

ASSESSMENT OF RESIDENTS' SOCIAL AND ECONOMIC WELLBEING IN
CONSERVATION RESETTLEMENT: A CASE STUDY OF PADAMPUR, CHITWAN
NATIONAL PARK, NEPAL

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ABSTRACT

Conservation resettlement is a controversial issue in balancing biological conservation with the people's social and economic needs. Very few studies have examined the conservation resettlement outcome, and majority of them view resettlement as counterintuitive to the people's livelihood in the name of biological conservation. This thesis focuses on residents' responses on social, economic and environmental consequences of a voluntary resettlement.

Studies of forced resettlement during the creation and maintenance of national parks and protected areas have found negative socioeconomic consequences for human wellbeing. I investigated residents' social and economic wellbeing following a citizen-initiated resettlement program in Padampur, Nepal. We found a difference between voluntary and forced resettlement respondents in overall satisfaction as well as evaluation of land quality and employment factors. However, there was no difference in their evaluation of land ownership, housing, physical infrastructure, health, social ties, and support services as having positive outcomes. Most respondents reported being socially and economically better off in the new location. In the future, economic status, food and nutrition, and marginalization of some groups could potentially reduce satisfaction.

Residents' post resettlement economic wellbeing is an important factor in balancing conservation and socioeconomic needs. After the resettlement, we found more residents were engaged in off-farm jobs, micro-enterprises, and physical facilities which were serving their needs. Our findings suggest that considering the following factors in resettlement planning may provide better post resettlement economic wellbeing: a) participatory and bottom up planning; b) fair compensation of physical asset; and c)

provision of basic needs for water, and facilities for health and education. I emphasize the need of participatory resettlement planning models, and feel that the results have general applications to resettlement efforts.

To see the biological aspects of the resettlement, I assessed the prey abundance in the evacuated area in comparison to the abundance in the park core area. I have chosen Sambar Unit (SU) as a measurement unit to assess the prey abundance. SU is significant with more prey abundance in the evacuated area than the core area of the park. Residents' perceived biodiversity loss and gain was assessed in both locations (old and new). After the resettlement, residents' positive perception in restoring wildlife habitat in the old site decreased pressure and decreased human wildlife conflicts. In the new site, I found increased understanding on sustainable utilization of natural resources through community forestry by reducing forest dependency. I suggest the need of periodic monitoring of post resettlement biological and socioeconomic gains to evaluate the long term viability of voluntary resettlement for conservation and residents' better wellbeing. We suggest future conservation related resettlement consider lessons from the Padampur model.

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CHAPTER I

INTRODUCTION

More than 100,000 protected areas cover 12% of the total area of planet earth (Chape et al., 2005), providing a range of ecological services for people and the environment. In the U.S., park and protected area institutions have existed since the 1872 establishment of Yellowstone National Park, the first national park in United States of America (USA). The primary aim of national parks is to preserve natural and cultural diversity to safeguard the intrinsic value of nature and natural resources from further degradation (IUCN, 1994; Brandon et al., 1998). Globally, International Union for Conservation of Nature (IUCN) defined six protected area management categories: i) strict nature reserve and wilderness area, ii) national park, iii) natural monument, iv) habitat / species management area, v) protected landscape / seascape, and vi) managed resource protected area (IUCN 1994). The IUCN, 1975 definition of the National Park excluded residents from the vicinity of the park and also restricted the use of the resources from the protected areas. People in the developing countries suffer more being excluded from the national park and restriction imposed for use of resources they were using from their generation (West & Berchin 1991).

There are a number of cases in Asia and Africa resettling people from protected areas and their livelihood distorted due to the unplanned and haphazard resettlement programs. The socio-economic impacts reported in these studies discouraged the conservation resettlement in anticipation that people's livelihood becomes worse and instead suggests to provide poverty alleviation programs to achieve the dual objectives

of conservation and economic development (Brokington & Schmidt-Soltau 2007; Cernea & Schmidt-Soltau, 2006). However, few noted positive trend in providing economic justification and residents being satisfied after the resettlement (Karanth 2007; Dhakal et al., in this volume). To-date no systematic methods have been so far established to measure precisely the impact of resettlement in social, economic and environmental scales. There are methodological complexities to measuring the extent of impacts according to the type of protected areas on human activities (Agrawal and Redford, 2009).

In this study we investigated a unique case of Padampur resettlement. This particular case was initiated from the citizen's demand to move from inside the national park to outside in proximity of market center with access to the health and education. The Government of Nepal resettled the village forming a participatory resettlement committee.

Nepal's conservation history starts with establishment of its first national park in 1973, the Royal Chitwan National Park secured habitat for the endangered rhino and tiger. The total park area is 932 sq. km with additional 16 sq. km after the Padampur resettlement. About 750 sq. km has been set aside a park buffer zone where numerous participatory conservation and development activities have been implemented provided by 50% of the park revenue. Due to its unique ecosystem and as a stronghold of rhino and tiger populations, in 1984, UNESCO declared this park as one of the World's Natural Heritage sites. The entire park area consists of tropical and subtropical forests with 70 % Sal (*Sorea robusta*) forest, 20 % grassland, 7% mixed riverine forests and the remaining 3% river beds and wetlands.

The park is regarded as rich in its biological diversity hosting 50 mammals, over 525 bird species, and 55 amphibians and reptiles species. Among them the endangered fauna includes: mammal-one-horned rhinoceros, gaur bison, tiger, wild elephant, and four-horned antelope; reptiles-gharial crocodile, marsh mugger crocodile, golden monitor lizard and python; birds-bengal florican, lesser florican, giant hornbill, black stork, and white stork (DNPWC website viewed March 25, 2010). <http://www.dnpwc.gov.np/national-parks-chitwan.asp>).

The park has a conflict-ridden history with many stories of forced eviction of people in the past. Prior to the park establishment 26 village clusters were forcefully removed with the exception of the old Padampur village, a cluster of 16 smaller enclaves. Since the beginning of park establishment, there has been a continuous political debate over resettling Padampur to elsewhere in outside of the park but within the Chitwan District. Earlier, people demanded a full compensation for their land and wanted the whole village to move to one place, but the government did not have the resources to fulfill the people's demand (Milton and Binney, 1980). At the same time, donor interests did not support the resettlement due to the anticipated adverse social and economic implications. In 1993 the devastated flood in Chitwan instigated Padampur residents to put more pressure to the government and the Padampur was eventually resettled in 2004. The resettlement program took almost 10 years to complete, as it was started in 1995.

A successful resettlement program is important and necessary to bring a win-win situation in balancing conservation with people's livelihoods. Conservation and resettlement has been and will be controversial issue. If not addressed appropriately then desirable conservation gains may not be achieved. More studies on social, economic and

biodiversity assessment of resettlement cases provide inputs to the policy changes. Is voluntary resettlement feasible? Has long term livelihoods of resettles been better after resettlement? Does voluntary resettlement bring a win-win situation? These are research questions and their answer will contribute to anticipated policy change in conservation and resettlement

The dissertation proposal is that balanced biodiversity conservation and development is achieved only when three dimensions are maintained: environmental, social and economic sustainability (IUCN 2006). Sustainable conservation and development after a resettlement will be achieved when social, economic and biological domains are balanced in a coordinated manner. The goal of this study is to evaluate conservation resettlement through social, economic and biological lenses, whether conservation related resettlement with full people's participation brings a win-win or win-lose, or lose-lose for those who are being resettled as well as those parties supporting biodiversity conservation. What people get after resettlement? Is new place providing them access to health, education and market for jobs with more employment opportunities? Whether residents are economically better off in the new location after five years of resettlement? How the added habitat is contributing to the park's ecosystem? These are the questions I tried to get answers from this research study.

Chapter 2: *Resident Wellbeing in Conservation Resettlement: The Case of Padampur in the Royal Chitwan National Park, Nepal*

In chapter, I compare Padampur residents' social and economic wellbeing in two time frames, before and after resettlement. This analysis provides information on resident's views on resettlement planning, compensation, access to health and education.

Applying Cernea's (1997) Impoverished Risks and Resettlement (IRR) model, it investigates comparative social and economic change in the old versus new Padampur.

Chapter 3: *Post-resettlement economic well-being of conservation and resettlement: a case study of Padampur, Chitwan National Park, Nepal*

This chapter focuses on post resettlement economic wellbeing. The method applied in this chapter is comparative economic wellbeing analysis before and after resettlement. Similarly, I also compare economic wellbeing between early-arrival and late-arrival residents in terms of their income, household assets, health, sanitation, and education.

Chapter 4: *Biodiversity benefit of a conservation resettlement: a case study of Padampur resettlement from Chitwan National Park, Nepal.*

This chapter evaluates the biodiversity benefits of the resettlement by measuring prey abundance in the evacuated site compared to the prey abundance in the core area of the park. In addition, I also assessed perceived biodiversity benefit of the resettlement program. It is an assessment of people's participation in managing community forest and contribution of these community forests into Padampur resident's conservation and sustainable economic development.

CHAPTER II

RESIDENT WELLBEING IN CONSERVATION RESETTLEMENT: THE CASE OF PADAMPUR IN THE ROYAL CHITWAN NATIONAL PARK, NEPAL

1. INTRODUCTION

The impact of biodiversity conservation on human wellbeing as a result of the creation of parks and protected areas has become an important concern in South Asian nations. Globally, the maintenance of a true balance between conservation and human needs has always been a complex matter (West and Brechin 1991). There have been resettlement cases that have negatively affected indigenous communities living within actual or proposed protected areas (Colchester 1997). Forced resettlement has resulted in economic impoverishment, social dislocation and a variety of psychological and physiological ailments. Usually resettlement has been initiated by government forestry and wildlife agencies, including non-governmental organization (NGOs) and development organizations whose primary goal is biological conservation (Cernea and Schmidt-Soltau 2006).

People voluntarily move from one place to another in response to economic, social, ecological, and cultural factors. These movements are often guided by people's social and economic motivations. There can be a difference between voluntary and forced resettlement in terms of the settlers' motivation for surviving in the new place (Roschenthaler 2000). Voluntary resettlement may be a better option as people become re-established sooner than in the case of involuntary resettlement (Gebre 2002).

Conservation related resettlement programs have been judged to be largely unsuccessful (Schmidt-Soltau 2003), due to people's opposition to being forced to move from their original place, especially in the case of tribal and indigenous peoples. Even if resettlement is helpful for biodiversity conservation, residents' socioeconomic status may be degraded due to unfair and unjustified compensation mechanisms. In some cases, environmental resettlement programs have been positive with respect to income, off-farm employment and access to infrastructure, but failed to provide for people's participation in decision making (Dickinson and Webber 2004). Cernea and Schmidt-Soltau (2006) evaluated World Bank projects, concluding that they did not produce desirable results in terms of mitigating risks to wellbeing. They concluded forced resettlement and displacement in the name of conservation should not be used, and that it is "doomed to be a failure."

Conservation scientists are looking for an effective mechanism to address resettlement issues in order to achieve improved protected area management (Robinson 2007). They are highly motivated to find an appropriate model for more socially, economically, and culturally-justified voluntary resettlement, where both biodiversity and people's livelihood can be protected. They encourage conservation organizations to get involved and investigate approaches that achieve better results in a more ethical and conservation friendly direction (Agrawal and Redford 2007). Similarly, Ganapati and Ganapati (2009) argue that citizens should be in the forefront of the planning process in post-disaster resettlement in order to achieve better outcomes.

Our overarching study goal was to evaluate if a participatory resettlement program, designed to achieve conservation goals, could enhance human wellbeing. This

could be true if people's judgments about their wellbeing outcomes were positive. We focus on social and economic comparisons between an old and a new location in a case of participatory resettlement. The questions this paper addresses are the following: 1) Is there a difference in people's perceptions of their wellbeing following settlements between those who agreed with the resettlement (voluntarily) and those who did not agree to leave (forced)? 2) Do people report being socioeconomically better off in the new location vs. the old location? And 3) What socioeconomic factors influenced people's satisfaction with the resettlement? This study reports the views of Padampur residents in a quantitative and qualitative assessment of their experience, current conditions, and prospects for the future. We considered eight potential risks to wellbeing in resettlement as discussed in Cernea's (1997) Impoverishment Risk and Reconstruction (IRR) model: landlessness, joblessness, homelessness, marginalization, increased morbidity, food insecurities, loss of common property, and social disarticulation. After the participatory resettlement of Padampur, we assessed respondents' perception of changes to their household wellbeing based on their evaluation of the new location in relation to the old location.

The Study Area

The old Padampur village lies within the Chitwan District, one of the most populous districts of Nepal due to its immense biological and economic resources. The Chitwan District extends from the low land Bhabar area to the Mahabharata Mountain range, a change in elevation from 141 to 1945 meters (Figure 1). The old Padampur Village Development Committee (VDC, the smallest political administrative unit in Nepal) was the only remaining enclave in the Royal Chitwan National Park (RCNP, or

“park”) and was relocated in 2005 to another area about 20 km. north of the Park.

Historical Background of Chitwan

In 1951, the World Health Organization (WHO) initiated malaria eradication at the same time as synchronized resettlement was launched to encourage Hill people, living in the resource poor mountain areas, to resettle in the highly fertile lowlands. Since then the influx of people from mountain areas has continued as people search for a better life. The increase in the population of Chitwan and the Terai (a Nepali word for lowland forest and grassland) as a whole was the primary cause of forest degradation in Nepal from the 1950's to the late 1980's (Ghimere 1992; Singh 1984; Elder et al. 1976; Gee 1959). This problem ultimately changed the government strategy for conservation of natural resources.

