housing site, and a subsistence allowance for the first six months following relocation. This allowance helped defray costs of food, fuel wood, and fodder. Both villages have electricity, pumped water available to every house, as well as access to public transportation, better communication facilities, several markets, schools, hospitals, and major cities. People in M.C. Halli were actively involved in the decision-making process (their suggestions on the design and construction of houses was incorporated), and requests such as gas stoves accommodated by the revenue department.

Recent developments (2002–2005) include a public water system, electricity, phones, television, solar lights, and gas cooking stoves in both villages. All households received housing compensation, and dismantled their houses in the reserve (Y. Kumar, personal communication 2002). In addition, there was a new school constructed in M.C. Halli, and health camps are held regularly (D.V. Girish, personal communication 2004). School enrollment has increased with active participation by the children.

The cost of land acquisition was originally proposed as 7.02 crore Rupees (~US $1.59 million) in 1992, and revised to 13.15 crore Rupees (~US $2.98 million) in 1999 (Karnataka Forest Department, 1999). The relocation and resettlement cost was originally proposed as 5.74 crore Rupees (~US $1.30 million) in 1992, and revised to 8.07 crore Rupees (~US $1.83 million) in 1999 (Karnataka Forest Department, 1999). Costs associated with different project components are in Table 2.

### 3.3. *Resettlement experiences in M.C Halli and Kelaguru*

During the interviews, people discussed good and bad aspects of their experiences, as well as the uncertainties they faced (details in Table 3). There were differences among individuals, households, and villages with respect to their willingness to relocate. Some villages were more willing to relocate, and within villages, some households were more eager to relocate. Larger landholding households were often the least willing to relocate. These households felt insufficiently compensated, and thought that relocation decreased their social status and dominance over other households. These wealthier households also expressed frustration that all households now enjoy the same facilities (phone, television, etc.) and access to better resources.

There are differences between the two-resettlement sites and people's experiences in the two villages. In M.C. Halli, all households received fertile and well-irrigated land. Therefore, these households were able to cultivate their first crop within three months of moving. Adequate water supply allowed households to diversify crop production (sugarcane, rice, fruits, and vegetables) within 3–6 months of settling in M.C. Halli. In Kelaguru, households received larger plots with soil suitable for growing coffee. Since coffee takes longer to grow, many households in Kelaguru had to find employment outside to support themselves. These households are also

**Table 3 – People's opinions about the relocation and resettlement**

*Positive aspects*

1. Fertile land provided (especially in M.C. Halli) with access to ample irrigation facilities.
2. Diversify crop production and increase in number of harvests/year. 65% of households cultivate sugar cane and 51% of households in M.C. Halli cultivate rice.
3. Absence of crop raiding elephants and ungulates.
4. Absence of livestock predation and loss of human life.
5. Increase in comfort due to availability of electricity, pumped water, gas stoves, television, and telephones.
6. Proximity to towns and access to markets.
7. Increase in contact with family and friends due to better communication facilities.
8. Improvement in the quality of education for the children and no disruptions. One centrally located school compared to three schools in Bhadra that required children walking 2–12 km in the reserve.
9. Proximity to hospitals and improved health care. In Bhadra, people walked many kilometers to reach buses to take them to a hospital.
10. More time available to pursue other professions and hobbies.
11. Households headed by women or lower castes did not face discrimination.

*Negative aspects*

1. Limited access to firewood and costs associated with gas stoves.
2. Limited livestock, many households sold their livestock due to limited grazing land around new villages and absence of freely available fodder. People switched to owning goats and did not like purchasing milk. In M.C. Halli livestock ownership decreased from 87% to 40% of households. In Kelaguru livestock ownership decreased from 100% to 40% of households.
3. Ability to find work and reluctance to work as labor in the new villages.
4. Time required to adapt to new environment and tensions with people who previously lived in M.C. Halli.
5. Some landless households given one acre were dissatisfied about the plot size and their inability to acquire additional land.
6. Importance of money-now required to purchase many basic commodities that they had unlimited access to and could barter in the reserve (especially non-timber forest products and fuel wood).

vulnerable to fluctuating coffee market prices. Initially, some households from both villages adopted a double-farming approach, they continued to cultivate crops in both the reserve and new villages, and this ensured that people did not face much loss of livelihood security. This caused significant stress between them and the forest and revenue departments who were trying to complete the relocation and resettlement process (Y. Kumar and D.V. Girish, personal communication 2002).