As a result the Park was established in 1973 (Sharma 1990) and recognized as a World Natural Heritage Site in 1984 (Mishra and Jefferies 1991). The Park is situated in south central Nepal; its area was 544 sq. km at the time declaration and expanded in 1977 to 932 sq. km (core area) in the subtropical lowlands of the inner Terai. Prior to the establishment of the Park there had been 26 village clusters, but all were removed forcefully with the exception of old Padampur, a cluster of 16 smaller villages. The reason old Padampur was not resettled prior to the Park formation was mainly due to the valid land titles held by villagers as well as the political influence of the Tharu landlords (Mr. Narayan Bhattarai, former VDC Chairman, May 15, 2004, personal interview).

Biological Significance of the Park

The Park's global biological significance exists because it has the highest density

of tigers and probably the second highest density of one horned rhinoceros (Dinerstein et al. 1999; Smith et al. 1999). Although there were few scientific records, historic species richness in Chitwan can be judged by the number of animals killed during a colonial hunting expedition in 1938 totaling 120 tigers, 38 rhinos, 27 leopards, and 15 bears (Smythies 1942). Today, the Park has over seven forest types, six grassland types, and three major river systems. The Park supports 50 species of mammals, 526 species of birds, 49 species of reptiles and amphibians, and 120 species of fishes. Floral diversity encompasses over 600 species, of which 50 are grasses (DNPWC 2009).

The Padampur Problem

Over the years, old Padampur and the Park had a rocky relationship. The main conflicts were over loss of human life and livestock. In one study a few villagers nearest to the park reported that in some years 80 to 90% of all their crops were lost due to grazing by wild animals. As a result, farmers responded by abandoning farming near the park boundary (Milton and Binney 1980). As one indication of increasing conflicts, sixteen people were killed by tigers in and around the Park between October 1980 and early 1989 (McDougal 1989) and the trend continues. As the number of tigers in the Park increased, so did the man-eating tiger conflicts, which presented a major problem for the local residents and Park authorities.

In addition, there were economic and legal problems. Tourism led to locally inflated prices for basic foods and household products. This problem was compounded by the fact that few local people were employed in the Park or in the tourism businesses, leading to poverty for the local population as a result of the Park's presence (Mishra

1982). At the same time, poaching was a major issue that increased after 2000, when the Royal Nepal Army guards diverted their attention from park security towards national security issues in response to increasing Maoist insurgency in the country (Baral and Heinen 2006).

Participatory Resettlement Decision

In the late 1980s, villagers from old Padampur began discussions about the difficult living conditions and the possibility of relocating again with the Biodiversity Conservation Center, one of the field projects of National Trust for Nature Conservation, a leading non-governmental organization dedicated to Nepal's biodiversity conservation. Opinions were divided primarily because villagers in the western portion of the enclave suffered more from floods and damage from rhinoceros trampling than those in the east. Western residents wanted to move; people in the east were less willing to move. As a result of this stalemate, the government did not take any action, but continued to reduce investment in infrastructure such as schools and health clinics. As a result, people faced added hardships, such as not being able to access health care during the monsoons, when river water swelled to higher levels, cutting them off from larger municipalities with social services.

Over a period of thirty years, Padampur residents discussed the possibility of resettlement to remove the village from the Park but could never reach a consensus to move. In 1993, for the first time, major flooding had a devastating impact on the agricultural land of the entire old Padampur community. This catastrophe awakened the Padampur residents to the fear that they might keep losing their highly valued production to each year's monsoon flood. As a result, a renewed local initiative was established to

request government help in resettling.

Given these circumstances, some old Padampur residents openly advocated moving to a site closer to an urban area. They collectively encouraged local political leaders to lobby government officials to proceed with a resettlement program. The Padampur Resettlement Commission was formed with local people as a majority. Of the 17 commission members, 12 were locals (four local political representatives, three local VDC and District Development Committee (DDC) members, and five Padampur residents (Padampur Resettlement Commission 2004). The official process of resettlement started in 1995 and took nine years to complete. Ongoing political instability due to the Maoist insurgency and frequent government changes were causes of delay. New Padampur is located adjacent to Juite Pani VDC of Chitwan District approximately 20 km. north of the old Padampur site and 12 km. north of the major east-west highway (the only highway along the lowland that connects different parts of Nepal through the road network). In 2005, new Padampur's population was 11,037 with 1,928 households. The village is divided into nine wards with 4 residents representing each ward on the Village Council. Old Padampur had a high school, but new Padampur has telephone and electricity facilities, along with a health post, a post office, and a high school. Major economic activity in Padampur is agricultural production with dominant crops being rice, maize and mustard.

According to the DDC files, castes and ethnicities are uniformly distributed in Padampur with the largest number of households (hh) from the Tharu (44%; 889 hh), Brahmin (22%; 444 hh), and Chhetri (8%; 161 hh) caste/ethnicities. Eleven other small caste groups constitute the remaining 26% of the population (540 hh).

2. METHODS

We explored the change in Padampur residents' wellbeing as a result of the resettlement by asking residents of new Padampur about their comparative socioeconomic wellbeing in the old versus new location. We used both qualitative focus groups and quantitative survey methods to examine the planning process and household wellbeing.

We used focus group discussions to assess the planning process of the resettlement program. Three independent focus groups were composed of ward chairpersons ($n=11$), government and non-government officials ($n=8$), and indigenous people including both men and women ($n=10$). We chose elected ward chairpersons because they were familiar with the people's situation in the old and new Padampur VDC. This group included all nine current chairpersons and two who served in old Padampur. For the indigenous focus group, we created a list of all Tharu people involved in community projects ($n=26$) and randomly selected six women and four men; six of these were elderly because they were able to discuss historical conditions in old Padampur as well as comment on concerns regarding cultural changes. Finally, eight representatives from government ($n=3$) and non-government groups ($n=5$) were invited to express the views of their respective institutions. All focus group meetings were conducted at a village site. A Tharu youth helped with non-Nepali speaking Tharu participants and co-facilitated the sessions. Participants discussed the resettlement process by evaluating the performance of the responsible institutions to-date and their perceptions of how resettlement planning addressed their interests.

Focus group discussions were stimulated by several questions: What is your

impression of the current resettlement program? What are the benefits of this resettlement program that you observed? If you had a chance to give advice to other people living in similar conditions, would you recommend a resettlement program? If so what advice would you give? If not, why? Discussions were tape-recorded and all statements regarding involvement in resettlement planning were transcribed into English. Each discussion was coded (Krueger 1998) based on key participatory concepts: local involvement, decision making, people's opinions, and responsiveness of authorities. These texts were analyzed for patterns regarding voice, influence, and involvement factors (Lind and Tyler 1998).

For the household survey, we randomly sampled 322 respondents from the 1,928 households listed as resident in new Padampur (Padampur Resettlement Commission 2004). The average sample household size was 6.6 people. Since the castes and ethnic groups are uniformly distributed among the Padampur community, we did not use a stratified random sample. However, we checked the sample to ensure that each ethnic group was approximately represented as in the general population.

All households sampled agreed to be interviewed. Interviews were conducted in residents' homes to understand household representatives' perceptions of their socioeconomic wellbeing before and after resettlement. Each interview took 45 to 90 minutes, depending upon the respondent's preference for elaborating. Questions about socioeconomic factors were asked, including land tenure, employment, housing, marginalization, health facilities, food management, common property resources, and social ties. Thirty-three questions were closed-ended and 42 were open-ended. We entered all response into the SPSS statistical package. The open-ended responses were

coded and entered as categorical variables.

We used a categorical data analysis method (Field 2005) to generate our results. First, we classified respondents into one of two categories: i) those who agreed to leave, labeled *voluntary*; and ii) those who did not agree to leave, labeled *forced*. The majority of responses were dichotomous, closed-ended questions (yes/no, better/worse, satisfied/not satisfied). In a few questions, respondents selected from three to four rankings; in these cases responses were reduced to two variables (better/same/worse became better/not better, grouping same and worse into not better). We used Pearson's chi-square test to evaluate whether there were differences in responses between voluntary and forced respondents.

To identify the factors influencing people's satisfaction (Overall are you satisfied with this resettlement program? Yes/No), we used logistic regression with forced/voluntary and all other well being indicators as predictor variables

3. RESULTS

Participatory Attributes of Planning

Floods were common in old Padampur during the monsoon season (June – August), resulting in damage to crops and household property. One 98-year-old Tharu remembered the occurrence of high monsoon floods affecting agriculture and livestock at 10-year intervals (Mr. Mallu Mahato, Village Elderly, May 14, 2004, personal interview). Due to the flood induced threats and severe crop depredation from animals, especially by rhinoceros, some old Padampur residents openly advocated moving to a site closer to an urban area. Prior to 1980, people of old Padampur were willing to move to the new location if the Nepali government fulfilled certain conditions, such as compensation for

their land and construction expenses, provision of development services, as well as shifting the whole village to one area in order to maintain social ties with adequate physical infrastructure (Milton and Binney 1980).

One of the major achievements of the resettlement program was incorporating participatory attributes in the planning process that allowed residents to influence the way resettlement would be done and provide for an increased chance of wellbeing post-resettlement. Residents were provided some degree of procedural justice as defined by Lind and Tyler (1998). They were able to express their “voice” and “influence” through the resettlement commission. The resettlement commission was formed with a majority of local people, 12 of 17 members. According to the focus group responses, these representatives were involved in planning and site selection. For example, the commission evaluated three sites and the one preferred by the residents was the final selection. In addition, during the focus groups, local leaders said that due to the local representatives pressure, they achieved fair compensation for land, something that was not always the case in past resettlement programs. The total resettlement expenditure was 31,057,1495 Nepalese rupees (US \$ 4.6 million) of which 62% was used for land compensation. All of the study respondents who previously had land received both land and compensation in the new location. In addition, the committee decided to provide land for all residents, even those who were landless in the old location. A minimum of 3 kattha (0.24 acre) was allocated to every household. The committee also set aside land for common property resources, such as schools, a health post, a post office, and a police station.

After the commission selected a location and settled the land compensation, the majority of Padampur residents decided to leave old Padampur; finally the government had invited local people to get involved in the resettlement planning process and fulfilled earlier demands. When survey respondents were asked, “Did you agree to leave old Padampur?,” a large majority said yes (Table 1). Sixty percent of respondents who agreed to leave said their reason for leaving was the threat of recurrent floods. For those who did not agree to leave, 40% said they had better agricultural production in the old place.

Wellbeing Assessment

There was a significant difference between voluntary and forced respondents for four out of 24 comparisons: overall satisfaction, better land quality, changes in their jobs and satisfaction with employment opportunities (Table 1). However, there was no difference between voluntary and forced respondents in their assessment of all other factors. Our logistic regression analysis indicates that being a household that agreed to leave voluntarily increases the odds of being satisfied with the overall resettlement compared to household defined as forced (Table 2). Few of the other predictors related to satisfaction, food sufficiency based on land holding had a negative relationship, partially due to water scarcity. A limitation of the model is that it does not predict dissatisfaction well.

In terms of land tenure, a majority of all respondents received their land compensation and had secured land title. Approximately 50% of both voluntary and forced respondents said they had fair land distribution and a smaller percentage said they had better land quality.

A large majority of voluntary respondents were satisfied with the resettlement program as compared to forced respondents. A majority of voluntary respondents had changed their jobs and said they were satisfied with the employment opportunities, whereas fewer forced respondents had changed jobs, yet more were satisfied with better employment opportunities. In terms of food and nutrition, the majority of people from both groups assessed the new location as not having better child nutrition, sufficient land for food production, or enough earnings to buy extra food. However, a strong majority of both respondent groups said they had good public physical infrastructure, compensation of all common properties, and were satisfied with the government's plan for village infrastructure development.

A strong majority of both respondent groups said they had better health facilities in the new location with access to immediate health care. Respondents also said they had facilities and access for pre and post natal care and child immunizations. Over one-third of respondents mentioned that they did not have the same neighbor, but felt they had the same degree of cooperation from their neighbors as they had in their past location.

In the transfer from old Padampur to new Padampur, the total community land area was reduced from 1800 to 1000 hectares. The average parcel size owned by residents was also reduced, as people who had previously owned more than one biga (1.67 acre) of land received only one biga, along with monetary compensation for the remaining land. Overall, in the resettlement, the per capita landholding was reduced from 23.5 kattha (1 kattha = 0.05 biga) in old Padampur to 14.8 kattha in new Padampur. The landless in the old location gained land in the new location. Out of the 322 sampled households, 13% (42 hh) were landless in the old location but received a parcel of three

kattha in the new location. This arrangement provided them greater security in land holdings.

Employment is crucial in maintaining the economic status of villagers and land is the primary resource for the residents. Agriculture fields in old Padampur were very productive. In the new location, some households reported that they must find off-farm labor because their landholdings had been reduced. In addition, after resettlement, some villagers experienced a change in employment from subsistence farming to more cash-based income generating activities, such as dairy farming, mushroom farming, vegetable farming, wool spinning, and retail in street shops.

Housing is a basic need for any community and it was a primary concern for Padampur residents. They wanted to construct better homes in the new location. In old Padampur people mostly had houses made of thatch, mud, and timber. In many cases, due to the speculation about the possibility of relocating the village, people did not invest in permanent structures in the old location. Comparing housing in the old and new location, more people said they had “better” housing after the move. The respondents’ criteria for “better housing” in the new location were mainly based on the physical structure, including roof, walls, number of rooms, and availability of electricity.

Wealth as measured by possessions increased slightly based on the number of household technology items, vehicles, and alternative energy options. In a comparison of energy options for cooking, use of biogas increased by 8%, liquid petroleum gas by 7%, electric cookers by 3%, and pressure cookers by 9%. The slight shift towards alternative energy sources and modern appliances was particularly beneficial for women, as they

reported that they typically had spent more time doing household chores (collecting fodder and fuel wood and cooking) in the old location.

Marginalization is a crucial issue in forced resettlement and displacement which can affect people both physically and emotionally. In Padampur a few factors had the potential to contribute to possible marginalization, including identity as a landowner, indigenous culture, and gender. Land was more equally distributed after resettlement, and the larger landholders controlled less land in the new location. The gap between landlords and tenants was reduced due to this mechanism, shifting the village towards greater equity.

Sixty-three percent of all respondents said some groups of people were more affected by the resettlement than others. For example, in the focus group that included women, these women said that women's empowerment had increased considerably in the new location. The reduction in land holdings resulted in reduced labor needs on the farm and in the household for many women. They reported that more spare time has enabled women to learn new skills and gain more education. Women's skill training programs included bee keeping, mushroom farming, goat rearing, fruit farming, wool spinning, and vegetable farming funded by UNDP, GEF and UNF supported Tiger Rhino Conservation Project

Food management is an essential factor after relocation, directly related to household land size and the availability of irrigation water. Reduced land size and water scarcity contributed to insufficient food production in new Padampur. In general, the land holdings were inadequate for people to produce sufficient food to feed their families (Table 1).

In terms of drinking water availability, about half of the respondents said that it was worse, some said it was better and some said there was no difference between the new location and the old (Table 1). Water scarcity may be a contributing factor for food insufficiency by limiting crop production throughout the year. In the old place there was an abundance of fresh water for agricultural and drinking purposes. The water problem appears to result from insufficient attention to important resources during resettlement planning. The commission did not conduct a feasibility study for the water supply, for both drinking and irrigation purposes, resulting in a vague estimate about the actual amount of fresh water needed for the entire village. In addition, it did not have a binding agreement with the adjacent villages regarding use of water from the upstream catchments; overall the commission's decisions lacked a long-term vision for the importance of water security for post resettlement wellbeing.

In the old location, Padampur residents struggled with inadequate health facilities. The situation was severe, especially in emergencies during the monsoon season when they could not cross the river. Public infrastructure, services and transportation facilities to reach the nearest health post were very poor. As opposed to the hardships Padampur residents were facing before the move, they were relieved to have better health facilities in the new location. During our survey in 2005, village children were being taken to the health post in new Padampur for immunization. The health post provided local people with basic medical needs, and was within walking distance, one indication of improved health services.

Planning efforts did focus on the necessary public infrastructure. Out of 1,000 hectares, in new Padampur, 200 hectares were used for public purposes. The Padampur

Relocation Commission (PRC) divided this into village roads (45%), government offices, schools, and sites for religious purposes (4%), river and drainage (20%), and community forests (31%) (Padampur Resettlement Commission 2004). In general, people believed that the physical infrastructure in new Padampur was very useful. Ninety-six percent said there was satisfactory to good common physical infrastructure.

Finally, one of the criticisms of forced resettlement focuses on the disintegration of the social fabric within resettled communities. PRC argued that it made every effort to maintain social ties by encouraging people to live together and by allocating land near their former neighbors. However, in our survey only 37% had the same neighbors in the new location, although the remaining respondents said their neighbors were from the same village and they knew each other well (Table 1). When asked, “What special events have you shared with your neighbors?” 96% mentioned “sharing good and bad times.” People believed they engaged in more community events in the new location as compared to the old. Participating in the management of the community forest and the village’s drinking water were major social events in the new location. Support services from NGOs and International Non-governmental Organizations (INGOs) helped people engage in more community meetings and develop a shared awareness about improving their environment and livelihoods.

4. DISCUSSION

Local participation in the Padampur resettlement program was critical for a positive transition. In this case residents pushed the government to take prompt action in order to expedite the resettlement process. Our findings reinforce the scholarly arguments that local participation in planning and implementation are essential for reducing risk in

the reconstruction of residents' post resettlement wellbeing (Cernea 1997). Based on our study, an important consideration is the people's willingness to move, both expressed by their demands to relocate and their involvement in the development of the resettlement plan. This bottom-up participatory planning contributed to achieving enhanced benefits in resettlement through people's voice and influence, providing procedural justice and distributive justice as defined by Lind and Tyler (1998). Community leaders and government officials explained that citizen involvement resulted in positive outcomes for three risk factors: fair compensation for land, improved physical facilities, and equitable common property.

Our findings suggest citizen-initiated resettlement, as presented in this study, can result in improvements in components of socio-economic wellbeing that benefit the entire community. Overall residents were satisfied with some components of the resettlement, but many challenges remain. Public infrastructure was in place, giving adequate access to resources as needed. Roads and easy access to the nearest town helped people become more mobile to perform their regular economic and social activities. Between 1995 and 2004, the Resettlement Commission's efforts gained people's satisfaction even in a time of political turmoil.

Many conservation related resettlement studies document a downturn in socioeconomic wellbeing due to the shortage of land, loss of income and jobs, food insecurity, loss of access to common properties and social disarticulation (Cernea and Schmidt-Soltau 2006; McLean and Straede 2003; Colchester 1997; Ghimere 1992). Our research suggests that a citizen-initiated resettlement program, with sufficient government subsidy, can result in positive outcomes. For example, more land was

distributed to smaller landholders and landless people received land to support their livelihoods. However, more needs to be done, to support shifts in employment from agricultural labor to an off-farm based economy. Though marginalization is difficult to evaluate at this early stage, it could increase if government and non-government institutions do not provide strong support services as households make the transition to new socio-economic conditions.

It appears gender-based marginalization was not exacerbated, perhaps due to the increased support services and women's empowerment programs. And in general, social ties among the Padampur residents did not disintegrate after resettlement. But there are remaining concerns that cultural values and ties to the land may disintegrate among the Tharu. Others have pointed out that the Tharu have strong ties to the forests and rivers of the old location (McLean and Straede 2003); it will take time to evaluate whether marginalization increases among the Tharu who have been removed from their original land.

Issues of concern suggest current achievements in wellbeing may not contribute to the long-term economic progress among new Padampur residents without improved fresh water management and capacity building for off farm economic enterprise opportunities. As scholars have documented in other resettlement studies (Colchester 1997; Ghimere 1992), our findings indicate that food production can be a major problem. In new Padampur, food production was reduced as compared to the old location, primarily due to reduced land availability and water shortages. Households will need greater access to water for planting a second season rice crop or technological assistance to shift production to drought resistant crops. Further research will be necessary for a

robust economic analysis of Padampur households over time during the post-resettlement period.

5. CONCLUSION

We argue that conservation related resettlement might be able to fulfill the objective of protecting human wellbeing, if resettlement plans are initiated and designed in consultation with the residents. People in rural communities often live in poverty due to a lack of basic physical infrastructure, and people living in buffer zones around parks often suffer from frequent animal depredation of crops and livestock. When people perceive this hardship is impeding their wellbeing, they may choose to move. In the case of Padampur, the people's hardship became greater than their social, cultural, and environmental attachments to the old location. The Padampur resettlement provides several insights for reconsidering resettlement in light of conservation goals. First, residents must initiate the resettlement. Second, if they decide to move, those who resettle must be represented in resettlement commissions, enabling them to take part in the decision making process with transparent compensation distribution mechanisms.

To ensure continued wellbeing, post resettlement economic planning is necessary, enabling people to cope with transitions. Preliminary insights from Padampur suggest that the absence of post-resettlement economic and water supply planning diminished the likelihood of an easy transfer. However, the availability of support services from NGOs and INGOs supported initial government efforts in economic transition from an agro-based to cash-based economy, school construction, improved health programs, and augmentation of community drinking water systems. These partnerships with government agencies and NGOs will be necessary into the near future in order for the community to

be self-sustaining.

To evaluate the socioeconomic and biodiversity impact of voluntary resettlement, we suggest that long term comprehensive monitoring is necessary. Conservation related resettlement in most developing countries, particularly in human dominated landscapes, is often considered as an option for achieving multiple benefits. Greater consensus among residents, policy makers, conservation professionals, and social scientists can help reduce hardships experienced by residents and enhance benefits for people and ecosystems. If residents choose to leave an area, participatory resettlement design and pre and post resettlement planning has to be the foundation of the actual resettlement program.

LIST OF TABLES

Table 1. Chi-square analysis of socioeconomic variables among respondents who considered resettlement as forced vs. voluntary based on the question, “Did you agree to leave?” (no = forced; yes = voluntary).

Description	Response	Forced % (n=47)	Voluntary % (n=275)	P Value
Overall, are you satisfied with the Padampur resettlement program?	Yes	27.7	89.8	<0.001
	No	72.3	10.2	
Land Tenure:				
Did you receive land compensation?	Yes	97.9	99.6	0.271
	No	2.10	0.4	
How do you rate the quality of land in the new location?	Better	8.5	25.5	0.011
	Not Better	91.5	74.5	
Do you have land title now?	Yes	80.9	85.5	0.417
	No	19.1	14.5	
Overall, what is your opinion about overall land distribution?	Fair	48.9	49.5	0.486
	Not fair	51.1	50.5	
Housing:				
How do you compare the structure and materials of your house?	Better	61.7	66.9	0.486
	Not Better	38.3	33.1	
Economy and Employment:				
How do you compare your economic status old vs. new place?	Better	27.7	26.9	0.915
	Not Better	72.3	73.1	
Are there any changes in your job since coming to the new location?	Yes	38.3	65.5	<0.001
	No	61.7	34.5	
How do you compare your satisfaction with employment opportunities?	Better	70.2	50.5	0.012
	Not Better	29.8	49.5	
Food and Nutrition:				
How do you compare your children’s nutrition in the old vs. new place?	Better	31.9	45.8	0.076

	Not Better	68.1	54.2	
Does the current land allocation allow you to produce enough food to feed your family?	Yes	21.3	27.3	0.389
	No	78.7	72.7	
Are you earning enough to buy an extra food needed for your family?	Yes	36.2	37.1	0.904
	No	63.8	62.9	
Physical Infrastructure:				
What is your general evaluation of the infrastructure in the new location?	Good	91.5	96.4	0.130
	Not good	8.5	3.6	
Were all common properties of old location compensated in the new location?	Yes	87.2	92.4	0.241
	No	12.8	7.6	
Are you satisfied with the government plan for infrastructure?	Yes	85.1	90.5	0.256
	No	14.9	9.5	
Health:				
How do you compare for condition of health in the old and in the new location?	Better	76.6	78.2	0.808
	Not Better	23.4	21.8	
Do you find easy to get immediate medical facilities in the new location?	Yes	89.4	91.3	0.672
	No	10.6	8.7	
Do you find easy to immunize your children in the new location?	Yes	87.2	93.5	0.133
	No	12.8	6.5	
Do you find easy to get to the nearest health post, if there is an emergency?	Yes	87.2	93.1	0.166
	No	12.8	6.9	
Do you find easy to get services particularly for women for their pre and post natal care?	Yes	87.2	92.0	0.284
	No	12.8	8.0	
Social Ties:				
Do you have the same neighbors that you had in the old location?	Yes	31.9	38.2	0.674
	No	68.1	61.8	
Do you feel you have the same cooperation from your neighbors as you had in the past location?	Yes	74.5	81.1	0.293
	No	25.5	18.9	

Support Services:				
Is there increase in support services in the new location compared to the old?	Yes	66.0	61.1	0.526
	No	34.0	38.9	
Marginalization:				
Do you think there are any groups of people who are more affected by the relocation program than others?	Yes	85.1	86.9	0.737
	No	14.9	13.1	

Table 2. The logistic regression predicting satisfaction with resettlement, Padampur, Nepal 2005
(n=322)

Classification Table (a)			
Observed	Predicted		
	Overall are you satisfied with the resettlement planning		
Overall are you satisfied with the resettlement planning	No	Yes	% Correct
No	32	30	51.6
Yes	7	253	97.3
Overall Percentage			88.5

a. The cut value is .500

Variables in the Equation	B	S.E.	Wald	Sig.	OR*	95.0% C.I. for OR	
						Lower	Upper
Did you agree to leave?	3.64	0.52	49.37	<0.010	38.21	13.83	105.56
Better land quality	1.11	0.60	3.37	0.067	3.02	0.93	9.86
Do you have land title now	0.36	0.49	0.53	0.465	1.43	0.55	3.77
Satisfaction in the land distribution	0.35	0.39	0.83	0.362	0.70	0.33	1.50
Better Housing	0.62	0.39	2.49	0.115	1.86	0.86	4.00
Better economic status	0.74	0.48	2.41	0.120	2.09	0.82	5.31
Change in work and employment	0.48	0.39	1.46	0.226	1.61	0.75	3.47
Satisfaction with employment opportunities	0.67	0.42	2.50	0.114	0.51	0.22	1.17
Better child nutrition	0.02	0.40	0.00	0.954	1.02	0.46	2.25
Sufficiency in food with current land holding	1.12	0.46	5.81	0.016	0.33	0.13	0.81
Enough earning to feed family	0.16	0.45	0.13	0.715	0.85	0.35	2.04
Better physical infrastructure	0.09	0.99	0.01	0.928	0.91	0.13	6.37
Compensation of all public properties	1.38	0.86	2.58	0.108	0.25	0.05	1.35
Satisfaction with government's Inf. Planning	0.20	0.57	0.12	0.728	1.22	0.4	3.69
Better health facilities	0.22	0.51	0.18	0.669	0.81	0.3	2.17
Availability of Immediate Medical Facilities	0.51	0.64	0.63	0.428	1.67	0.47	5.89
Same neighbor?	0.68	0.45	2.27	0.132	1.96	0.82	4.73
Cooperation from neighbors old vs.	0.30	0.49	0.38	0.538	1.35	0.52	3.51

new							
Increase in support service old vs.							
new	0.37	0.42	0.76	0.384	0.69	0.3	1.58
More affected people from							
resettlement	0.58	0.62	0.87	0.350	1.79	0.53	6.08