In M.C. Halli, households have successfully grown many crops, and sold them in local markets (Table 5). Some households have opened restaurants, grocery stores, and shops that serve the new community. Women united to form an association that tackled and successfully dismantled an illicit liquor shop that opened in M.C. Halli (Pandurangaswamy, personal communication 2002). There have been several weddings between families from different villages. Initially, people in M.C. Halli felt some hostility from surrounding village households that had encroached relocation land set aside by the government but they overcame these challenges. People from M.C. Halli contested elections, and were elected to the local Panchayat (D.V. Girish, personal communication 2005). In the short and mid-term, households in Kelaguru have faced greater hardship than in M.C. Halli and it will be important to follow how they cope in the long-term.

There has been a decrease in overall approval for the project from 71% to 52%. In 2002, 70% of households in M.C. Halli and 81% in Kelaguru considered the relocation project a success, and indicated that it improved their quality of life. In 2006, 53% of households in M.C. Halli and 41% in Kelaguru considered the relocation project a success, and indicated that it has improved their quality of life. There are several possible reasons for this. Most people agreed that their standard of living had improved. They are also happy with all the facilities, and access to resources (Table 5). Many observed that it was taking them time to get used to the new environment. People acknowledged the significant improvement in their assets (Table 5). This increase in assets was more evident for M.C. Halli households than for Kelaguru (Table 5). During the follow-up survey 75 households were absent in M.C Halli. These households were able to sell or rent their property, and move to other towns or villages. People acknowledged the improvement in lifestyle, and significant economic benefits. There is a gradation in people's satisfaction with the project as supported by Tables 3 and 5. This is not captured by a single question on overall satisfaction with the project. The various nuances and dimensions presented in Tables 3 and 5 are not captured by the use of a single statistic in either year. There was a tendency among people to emphasize the negatives aspects during the 2006 survey. Their dissatisfaction focused mainly on the inadequate financial compensation provided. Their statements regarding the amount of compensation provided to them often contradicted the official government records.

I observed that in 2002, people's statements were more forthright and less influenced by external views. In 2006, people's opinions appeared influenced by living in the new village society (particularly in M.C. Halli). In the follow-up survey, it was evident that people had become used to speaking to reporters and others due to the publicity that this project has generated. People often asked if I would provide them financial compensation for participating in the interviews.

## 4. Discussion

### 4.1. *Reasons for success and emerging challenges*

The Bhadra relocation is now complete and is considered a success by the government, non-governmental organizations, and many relocated people. There are many important reasons for this projects success. There was no forcible eviction of people from Bhadra, with some people voluntarily choosing to relocate and others choosing to relocate once they received fair compensation. The hardships (especially wildlife conflicts) faced by people living in the reserve, the opportunities available to them (particularly their children), facilities provided, and equitable land tenure appear to be the strongest reasons for their willingness to relocate. Active participation by the non-governmental organizations, and government

ensured that the households received adequate support throughout the process.

Positive aspects include active consultation of households, and the choice of suitable relocation sites (particularly M.C. Halli). The distribution of fertile plots and irrigated land to all families, appropriate housing, financial compensation, provision of adequate health care, schools, transportation and communication, access to electricity, water and markets-all facilitated this projects success. Equitable distribution of land titles and other development aid (houses, water supply,

**Table 4 – Resettlement package for households**

| Relocation village | M.C. Halli | Kelaguru |
|---|---|---|
| Land (in Hectares) | 0.4–2.02 | 0.81–4.04 |
| Compensation money | Yes for all households | Yes for all households |
| Housing sites | $40 \times 50$, $50 \times 80$, $60 \times 90$ | $50 \times 80$, $60 \times 90$ |
| House built | 203 constructed by Rajiv Gandhi Corporation at cost $900 per house (for landless households) and 170 self constructed | 46 self constructed |
| Crops grown | Sugar cane, Rice, Vegetables | Coffee, pepper |
| Access to towns | 10 km to towns | 12–18 km to towns |
| Facilities | Schools, colleges, primary health center, and hospitals. Electricity, gas stoves, solar lights, pumped water, phones and television. | Schools, primary health center and hospitals. Electricity, gas stoves, solar lights, pumped water. |