LIST OF FIGURE

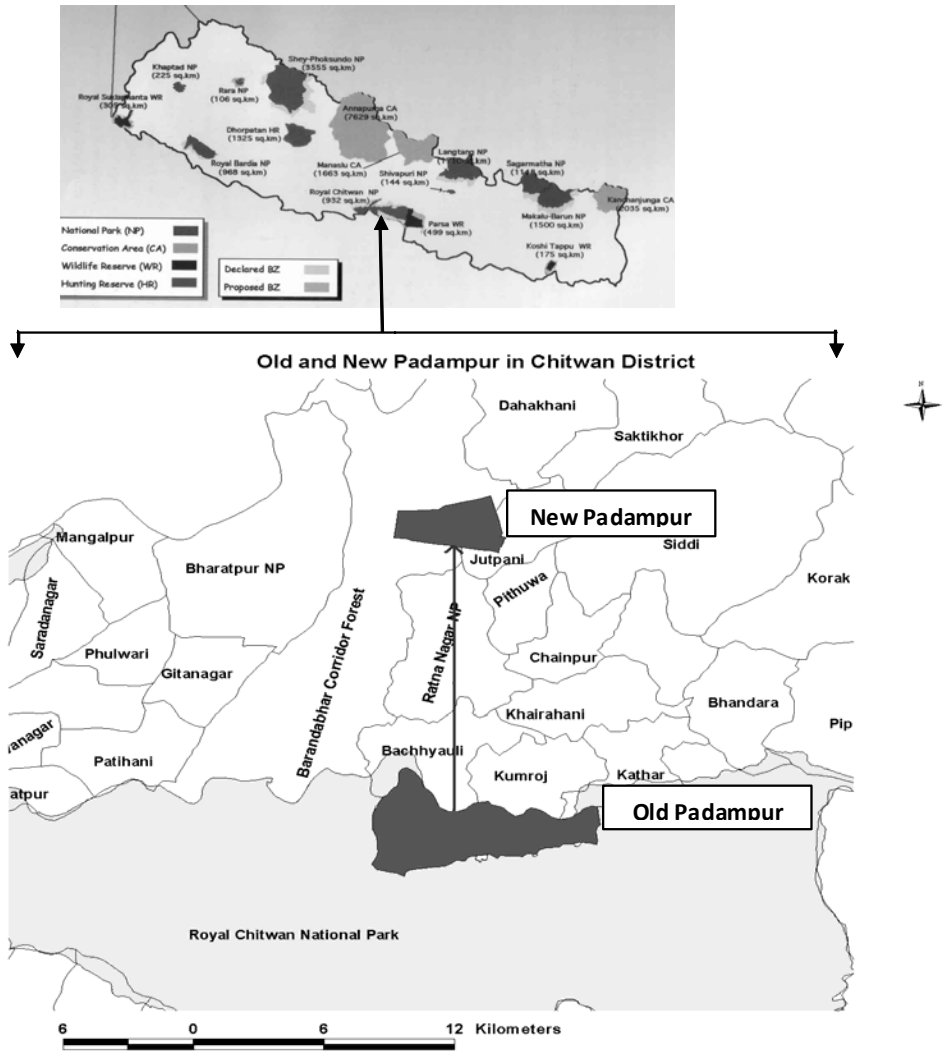


Figure1. Map of the study area

CHAPER III

ECONOMIC ASSESSMENT OF VOLUNTARY RESETTLEMENT: EVIDENCE FROM CHITWAN NATIONAL PARK, NEPAL

1. INTRODUCTION

Resettlement to enable conservation of important natural environments has been a controversial subject since the practice was first used for the establishment of parks and protected areas (Schmidt-Soltau & Brockington 2007; Curran et al. 2009). Advocates of the conservation benefits of resettlement and critics concerned about the socio-economic impact of resettlement generally express their opinions in accordance with their disciplinary focus (Schmidt-Soltau 2003; Cernea 2005; Cernea & Schmidt-Soltau 2006; Schmidt-Soltau & Brokington, 2007; Curran et al. 2009). As with many controversies, there is a need for rigorous analysis to define the benefits and costs of resettlement in social, environmental and economic terms to aid decision making and allow for more informed discussion.

Particularly lacking in the discussion of resettlement efforts has been good empirical economic data to understand residents' post resettlement economic wellbeing (Agrawal & Redford 2009; Curran et al. 2009). Issues of livelihood, poverty, fair compensation and social and economic justifications for resettlement are central to the conservation and resettlement debate but good data is often lacking (Schmidt-Soltau & Brockington 2007; Cernea & Schmidt-Soltau 2006; Cernea 2005; Schmidt-Soltau 2003; Dhakal et al. 2011). In most studies, the social impact of resettlement efforts has been

negative with impoverishment, abrupt changes in livelihood options, and loss of culture being important impacts (Cernea 2005).

Biological scientists view the importance of resettlement in the biodiversity conservation arena. They are most interested in promoting ecosystem protection by safeguarding natural habitats from human disturbance. After resettlement, habitat for endangered species such as tiger, lion, and rhinoceros have improved. Resettlement has helped connect critical tiger habitats through biological corridors and secured habitats for lion (Smith et al. 1999; Mukharjee & Borad 2004; Karanth 2007; Harihar et al. 2008).

Statements about global conservation gains from resettlement have been criticized for neglecting the poor and indigenous residents who sacrifice their homes, land and physical setting. The loss of forest-based indigenous knowledge is also a concern of social scientists (Colchester 2002; Cernea 2005; Cernea & Schmidt-Soltau 2006). Past resettlement studies on involuntary and forced resettlement and displacement cases in Africa and Asia have shown adverse consequences on livelihood. The situation has often been even worse in the absence of a fair compensation mechanism for the resettled people (Schmidt-Soltau 2003; McElwee 2006; Rangarajan & Shahabuddin 2006).

In the conservation and resettlement debate, another important topic of discussion is the differences between voluntary and involuntary resettlements comparing human wellbeing and conservation achievements under both alternatives. Some researchers believe that voluntary resettlement may produce better results in social and economic wellbeing than involuntary resettlement. There are still a number of definitions for 'voluntary and involuntary resettlement'. It is difficult to separate voluntary and involuntary resettlement due to various implications for decision making (Schmidt-Soltau

& Brockington 2007). In voluntary resettlement as discussed in this paper, residents must be fully informed and willing to resettle in exchange for a compensation package, including the development and provision of resources and facilities (Dhakal et al. 2011). Involuntary resettlement is defined as “a resettlement when affected individuals or communities do not have the right to refuse land acquisition that result in displacement” (Definition of International Finance Cooperation quoted by Schmidt-Soltau & Brockington 2007).

Recent resettlement studies do show a positive socioeconomic trend if conservation resettlement is undertaken with the participation of the affected populations and with bottom up planning. After voluntary resettlement, residents’ livelihoods have been better when compared to living inside the park and protected areas. Recent South Asian resettlement case studies show a positive indication of balancing conservation with residents’ livelihood requirements (Karanth 2007; Dhakal et al. 2011).

Populations in voluntarily resettlements have been shown to be better off socially and financially than those from involuntary resettlement. In terms of resource and service provision, Gebre (2002) found that most voluntarily resettled residents are materially better off than most involuntary resettlers. The author studied five indicators (cattle ownership, resilience of periodic food scarcity, self-reported satisfaction, per capita production and possession of household goods). Gebre’s and other’s studies of resettlement have found positive results in the settlers’ socio-economic wellbeing as well as conservation benefits. These positive impacts included enhanced biodiversity, reduced illegal logging, socioeconomic benefits, improved village economies, donations, and

more support from non-government and charitable organizations (Karanth 2007; Dhakal et al. 2011).

In this paper, we look at the Padampur resettlement in Chitwan National Park in Nepal. We consider the Padampur resettlement case to be a model voluntary resettlement project that combines voluntary and participatory planning methods. The majority of Padampur residents agreed to leave their residence in return for the land compensation package offered by the government. The whole village moved to a single location which allowed them to maintain their social ties. The new settlement site was developed with full public infrastructure (roads, schools, health post, post office, veterinary service, and a police post). Prior to being resettled, the residents were living under continuous hardships including floods, frequent crop and livestock depredation, and limited or non-existent infrastructure. This resettlement was participatory, bottom-up and voluntary as the committee involved the local people and Padampur residents in the decision making process. This innovative approach to resettlement planning may provide some insights into future resettlement design particularly in relation to the economic impacts of resettlement that have received limited attention in the past (Dhakal et al. 2011).

While social and environmental impacts have received the greatest attention, economic and financial aspects of past resettlements have not been sufficiently studied to assess resource and livelihood impacts. To facilitate an in-depth analysis of post resettlement economic wellbeing, a methodological underpinning is required (Cernea 1999; Pearce 1999; Eriksen 1999; Cernea & Mathur 2008). A small number of studies have shed some light on long-term economic impacts of resettlement and these can be

used to help develop theory and methodological approaches to measure economic impacts (Cernea 1999; Eriksen 1999; Cernea & Mathur 2008).

In most forced resettlement and displacement, physical and material compensation is considered as a tool for improving resettlement outcomes, but compensation alone does not reduce the risk of impoverishment. Compensation is often short term and does not always sufficiently address creating sustainable livelihood options for populations adjusting to changing livelihood conditions and changes in the resource base needed to sustain livelihoods. More attention to post resettlement economic planning in support of sustainable livelihoods is required to prevent people from becoming impoverished (Cernea & Mathur 2008).

This paper investigates economic impacts of voluntary resettlement providing empirical data to analyze economic costs and benefits both materially and from the perspective of the population being resettled. It may provide some methodological tools for future resettlement studies. The purpose of this study is to analyze post-resettlement economic performance in a voluntary conservation resettlement project and contribute information and methods that could be used in future resettlement planning.

Framework for Evaluation

As has been discussed, there has been much attention paid to resettlement impacts in the past, but limited economic information has been provided by previous studies. The Impoverishment Risks and Reconstruction (IRR) theory developed by Cernea provides a well-constructed post resettlement theory (1997). The IRR model examines eight major resettlement risks: landlessness, joblessness, homelessness, marginalization, increased

morbidity and mortality, food insecurity, lost access to common property resources, and social disarticulation. The model predicts post resettlement livelihood is improved by utilizing risk reversal strategies with financial backups. This model was widely used in assessing the risk of development-induced forced resettlements and displacements. Recently, the model was used in a conservation related resettlement for analyzing national park related displacements in Africa (Cernea & Schmidt-Soltau 2006). We applied this method in our earlier publication to evaluate comparative pre and post resettlement wellbeing of Padampur residents (Dhakal et al. 2011).

When the resettlement Program takes place over a longer time period, in the Padampur case, a decade, it is essential to compare the economic wellbeing status between early and late arrival settlers. This comparison is useful to see how early arrival lead the economic transition that late arrivals follow. We assume that after resettlement early arrivals will disseminate important innovations and development information that will be helpful for the later arrivals. Rogers (2003) found the earlier adopters innovate and disseminate new ideas through communication with people who then adopt these ideas. More people follow innovation earlier phase in their social and economic progress than later phase. We would expect the earlier arrival to innovate and the later arrivals to benefit from that innovation.

The purpose of this study is to assess Padampur residents' post resettlement economic wellbeing based on different arrival time intervals. We also investigate whether residents changed their economy from a farm-based to non-farm market-based economy. Research question we asked were: a) what is the post-resettlement residents' household

economic status now, as compared to their economic conditions prior to resettlement? b) Do early arrivals make more economic progress than late arrivals?

2. METHODS

We used quantitative survey methods to examine changes in household economic wellbeing of resettled households. Altogether 1,928 households were listed as resident in the new Padampur (Land Distribution Lists of Padampur Resettlement Commission Report 2004). This population record was the most reliable document available because every household (hh.) was listed according to land area received as compensation in new Padampur. Our analysis is based on two surveys, one was carried out in 2005 and the other in 2008. We randomly selected 322 respondents from the new Padampur Village Development Committee (VDC) list. The second survey was carried out in 2008 using the same households. Since the caste and ethnic groups are uniformly distributed among the Padampur community, we did not apply a stratified random sample. However, we checked the sample to ensure that of each ethnic group was proportionately represented. Altogether, six households from those interviewed in 2005 did not take part in the survey in 2008. Four hhs. did not participate in the interview and two hhs. had transferred from the new Padampur to another part of Nepal. We were unable to locate them.

Face-to-face household interviews were conducted to understand household representatives' perceptions of their economic wellbeing. The interview ranged from a minimum of ½ hr. to a maximum of 1 ½ hr., depending upon the respondent's preference for elaborating. Six local enumerators with university undergraduate degrees were hired and trained to conduct the survey. Residents were asked earlier whether they wanted to

respond or not. Residents responded positively to the informed consent. People appreciated being asked to participate and given the right to decline.

The survey tool was designed for eight factors: landlessness, joblessness, homelessness, marginalization, increased morbidity, food insecurity, loss of physical facilities as well as social disarticulations (Cernea 2005). We asked fifty-eight questions on land tenure, employment, housing, food management, social articulation, marginalization, health facilities, and physical infrastructure (Dhakal et al. 2011). Comparative questions were asked about people's perception of factors in old Padampur vs. new Padampur.

Study Area & Background

The new Padampur Village lies within the Chitwan District, one of the most popular districts due to its immense biological and economic resources (Figure 1). In 1973, establishment of Royal Chitwan National Park (RCNP) made the whole Chitwan district a popular tourist destination. In 1982 RCNP was recognized as a World Natural Heritage Site (Mishra & Jefferies 1985). RCNP is situated in south central Nepal, covering 932 sq. km. in the subtropical lowlands of the inner Terai. Prior to Park establishment, the area comprising the Barandhabhar forest – from the Rapti River to the foothills of the Mahabharat – extending over an area of 175 sq. km. was designated Mahendra Mriga Kunj (Deer Park).

The economy of Padampur before its resettlement was highly dependent on agriculture. After resettlement residents were gradually modifying their economy with additional off-farm employment opportunities. Off-farm employment opportunities help

reform the peasant economy towards a more market/cash based economy (Lindbach & Smith 1994). A balanced agro and cash based economy can help residents in fulfilling their food requirements and maintaining livelihoods. Lower agricultural productivity due to lower rainfall and lack of irrigation in New Padampur forced the residents to use their land in a more productive way introducing more innovative approaches. Resettlers also expanded into other economic activities to supplement farm income.

Prior to the establishment of the Royal Chitwan National Park (RCNP)¹, old Padampur was a predominantly *Tharu*² village in Chitwan. People were happier as they could utilize park resources (fodder, firewood, khar-khadai, and timber) for daily use without restriction. They could hunt, fish and collect forest fruits and vegetables for fulfilling their dietary supplements from the forest. They could collect medicinal herbs used to maintain their health and wellbeing (Milton & Binney 1980).

After designation of the RCNP and implementation of conservation rules and regulation in 1973, people started experiencing a loss of benefits from living within the park due to the restrictions on resource use. Loss of livestock and crops from depredation by park animals, without compensation, floods and other isolation problems made the people's livelihood more difficult over time. Due to these hardships, residents expressed their willingness to move in 1981, but under certain conditions. Their demands were: i) full compensation for land and housing, ii) the whole village shifts to one site to maintain social ties; and iii) provision of all physical infrastructures in the new location (Milton & Binney 1980). However, the government did not have the financial resources to fulfill all

¹ Royal Chitwan National Park (RCNP) will be referred as Park hereafter.

² *Tharu* are considered an indigenous people of RCNP. However, anthropologists argue they might have migrated from the Northern Indian States of Bihar during extreme drought in 1769 and made their refuge in the boarder forest in Nepal (Gunaratne 2002)

these demands and no donors were interested in supporting conservation resettlement due to adverse socioeconomic conditions in cases of past resettlement projects.

In Padampur, competition for land between wild animals and people created human wildlife conflicts (Mishra 1982; Mishra & Jefferies 1991). The park vegetation in border areas just inside the park may have been degraded due to illegal grazing by domestic cattle. As a result the prey population may have declined in the old Padampur forest areas. Both tigers and their prey had a negative impact on residents of old Padampur. The prey species (e.g. deer, wild boar and rhino) grazed on local crops and tigers killed livestock. People often become hostile when a tiger killed a person (McDougal 1989) or when innocent people were apprehended and accused of poaching by the park authorities.

In 1993, for the first time, major flooding had a devastating impact on the agricultural land of the entire old Padampur community. This catastrophe created fear among the Padampur residents that they might keep losing their high valued land to yearly monsoon flooding. In 1995, the government of Nepal decided to resettle Padampur from its original site (inside the park) an area 20 Km North at the foot hills of Mahabharat Mountain (mid-hill mountain range of Nepal). The objectives of this resettlement were i) provide access to health, education, communication and transportation for the Padampur residents; ii) save intense loss of land and properties from the monsoon flooding; iii) discourage poaching of endangered species such as tiger, rhinoceros and wild elephants; iv) support the government's biodiversity conservation efforts; and v) develop a suitable breeding habitat for valuable wildlife. A 17 member high level committee was formed based on the Nepal governments' ministerial level

decision. The committee was charged with making all of the resettlement decisions. The committee was comprised of seven local political leaders, five Padampur residents, and five members who were from local government agencies. The resettlement Program started in 1995 and ended in 2004 (PRC 2004).

3. RESULTS

Post-resettlement Economy

In order to assess comparative wellbeing in the old location and in 2005, we compared resident's responses to a comparative evaluation of the eight socioeconomic factors identified by Cernea (2005). We also constructed a comparative post resettlement economic wellbeing assessment based on survey data from 2005 and 2008 (Figure 3a and 3b). The 2005 data provides residents' perceptions of socioeconomic conditions post-resettlement, just after the completion of the Padampur resettlement project compared to the old location (Figure 3a). The 2008 evaluation provides the residents' perceptions of additional factors used to evaluate their economic status in 2008. Our questions in 2008 were about how factors had changed as compared to 2005 (Figure 3b). We found positive improvements in many factors with the exception of food sufficiency and perception of marginalization as compared to studies of other resettlement projects that found a decline in the post resettlement wellbeing factor (Cernea & Schmidt-Soltau 2006). With the exception of a couple of factors, we found social and economic factors were better in the post resettlement Padampur.

There was a range of improvement among factors evaluated in 2005, land, housing, physical infrastructure and health were seen as better than food sufficiency and

marginalization. Socioeconomic factors in 2008 continued to show improvements as people had added extra land, household utilities, experienced an increase in off-farm jobs, and physical facilities that served their needs. Marginalization was reduced with an increase in government and non-government support in economic development. But food sufficiency continued to decline in part due to a water shortage contributing to lower food production.

Changes in Economic Wellbeing

The economic condition of residents' is crucial for post resettlement wellbeing and economic wellbeing and livelihoods are directly influenced by resource availability and infrastructure. Padampur residents had better agricultural production in their old location due to rich alluvial soils and an abundance of freshwater. However, in the new location, fresh water level is not adequate to utilize for irrigation. It is barely sufficient for drinking and other household use. As a result, households tend to be involved in more off-farm economic activities. An increase in access to the market, since the new location is along a major highway, combined with poorer agricultural conditions has led people to get involved in micro-enterprises. This shift in economic activity is primarily due to the reduced landholding size and limited water for irrigation (Dhakal et al. 2006).

In the new Padampur, land value was greater. The price per *Kattha*³ of land was about NRs 35,000 to 45,000 in the old location. The market price had increased up to seven fold or more (i.e NRs. 300,000) per *Kattha* in the new location. In the old Padampur, land value was mainly determined by its rice production capacity. People used

³ *Kattha* is the land measurement unit in low land Nepal. One Katina is equivalent to 0.084 Acre.

to trade land based on the capacity to produce. The land value was not calculated as a real estate value due to a non-existent land market. From our survey, we found that the median household property⁴ value of our sample (n=316) in 2008 was NRs. 8,00,000 (US \$ 11,428) based on the current market price.

Compared to income in the old location, average household income from agricultural production had declined, but income from off-farm economic activities had increased for some households. The total number of households with off-farm income sources had declined in 2008 as compared to 2005, but the income amount had increased (Figure 4). Income from microenterprises decreased by a third between 2005 and 2008, while at the same time more households were involved compared to 2005 (Figure 4). Overall wealth indicators such as land and title (Figure 3a) increased after resettlement and there were more entrepreneurs involved in micro-enterprises (Figure 4).

Respondents mentioned that they were involved in government and non-government jobs, tourism businesses, street retail shops, and also received remittances from family members working overseas. The microenterprises are mostly agro based with the exception of street shops. The main microenterprises were dairy, mushroom farming, vegetable farming, and wool spinning. These microenterprises indicate that agriculture was an important resource base for household economy and livelihoods.

Based on the household income categories', it shows the residents' economy gradually turning towards non-agro based. Earnings from off-farm jobs increased in 2005 and 2008, and were also higher than the earnings from agricultural production. The

⁴ Land and building

median income from agricultural production was lower than the median income of off-farm jobs (Table 2).

Health services in the new location were improved as a result of increased access and availability of a range of health services and facilities. Seventy eight percent of respondents in 2005 said the health facilities and services were better than the old location (n=322). This positive assessment continued in 2008 as 89% of respondents said health services were better than 2005 (Figure 5). The overwhelming majority believed that health services related to emergency care, children's immunizations, and pre & post natal care were better in 2008 than in the old location and in 2005. However, there was a mixed reaction when evaluating specific health services in 2008 as compared to 2005. A higher percentage of respondents were satisfied with the performance of the emergency medical services and children's immunization in 2005 than in 2008 (Figure 5). Satisfaction with the health services was primarily due to people's access to the nearest health post and regular transportation facilities to the market center.

Comparing housing structure in 2005, in the old and new location, the majority (66%) said they had better housing after the transfer (Dhakal et al. 2011). At that time many households were in economic transition and they were in the process of constructing permanent houses. However, in 2008, 80% of respondents said they had a permanent housing structure. The respondent's criteria for indicating better housing in the new location were mainly based on the physical structure, including roof, walls, number of rooms, and availability of electricity and enough fresh water for household use.

In terms of education, the respondent's opinions were positive in both the formal and informal education sectors. In 2008, the number of illiterate respondents declined and

number of higher education students increased compared to 2001⁵ and 2005 (Figure 6). Education overall may have demonstrated a positive change; however there have not been many changes in the number of school going students. The number of students attending school in 2008 is higher than the year 2001.

The majority of respondents are concerned about their children's education. Both groups, early arrival (61%) and late arrival (83%) respondents said they send their children to both public and private (English medium) schools. About 50% of each group was sending their children to the private school and the other 50% went to public schools. Public schools are managed through a joint collaboration between the government and local community.

The opening up of a higher secondary school in New Padampur has enabled more school going students to upgrade their education in a locally established college. However, the financial cost to educate children in the higher secondary (10 + 2)⁶ represents an additional cost to families. A majority (55%) of respondents said they have difficulty to support their children's higher education. In the old location there was not any higher secondary school, students had to travel a long distance to get to the nearest higher secondary school.

⁵ Since there was not any education data available in the old location we used government 2001 census data published by the Central Bureau of Statistics (CBS).

⁶ In Nepal, the higher secondary considered as school after 10th grade. After 10th grade they go 2 years for higher secondary to fulfill the school level education requirement.

Post Resettlement Household Economy

The Padampur resettlement process took a decade to complete. Residents arrived in the new location in different years from 1995 to 2004. Some hhs. arrived earlier i.e., between 1995 to 1999 (during the first 5 years of the resettlement process) and some hhs. arrived later i.e., 2000 onwards (during the second 5 years of the resettlement process). In accordance to the ethnic groups more hill migrants (those who migrated from hilly areas to Chitwan valley) arrived earlier than *Tharu*⁷.

Of a total of 316 respondents, 80 hhs. (25%) arrived in the first five years and 236 hhs (75%) arrived in the second 5 years. We ran a Chi-square test, z-test to see whether residents who arrived earlier are better off than those who arrived later. The differences in responses of early arrivals compared to late arrivals were significant in water availability, access to markets and health services, occurrence of flooding and loss of property, and attitude regarding the importance of the Government and the Non-government in providing support services (Table 1).

Food Management

In the new Padampur, overall lower food production per household was observed as a result of the decrease in land area for farming and reduction in yields due to water scarcity (Dhakal et al. 2006) (Figure 3a). People who used to grow enough food before resettlement now depend on cash because their existing land is not sufficient to meet their food requirements. Padampur residents expressed mixed reactions about their food

management. In the earlier survey, food production was low from the current land holding due to the water shortage. Some believed that food produced in their own backyard was more nutritious than the food bought from the market. However, in our 2008 survey, residents were spending money for buying food and some households consumed their own farm production. When asked how frequent food is purchased for household consumption, they indicated that they purchase food every month (Figure 3b).

Similar to the old location, we found households in new Padampur were growing cereal crops such as rice, corn and mustard; 67% of early arrivals and 54% of late arrivals were producing cereals. The median income from agricultural production was NRs. 11,250 (Table 2). We observed a food deficit due to water scarcity, which was a major factor impeding food production.

Income Sources and Pattern

We found four different income sources, agriculture, off-farm, micro-enterprise and remittance. Income from agriculture was considered as any income from selling agricultural products such as, rice, corn, mustard, and lentil. The off-farm income is from salary and wages from government, non-government and private jobs. The income from micro-enterprise is from household enterprises like, mushroom, street shops and dairy. The remittance is the income received from hh. members working in overseas jobs. These income categories were compared between early arrivals and late arrivals. A range of income patterns existed in 2008. The primary source of income was from agriculture. Distribution of income according to the category is uniform in the lower tier but not in the higher level. Median income of all categories lies between NRs. 5,000 and NRs.

80,000, and is similar for early and later arrivals. Income from remittances is the dominant contributor among households due to higher wages in overseas jobs (Figure 7).