**Table 5 – Comparing households resources and assets**

| Characteristics | M.C. Halli | Kelaguru |
|---|---|---|
| Houses | 91% of households have built houses | 90% of households have built houses and all are self-constructed |
| | 69% of houses built by Rajiv Gandhi Corporation and 31% self-constructed | |
| Time in new village | Average: 4.6 years | Average: 4.7 years |
| Plot size | Average: 0.72 hectares | Average: 1.86 hectares |
| Compensation | Average: 46,044 Rupees (US $ 996) | Average: 57,143 Rupees (US $ 1236) |
| Family Structure | 81% were single families and 19% joint families | 78% were single families and 22% joint families |
| Household facilities in the relocated villages | 100% have access to schools, health care, electricity, water, towns, roads and transportation, markets and phones. | 100% have access to schools, health care, electricity, water, towns, roads and transportation, markets and phones. |
| Percentage increase in households owning asset from 2002 to 2006 | Cycle: Increased from 15% to 34% | Cycle: Increased from 19% to 39% |
| | Two wheelers: Increased from 10% to 15% | Two wheelers: No change 13% |
| | Three wheelers: Increased from 0% to 1% | Three wheelers: No change 0% |
| | Four wheelers: Increased from 1% to 1.5% | Four wheelers: Decreased from 10% to 6% |
| | Tractor: Decreased from 3.5% to <1% | Tractor: Decreased from 10% to 0% |
| | Plough: No change 7% | Plough: No change 20% |
| | Pump set: No change 6% | Pump set: Increased from 3% to 6% |
| | Refrigerator: Increased from 1% to 3.5% | Refrigerator: No change 0% |
| | Stoves: Increased from 2% to 54% | Stoves: Increased from 0% to 48% |
| | Phones: Increased from 3% to 20% | Phones: Increased from 0% to 16% |
| | Radio: Decreased from 64% to 63% | Radio: No change 81% |
| | Television: Increased from 4% to 58% | Television: Increased from 6% to 29% |
| Households in the reserve | 4% had access to schools | 3.5% had access to schools |
| | 0% had access to health care center | 0% had access to health care center |
| | 1% had access to electricity | 3% had access to electricity |
| | 96% had access to water | 100% had access to water |
| | 5% had access to towns | 0% had access to towns |
| | 4% had access to roads and transportation | 0% had access to roads and transportation |
| | 9% had access to markets | 0% had access to markets |
| | 1% had access to phones | 0% had access to phones |
| | 17% had injury or death due to confrontations with wildlife | 97% had injury or death due to confrontations with wildlife |
| | 81% lost livestock to tigers, leopards and wild dogs | 97% lost livestock to tigers, leopards and wild dogs |
| | 63% lost crops to elephants and wild pigs | 97% lost crops to elephants and wild pigs |
| | 18% hunted wildlife and 39% fished | 0% hunted wildlife and 36% fished |

electricity, solar lights, and gas stoves) convinced people to relocate. In contrast, people relocated from other Indian reserves such as Kuno and Gir received poor agricultural land and limited developmental aid (Sharma, 2003; Ganguly, 2004; Kabra, 2006). Importantly, in Bhadra the non-governmental organizations and the government continually interacted with people and actively sought their opinions. Following relocation, loss of economic security did not affect people in M.C. Halli, but in Kelaguru, the long-term consequences for people are still unknown. Financial compensation and other support were provided to people during the transitional phase unlike other relocations (Rangarajan and Shahabuddin, 2006). The resettlement package offered to households in Bhadra cost three to four times more than packages offered in other reserves (Table 4; Karanth, 2005).

People in Bhadra are primarily cultivators, and post relocation did not have to alter their livelihoods. They remain agrarian with access to better facilities, with opportunities to improve crop productivity and diversify production (Tables 4 and 5). They were not nomadic or hunter-gatherer communities that are more dependent on the reserve, and perhaps less able to undergo rapid socio-cultural transformations that are often required by such resettlement efforts. In Kanha and Gir National Parks, relocated people were unable to adapt from nomadic hunter-gatherers to settled agriculturalists and wage laborers (Rangarajan and Shahabuddin, 2006). People from Bhadra are not indigenous groups or tribal communities that lived in the reserve for many generations. Some people moved into the reserve as labor for British teak plantations about 85 years ago, and most migrated from neighboring towns and cities in the last 30 years (Karanth, 2003). No single social group was able to exert dominance in both M.C. Halli and Kelaguru (Karanth, 2003, 2005), and people integrated well into the larger society. In fact, women and weaker groups in particular seem to have benefited from the move. In Kuno and Gir, dominant social groups overpowered people from marginal social groups (Kabra, 2003; Rangarajan and Shahabuddin, 2006).

This project's success is attributable to the commitment of key individuals in the non-governmental organizations working together with the government. In many Indian reserves, only the government has carried out relocation and resettlement projects. In Bhadra, non-governmental organizations were actively involved, and ensured that the government delivered on its promises to the people. These organizations negotiated and resolved problems that arose, and ensured that compensation efforts proceeded smoothly. Regional differences also play a role in success or failure of resettlement projects. The south Indian state of Karnataka is a state with greater social safety services than North or Central Indian states where relocations have taken place (Rangarajan and Shahabuddin, 2006). Hence, perhaps regional political and social conditions also contributed towards facilitating the planning and proper execution of this project.