The majority of respondents had less than the median income in Padampur. Both early arrivals (84%) and late arrivals (85%) are below the median that falls between NRs. 500 to 10,000 annual income categories. However, a few outlier households had higher income. We found a strong majority (80%) of both late and early arrivals said that their overall economic condition in the new place was better than the old place. We checked whether income category differences were significant between early and late arrivers. We found no significant difference in mean income between early and late arrival households (Table 3) for all categories. More late arrival households (66%) replied that they had more stable income than the early arrival households (34%). In 2008, the late arrival households were earning the same amount of money each month as the early arrivals.

Overall, 10% of the respondents were involved in various micro-enterprises (ME) as an income source. More late arrivals (11%) were engaged in micro-enterprises than the early arrivals (8%). The median income from ME was NRs. 5,000 which was lower, as compared to other sources, but the number of people involved in ME was growing. Residents were involved in bee keeping, dairy farming, mushroom farming, and wool weaving.

Income from remittances was the highest source because household members were working overseas. Altogether 66 respondents said that their household family members were in other countries. Some households received remittances between NRs. 300,000 and 400,000 (US \$ 4,000 to 5,000) per year, which was a substantial amount of money for a rural household. Income from remittance can be a help to maintain a

household economy in post resettlement establishment, especially under political uncertainty. We did not conduct a detailed investigation of how remittance money was utilized or invested.

Support Services

Support services such as physical infrastructure, health and awareness supported by Government (GO), Non-government (NGO) and International Non-profit organizations (INGO) is common to all rural Nepal. Besides compensation, post resettlement economic wellbeing depends on planning and management of basic services, with the support of GO, NGO, and INGO organizations. These support services were building physical infrastructure such as roads and public building, and providing health and education facilities. The Government investment was mainly on the establishing physical infrastructures such as roads and public building. Among NGOs, the National Trust for Nature Conservation (NTNC) contributed substantial conservation and livelihood development works in new Padampur. Other NGOs and INGOS were involved in health, sanitation and small scale micro enterprises.

There was a significant difference in responses of both early and late arrivals. When asked how important the contributions of NGOs and INGOS were in economic development, a strong majority of early arrival and late arrival said that these organizations played an important role in economic development (Table 1).

Health and Wellbeing

To evaluate how health related services have changed since respondents arrived in new Padampur, we asked several questions on access to, and services provided by the health posts. The overwhelming majority of both early and late arrivals said that health services were better; a strong majority of early and late arrivals, said that the Padampur health post (PHP) was serving their needs, and children under 5 years of age had been immunized in the PHP (Table 1). When asked about emergency services, a strong majority of both groups indicated they were satisfied with the maternity and medical emergency services.

Transportation, Markets Access and Household Utilities

The availability of road and telephone facilities in Padampur enabled people to be more mobile in reaching the nearest market center. In the old Padampur it could take a resident a very long time, even days during monsoon season (Dhakal et al., 2006), to get to the nearest service and market center. Time it takes to get to the market site can be an important asset. The shortest time period is approximately <math><1/2</math> hour using motorized vehicle (bus, car, and truck) (Table 1).

People in old Padampur used only a few means of transportation such as bullock cart and bicycle. In the new Padampur however, villagers can use various means of transportation to get to the nearest market centers. More late arrivals had household utilities and appliances than early arrival household. They have been able to access entertainment, transportation, communications, furniture and other household utilities for their use (Table 4). Residents of both arrival years have mobile phones (Table 1). It was

expected that the use of mobile phone is for job and exchange communication for micro-enterprise, however we found it has not been used productively to explore market opportunity for household economy.

Economic Implications of Water Shortage

Perception of water scarcity is significantly different between early and late arrival households. The majority of late arrivals but fewer early arrivals said there was a limited supply of fresh water in new Padampur. In our 2005 study, we found fresh water planning and management were not considered as a serious issue (Dhakal et al. 2011) during resettlement planning. Water demand will increase in new Padampur and it is unlikely that the situation will improve in the near future. This continued water shortage will be critical for household's post resettlement economic development.

Nepal's atmospheric temperature is rising than the global average temperature and there are risks of flash floods and severe droughts effecting poor and vulnerable people (Gurung & Bhandari 2009). In the new Padampur, residents are already under the pressure of water shortage.

A growing concern is that the impact of climate change may add to the water scarcity problem. The IPCC report (2007) indicates that, in Asia, by 2050, the shortage of water will create pressure for economic development and degrade human health and wellbeing. Countries such as Nepal will be less able to deal with this uncertainty, where 30% of the 28 million population lives below the poverty line. Most of Nepal's poor, including Padampur residents, rely on monsoon rains for subsistence agriculture. These rains only provide sufficient water for one or two crops per year. Water shortages from climate

change will add another stress to the production system for post resettlement economic development. Padampur residents should also be aware of adverse consequences of climate change. Agro-dependent economies are vulnerable under climate change scenarios (Brown & Funk 2008). Padampur residents are likely to face additional hardships of water shortage seriously limiting food production.

4. DISCUSSION AND CONCLUSION

Compensation – Economics and Equity

The resettlement commission's decision on land compensation criteria addressing poverty and investing sufficient budget for physical infrastructure development made this resettlement unique in looking through an equity compass. The resettlement commission set land compensation criteria as i) minimum 3 *kattha* (0.25 acre) to those who were landless in the old Padampur; ii) households who owned 3 *kattha* to 1 *bigha* (0.25 acre to 1.67 acre) were compensated with an equal amount of land in the new place; and iii) for any hhs. that owned over one *bigha* 1/3 of the additional land was compensated with land and the remaining 2/3 were compensated with money. However, the threshold for a maximum land holding in the new location was two *bigha* (2.79 acre) of land. None of the farmers in the new Padampur received land greater than two *bigha*, any excess land above two *bigha* was compensated with money. Nepalese rupees of 3,500 were provided as compensation for transportation costs of household belongings. The committee decided to set aside adequate land for public services such as schools, roads, a health post, post office, police post and veterinary center (PRC 2004).

Fair and justified compensation distribution is always a challenge. Compensation alone can-not ensure post resettlement economic wellbeing without addressing poverty and a fair distribution mechanism (Cernea & Mathur 2008). To evaluate how compensation contributed to the Padampur resettlement, we analyzed the decisions of the Padampur Resettlement Commission (PRC). First, the land compensation for landless has been an innovative and pro-poor policy of the Padampur resettlement Program. We did not look at this resettlement through the poverty lens, however land distributed land for poor hhs. along the main road enabled them either to start small scale businesses or lease land to business owners for income. Second, The total budgeted amount for the Padampur resettlement was approximately equivalent to US \$ 4.6 million broken down as 67% for land compensation, 12% for drinking water, 7% for landscaping, road gravelling and river training, 7% for the master plan, physical infrastructure and electricity and 2% support to transport residents' household belongings (Figure 2) (PRC 2004).

The participatory infrastructure planning and transparent implementation mechanisms contributed to perceived socio-economic wellbeing. The Padampur model is more cost effective compare to cost per capita to other resettlement projects. Allocation of public land for local infrastructure development such as schools, roads and other physical necessities is important for community wellbeing after resettlement. Of the total 1,000 ha of land allocated in the new Padampur, 200 ha (20%) of the land has been used for public common property. The per capita open space and public area was approximately 100 sq. meters. The Relocation Commissionⁱⁱ divided the total allocated public land into the following assigned uses: village roads 45%, government offices,

schools, and sites for religious purposes 4%, river and drainage 20%, and community forests 31%.

Robust economic analysis of resettlement is difficult. The challenge is mainly due to the lack of standard procedure, differences in anticipated and actual cost of resettlement, number of people (beneficiaries) changing over time (Eriksen 1999). In a list of previous World Bank funded resettlement projects the highest per capita budget of an Indonesian Transmigration was US \$ 23,225 and lowest budget of the Rajasthan Commend Area and Resettlement in India was US \$ 473 (Eriksen 1999). Compared to the heavy investment in donor funded resettlement projects in Asia, Africa and Latin America, the Padampur resettlement project costs were born by the Government of Nepal and appear minimal in scale (US \$ 416 per capita including all land compensation and physical infrastructure planning (PRC 2004). The Padampur resettlement model may provide an example of voluntary resettlement planning; where the people have had their voice heard in setting up a compensation package and the selection of the area they would resettle (Dhakal et al. 2011).

Well being – Livelihood Impacts

Our 2005 study indicated that in terms of livelihoods, residents' were better-off in new Padampur (Dhakal et al. 2011); this was primarily due to the access to market, immediate services and mobility to search for jobs. Resident's evaluated the resettlement positively on land ownership, housing, health facilities, social ties and support services in the new Padampur (Dhakal et al. 2011).

Compensation and a fair distribution of resources are critical in any post resettlement wellbeing. In Padampur we found a successful foundation for a compensation distribution mechanism. Past resettlement Programs have been criticized having unfairly distributed and inadequate compensation. As a result, residents' socioeconomic condition often remained impoverished after resettlement. Cernea (2005) found that resettlees became homeless and took refuge in slums, becoming squatters rather than landowners. We emphasize that participatory planning for resettlement can enhance transparency and lead to a fair compensation distribution with adequate physical infrastructure and opportunities for enterprise development.

We observed improvements in economic development between conditions in old Padampur and 2005 and 2008. This is due to the development in local physical infrastructure and support services from the Government and Non-government agencies. Padampur residents were economically better off due to an increase in income, off-farm employment, modest increment in education, physical facilities, satisfactory public services, and increased access to transportation. We found an increase in additional properties as some residents have been able to add into their household assets. Most importantly, there has been a great increment in economic values of land and building due to the access to the road network.

This study provides an illustration of how a resettled population has responded to changes in resource availability. The land received in the new settlement is less productive with reduced availability of water presenting a challenge to the resettled population. Nonetheless, the new location presented improved infrastructure with access to roads and markets. The existence of that infrastructure has allowed the resettled

population to adjust to the less productive land base by moving from a farm based economy to a farm and market based economy expanding into microenterprises and other market options.

Between 2005 and 2008, more people became involved in enterprise development as a source of their income. The functional micro-enterprises that we surveyed are; mushroom farming, dairy production, wool production, bee keeping, street shops, and a small scale concrete factory. The nature of these enterprises is either agro-based or required water to scale up their production. Marketing products from these micro enterprises became easier as dairy farmers, mushroom farmers and honey producers sell their products either in the Narayangarh main market center for Chitwan and Sauraha, a Tourist town. However, water availability in the new Padampur continues to be a problem. This issue has to be resolved by the government and conservation organization in order to make the conservation resettlement a success story.

Lessons Learned

The Padampur resettlement met the criteria as identified by Schmidt-Soltau and Brockington (2007) that resettlement should be established based on free, prior, and informed consent (FPIC) to be able to bring positive social and economic wellbeing. This study provides insights for FPIC that may be a viable conservation option for tiger conservation. The characteristic of this resettlement is that planning was participatory, there was well planned infrastructure provided and compensation distribution was equitable. The resettlement planning model combined with a pre and post resettlement

economic development package can ensure resident's post resettlement economic wellbeing.

We found locally funded resettlement Programs can be more cost effective than the donor funded Programs. In the donor funded resettlement the cost allocation can be complex in both the process and outcome (Erikson 1999; Cernea 1999; Cernea & Mathur 2008). The Padampur model suggests a lower per capita cost of resettlement than donor funded efforts, yet resident's satisfaction remains higher. The Padampur model should be further analyzed as a funding approach for modest resettlement Programs.

Resettlement induced poverty has been a critical consideration issue in any resettlement planning and it is a factor for better economic wellbeing and conservation. If resident's economic conditions worsen, then resettlement brings adverse effects for biodiversity and people's livelihoods (Schmidt-Soltau 2003). The Padampur resettlement Program provided land for the landless, an important factor in addressing poverty. Similarly, land disparities were reduced as landlords with larger holdings had only a portion of their holdings as land in the new location. This approach provided land based equity among the community minimizing the gap between landlords and tenants.

We emphasize that post resettlement economic planning needs to happen before people move to any resettlement effort. In Padampur, post resettlement planning was not a part of the resettlement design process. This shortcoming meant many livelihood problems were not anticipated and addressed, resulting in a reduction of food production once everyone relocated. In addition, this has created a slow transition in resident's post resettlement economic progress. In the future, Nepal's resettlement policy makers are

advised to develop and implement post resettlement economic Programs, supporting the residents' economic transition.

The scope of voluntary resettlement is becoming elevated as a means to address the needs of likely affected populations as well as secure habitats for critically endangered species such as tiger and rhinoceros. The insights from this study can also be utilized to address the climate change refugee issue and enclave resettlement for tiger conservation. The participatory model used in this study may be used to form a participatory resettlement group to advocate resettlement. The group will develop local level capacity to look for the alternative location and make both pre and post resettlement plan and seek help from international organizations. The IPCC report (2007) indicates millions of people in the coastal countries will be homeless due to the climate change impact. Bangladesh, Maldives, and Pacific Islanders are vulnerable as millions of people may become homeless and land less (IPCC 2007) due to coastal flooding associated with climate change.

Resettlement of enclaves from protected areas is another concern of the conservation organization to secure tiger habitat and safeguard tiger population from extinction. A recent tiger conservation declaration announced some 48,000 families to be resettled from protected areas in India to secure tiger habitat (GTI 2010). However, the resettlement / non- resettlement debate becomes complex to assure post resettlement wellbeing. The people have not felt assured from the institution for the safer transition. Understanding conservation by the local community coupled with the economic incentives will help to generate citizen's willingness to leave their traditional area for safer tiger habitat. Such willingness can only become a reality if people are involved in

the decision making process.

LIST OF TABLES

Table 1. Responses of the early arrivals and late arrivals residents on the socioeconomic wellbeing factors

Variables	Response	Early Arrivals (n=80)		Late Arrivals (n=236)		p
		n	%	n	%	
Ethnic Groups: Hill Migrants		49	61.2	137	58.1	0.615
<i>Tharu*</i>		31	38.8	99	48.9	
Household Investment: Did you buy properties?	Yes	5	6.2	27	11.4	0.18
Are you leasing your properties?	Yes	3	3.8	4	1.7	0.28
Availability of Water: How is the water availability now?***	Limited	32	28.8	158	66.9	<0.001
Increased in water supply since arrived?	No	71	88.8	192	81.4	0.12
Sanitation and HH energy: Do you have electricity?	Yes	69	86.2	202	85.6	0.88
What type of sanitation facilities do you have?	Permanent	56	70	140	59.3	0.18
What source of energy you use for cooking?	Fuel wood	64	80	180	76.3	0.69
What source of energy you use for heating?	Fuel wood	78	97.5	233	98.7	0.33
Food management: How often do you buy food for your household?	Once in a month	33	41.2	87	6.9	0.120
Communication: Do you have land-line phone in your house?	Yes	5	6.2	31	13.8	0.09
Does any one of your family have a mobile phone?	Yes	37	46.2	132	55.9	0.13
Access and services: How long it takes to get the nearest market center?***	<1/2 hr.	13	16.2	49	20.8	0.003
Does health post serve your need?	Yes	77	96.2	229	97.0	0.73

Does police post serve your need?	No	74	92.5	220	93.2	0.83
Does vet. Center serves your need?	Yes	73	91.2	227	96.2	0.082
Does schools serve your need	Yes	79	98.8	235	99.6	0.421
Microenterprise and remittances: Are you involved in Microenterprise	Yes	7	8.8	26	11	0.567
Is anyone from your family working overseas?	Yes	19	23.8	76	32.2	0.154
Health services: How has the health service change since you have been to Padampur?***	Better	70	87.5	212	89.8	0.041
How satisfied are you about the maternity emergency services?	Highly Satisfied	72	90	226	95.8	0.157
How satisfied are you about the emergency medical services?	Satisfied	9	11.2	34	14.4	0.715
Have your all children under 5 years of age immunized?	Yes	59	73.8	156	66.1	0.302
Occurrence of flood and loss of properties: In old Padampur was there any flood noticed?***	Yes	57	71.2	195	82.6	0.029
In old Padampur was there any loss of land or properties**	Yes	47	58.8	88	37.3	0.001
Was there any flood since you arrived in new Padampur?***	No	47	58.8	179	75.8	0.003
Education: Does your children from your hh. go to school	Yes	62	77.5	188	79.7	0.229
Support services from NGO and INGO: How important are the contribution of NGOs and INGOs**	Important	62	77.5	204	86.4	0.018
How do you evaluate NGOs and INGO's performance in economic development?***	Good	55	68.8	156	66.1	0.008
Overall how do you evaluate government performance in economic development?***	Good	59	73.8	132	55.9	0.006
Marginalization: Are there any ethnic group more affected than others?	Yes	31	61.2	90	61.9	0.922

Overall economic condition: Overall how do you rate your economic condition now compare to old Padampur	Better	64	80	189	80.1	0.992
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*Indigenous group of people, in low land Nepal, whose traditions are strongly attached to the forest

** Statistical significance levels <0.01, <0.05 and <0.001

Table 2. Post resettlement income categories and distribution

Income From	N	Mean	Median	St. Dv.	Min.	Max.
Agriculture	250	19962	11250	24785	1000	200000
Off-farm	74	47138	30000	48763	1000	300000
Microenterprise	33	11530	5000	16255	500	70000
Remittance	66	92048	80000	80489	4000	400000

Note: Income figures are all in NRs: exchange rate US \$ 1=72.00

Table 3. Comparisons of income category means between late and early arrived groups (z-test)

Income Sources	t	p	df	Diff in Mean	SE	Lower	Upper
Agro-production	0.500	0.345	248	1773.09	3544.45	-5207.97	8754.15
Off-farm employment	0.778	0.109	71	9833.24	12642.52	-15375.23	35041.72
Micro-enterprise	0.258	0.344	30	1762.50	6822.57	-12171.04	15696.04
Remittance	-1.227	0.189	64	-29616.48	24141.44	-77844.55	18611.58

Note: Income figures are all in NRs: exchange rate US \$ 1=72.00

Table 4. Possession of household utilities

Household Utilities	Old %	2005 %	2008 %
Entertainment:			
Radio / Cassette Player	73	73	72
Camera / Camcorder	NA	NA	6
TV/ VCR	NA	5	46
Transportation:			
Bicycle	75	88	61
Motorcycle / Scooter	2	4	9
Motor Car	NA	NA	3
Communications:			
Telephone	NA	NA	15
Mobile phone	NA	NA	53
Furniture and Household Utilities:			
Refrigerator	NA	NA	3
Fans	NA	NA	50
Pressure lamp (petromax)	NA	NA	3
Sewing machine	NA	NA	13
Furniture and rugs	NA	NA	55
Kitchen Utensils	12	21	48

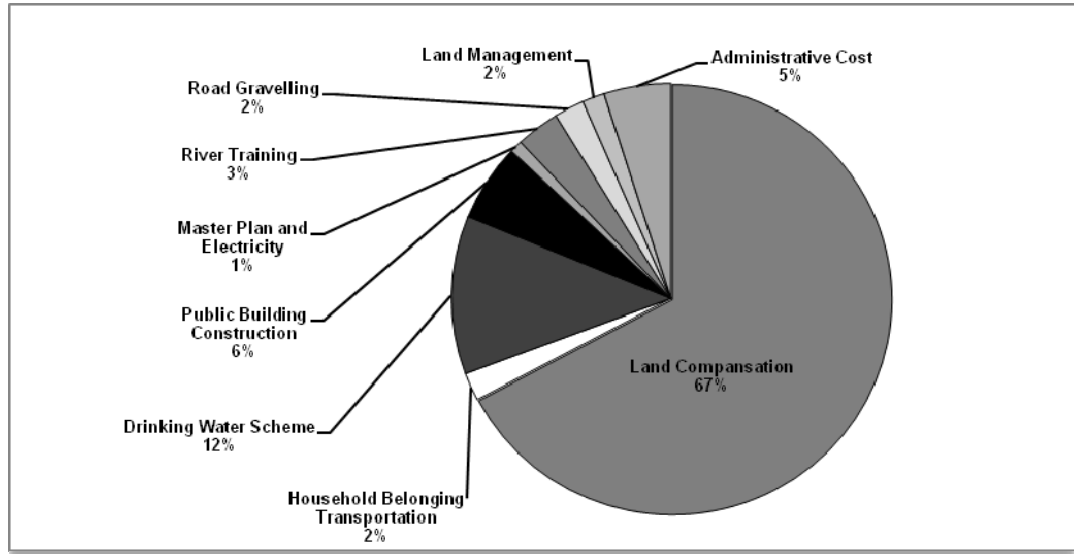


Figure 2. Padampur resettlement budget breakdown

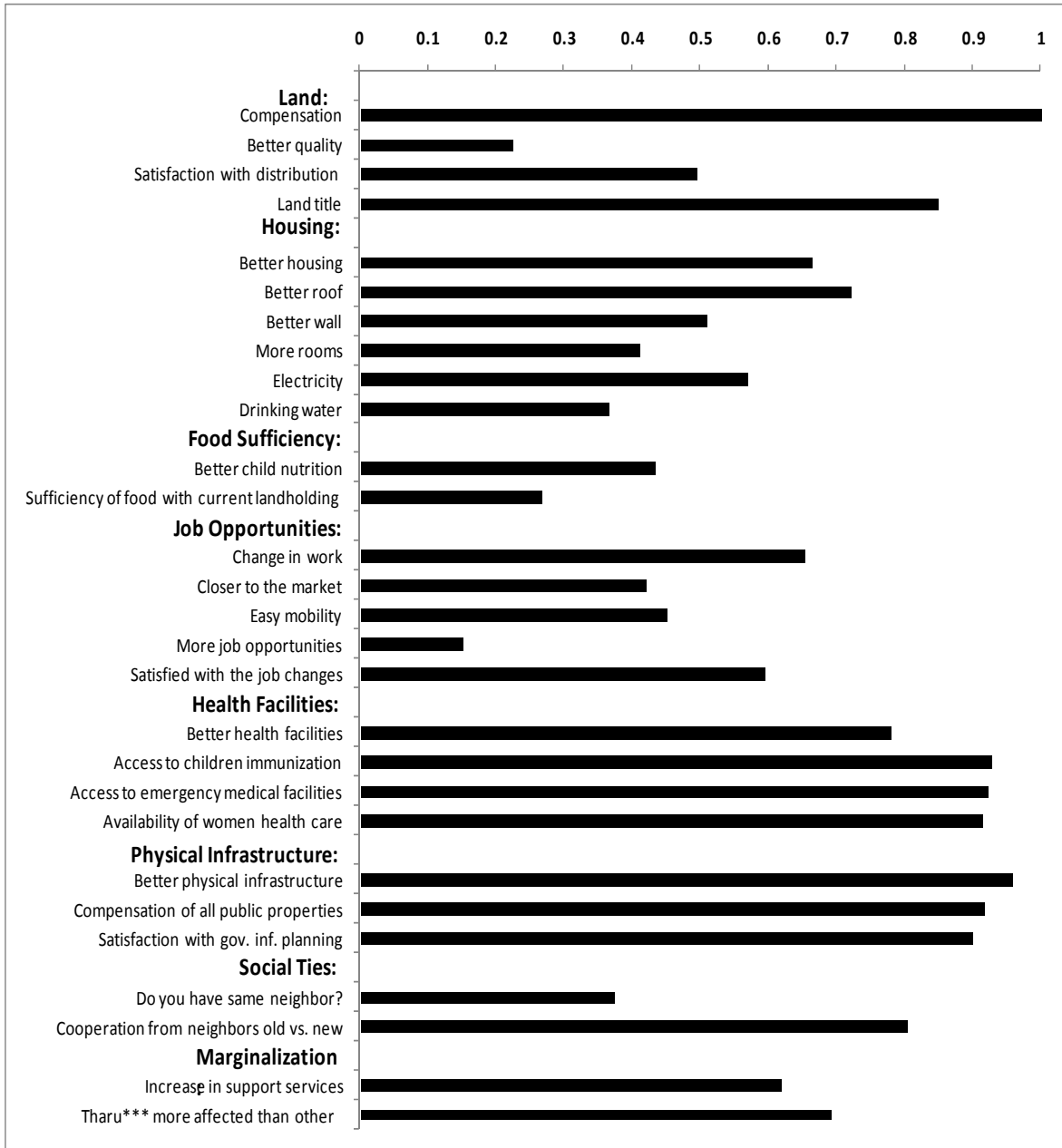


Figure 3 (a). Residents' perception on comparative wellbeing factors in the new location vs. old location in 2005

*** Indigenous communities living in the Terai (lowlands Nepal)

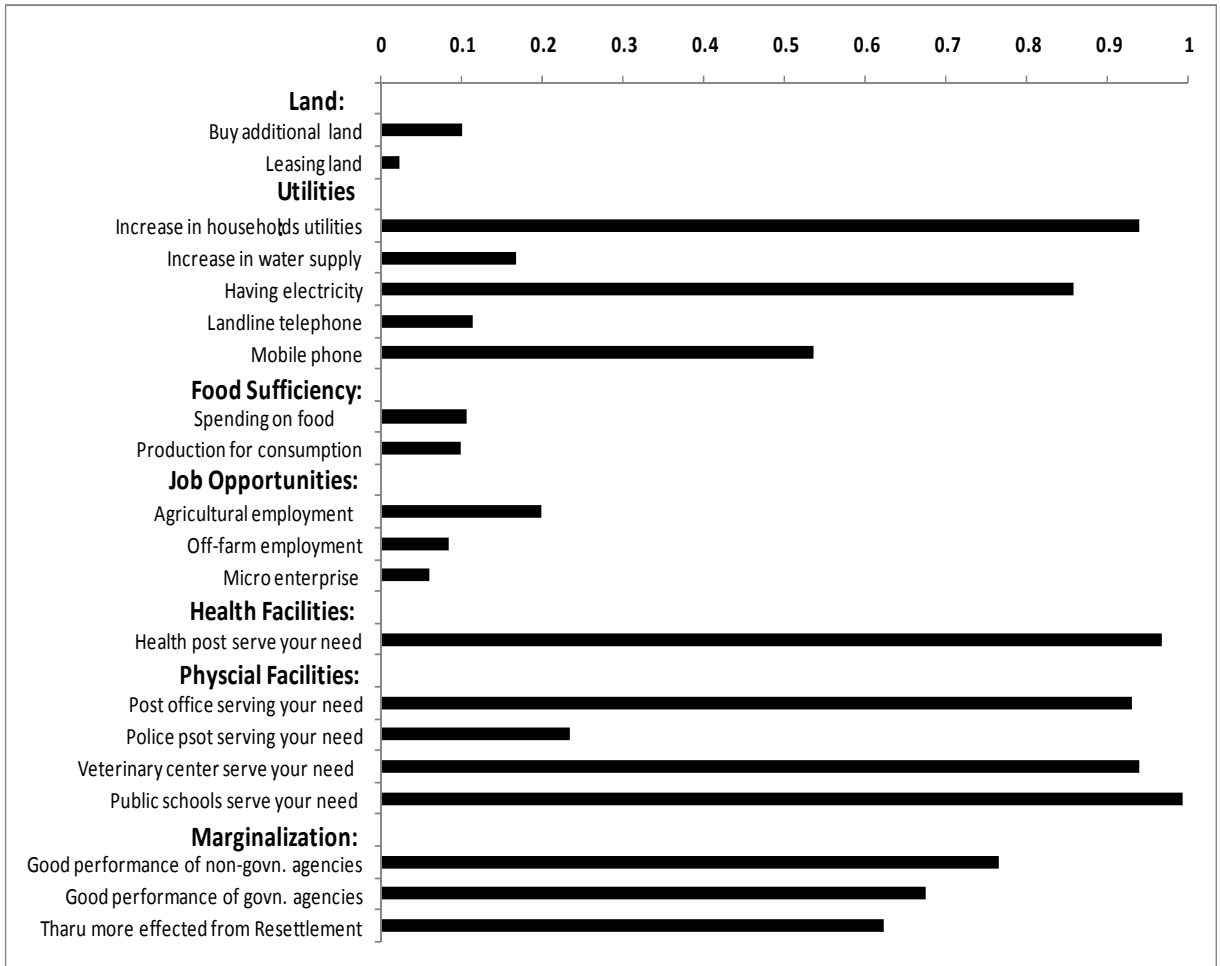


Figure 3(b). Residents' perception on increase in wellbeing factors since 2005 to 2008