The Bhadra project appears to have overcome many hurdles, but it also faces new challenges. Differences between the two-resettlement villages have emerged in the last 4 years. Resources available in M.C. Halli are better than in Kelaguru. In this case, due to the encroachment of land in M.C. Halli there was no choice but to move some households to Kelaguru. It is best to provide similar resources to all households, and ensure equity among them. It will be important to follow how households (particularly in Kelaguru) cope economically in the long run. Hurdles include the slow distribution of housing compensation, and delays in provision of facilities to households in Kelaguru. It has taken households in both relocation villages longer than the 6 months to settle and re-establish living in the new villages. This suggests that households should receive financial support up to a year following relocation. Other problems include absence of alternatives to forest resources (forest products, fodder, and grazing land). Concerted efforts to avoid or minimize delays have to be made, as it only increases frustrations of people. Prolonging the process leaves people vulnerable, as they deal with pressures of moving to and establishing themselves in a new environment.

### 4.2. *Implications for Bhadra*

The resettlement of people will have major implications for the reserve. Karanth et al. (2006) examined forest disturbance, and impacts of human activities in the reserve. This study estimated that human activities in six of these 13 villages disturbed 8–10% of the forest. The households in the reserve owned ~4000 livestock, and grazed all their livestock in the reserve. Removal of livestock will allow regeneration of vegetation, recovery of grazed areas, and improve forage available to wild herbivores. In 2002, all households collected fuel wood inside the reserve (Karanth, 2003). Relocation will significantly decrease the number of trees lopped, cut, and burnt (Karanth et al., 2006). Fuel wood consumption rate varied between 2190 kg *per* week in the smallest village Karvani and 22140 kg *per* week in the largest village Madla (Karanth et al., 2006). Households collected several forest products in the reserve. The non-timber forest products include four species of bamboo, honey, savige (*Sterculia villosa*), nellikai (*Emblica officinalis*), wate huli (*Artocarpus lacoocha*), seegakai (*Acacia concinna*), soap nut (*Sapindus emarginatus*), wild fruits, and edible mushrooms (Karanth, 2003; Karanth et al., 2006). The households also sold two non-timber forest products (seegakai and soap nut) commercially in markets. Details on quantities collected, market price, and income generated are in Karanth et al., 2006). The relocation will significantly decrease poaching, and will support the recovery of several commonly hunted species (see Table 1; Karanth, 2003). The relocation of villages will cause an overall decrease in forest disturbance, as well as diminished impacts of grazing, hunting, and collection of forest products. I expect this to promote regeneration of several plant species, and recovery of animal populations.

### 4.3. *Relocation and resettlement as a conservation tool*

At present, there are few well-documented studies of resettlement in India or, indeed, worldwide. There is limited understanding of the social injustice issues, and impacts that relocation has on the lives of people. Relocation has been attempted in many Indian reserves (Gir National Park, Sariska Wildlife Sanctuary, Kanha National Park, Nagarahole National Park), and most did not involve long-term follow up of relocated people (Rangarajan and Shahabuddin, 2006; Karanth and Karanth, 2007). The Bhadra case study is certainly a step

in the right direction compared to the overall poor record of relocations from reserves in India. This case study illustrates the complex nature of the issues involved, and provides several valuable insights for conservation practice. It is clear that the multitude of socio-economic, cultural, political, and ecological aspects involved requires the active engagement of relocated people, and involvement of more than one agency. The conservation community must not assume that people living in reserves want to remain there, and are reluctant to leave. Rather, as in this case, people are willing to relocate if provided fair compensation, and adequate socio-economic opportunities. This case study shows that co-operation among non-governmental organizations and governments can be effective, and help resolve complex conservation issues in an equitable and ethical manner. Such project's require sustained financial investments, with support for relocated people extended to the medium and long run. People must be able to regain or surpass the economic security and social stability they experienced before relocation. Overall, the Bhadra resettlement has had a mixture of beneficial and detrimental outcomes, and is claimed a success by many. The project has many aspects that need to be emulated, and some that must be avoided.

In countries like India that are under enormous economic growth and demographic pressure, nature reserves play a critical role in protecting biodiversity. With less than 5% total land area classified as protected, it is important to delineate some nature reserves as fully protected, while allowing different levels of access and use in others. In fully protected reserves, the conservation community must work on developing long-term solutions that may require relocation and resettlement of people. Conservation efforts that require resettlement of people from reserves will need to provide suitable alternatives. Relocation of people from reserves will not eliminate conflicts that exist with the surrounding landscape. Successful conservation initiatives will also require greater participation, and involvement of local communities that live around these reserves. For resettlement to be considered a viable conservation tool, solutions must be developed with active involvement of local people, and require substantial long-term investments. The conservation community will need to assess the needs of wildlife and people in an objective independent manner on a case-by-case basis. Targeted efforts to conserve biodiversity, and improve human welfare can be effective in specific cases such as Bhadra. In densely populated countries like India, I submit that resettlement presents a workable conservation solution for sustaining nature reserves, and improving human lives if carried out in a socially just and equitable manner.

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