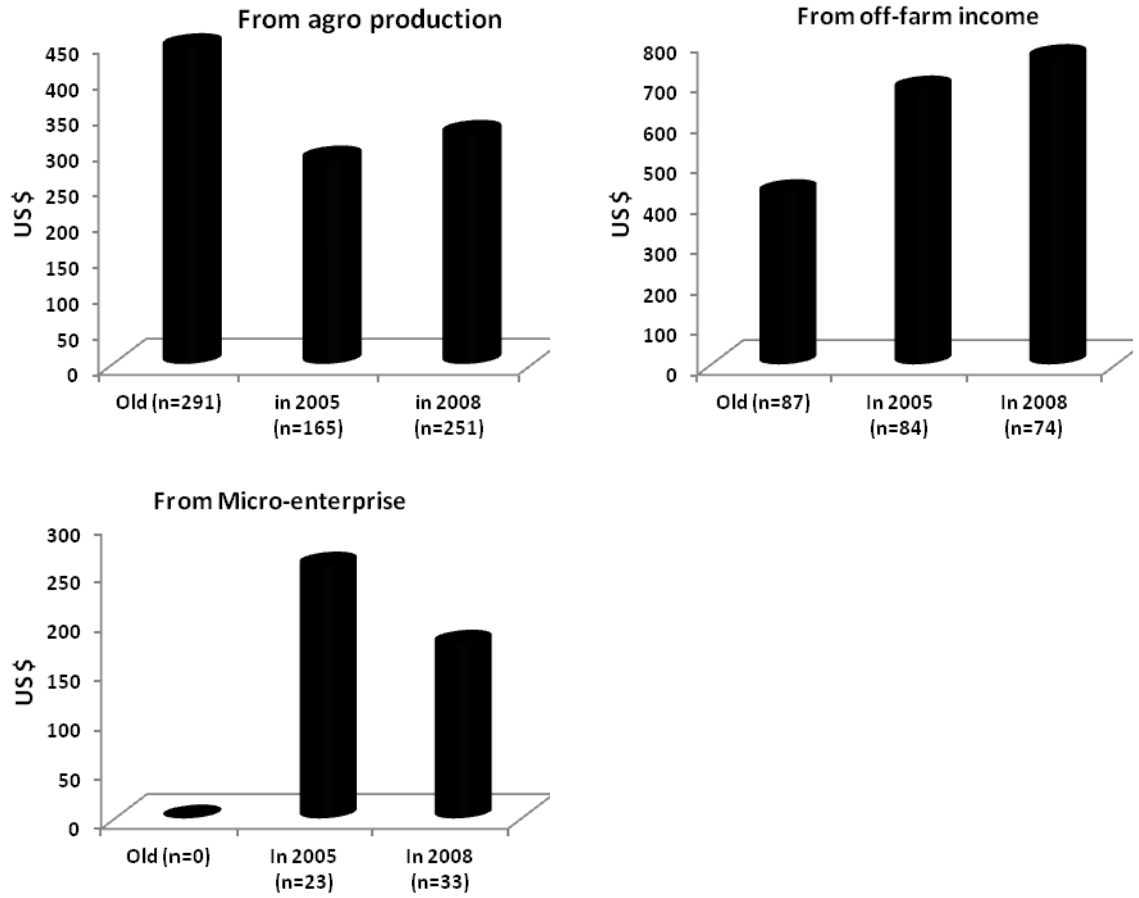


Figure 4. Farmers reported income sources: Average for old Padampur, 2005, and 2008

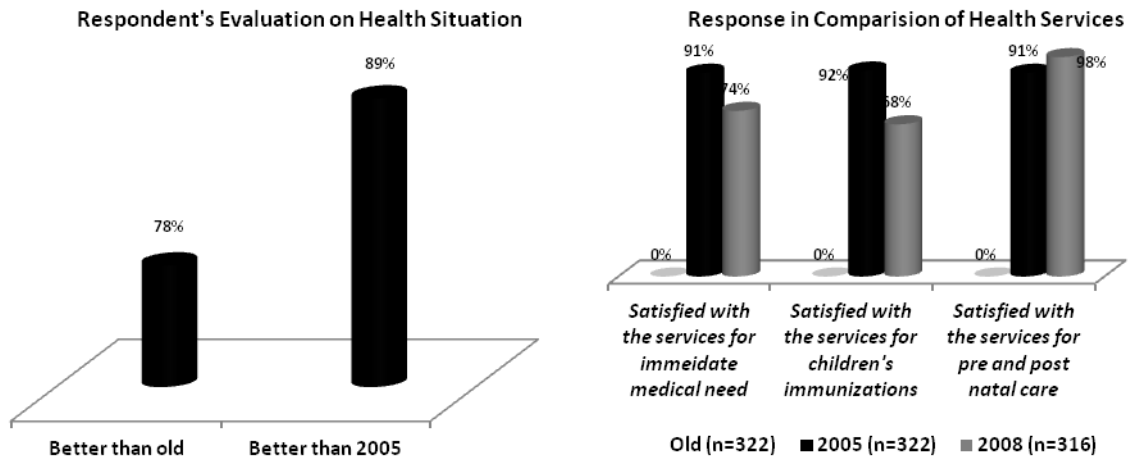


Figure 5. Improvement in health services and facilities from old Padampur, and 2005, as compared to 2008

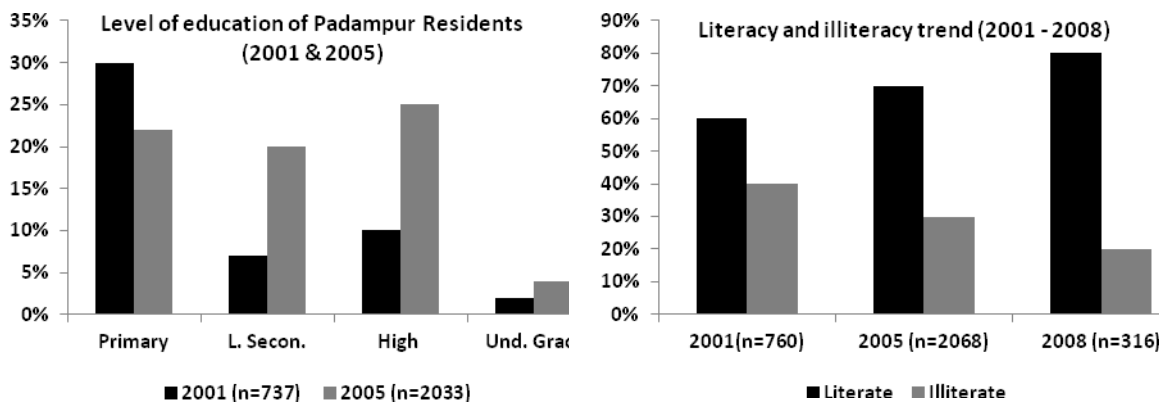


Figure 6. Trends in educational pattern in the new Padampur

Source: Central Bureau of Statistics (CBS), Nepal for 2001 and 2005 data

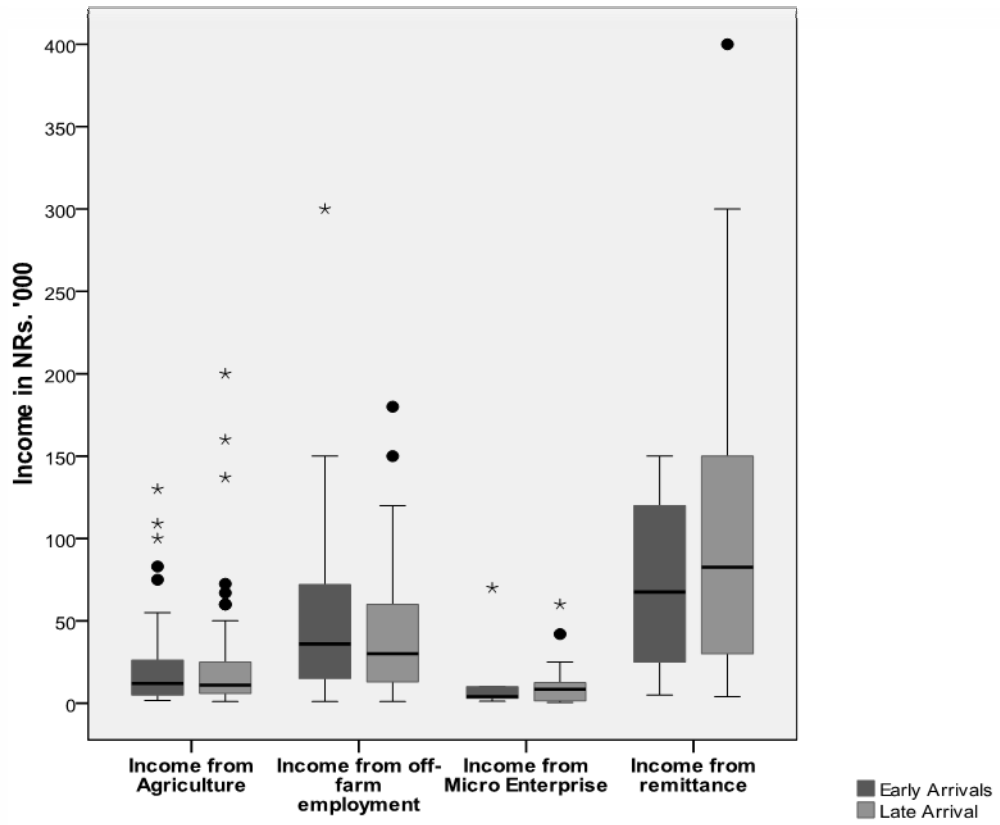


Figure 7. Income distribution and median income of early and late arrivals

CHAPTER IV

PERCEIVED CONSERVATION GAINS OF VOLUNTARY RESETTLEMENT: THE CASE OF PADAMPUR IN ROYAL CHITWAN NATIONAL PARK, NEPAL

1. INTRODUCTION

A primary goal of establishing national parks is to preserve wildlife species and prevent their extinction. This is typically accomplished by securing existing biological resources to prevent further degradation (IUCN, 1984). The establishment of protected areas in Asia in the early 1970s helped secure wildlife habitat especially for area sensitive species such as the tiger (*Pantheria tigris*), a critically endangered and rare species that was once widespread across the Asian continent (Wikramenayake et al. 1998, Smith et al., 1999). Many protected areas in India and Nepal constitute prime tiger habitat, and Chitwan National Park in Nepal's lowlands is recognized as a globally important area for tigers.

However, most reserves in south Asia, including Chitwan, support at best minimum sized tiger populations, and despite the network of extensive protected areas in the Nepalese lowlands, tigers are threatened. One of the major causes of continued tiger decline is habitat fragmentation in already existing small protected areas (Dinerstein and Wikramanayake 1999). While these protected areas provide the main refuge for breeding tiger populations (Karanth 1991), enlarging protected areas where possible, and linking them into a network through corridors is an important tiger conservation strategy (Smith et. al, 1993; Dinerstein and Wakramanayake, 1993; Smith et. al. 1998; Ahearn et al.,

2001; Smith et al. 2010). But in Asia, the numerous human settlements in areas important for tigers limit the ability to safeguard tiger habitats; to secure tiger habitat over the long term, 39 networks of tiger reserves require human resettlement (Mathur et al, 2010). To secure tiger habitat in India, more than 48,000 families will need to be resettled (Tiger Action Plan India, 2010).

In the early 1970s, when many Asian protected areas were created, the human wellbeing component was only superficially included in park management. Furthermore, when wildlife managers realized that many of the parks they created were too small for area sensitive species such as the tiger, they often implemented protected area expansion by forcibly translocating local inhabitants. Under these circumstances, there was little concern for the livelihoods of people living near protected areas. The Gir forest in India exemplifies this approach. People were removed and the lion (*Panthera leo persica*) population increased. However, the needs of subsistence farmers were ignored (Mukherjee and Borad, 2004).

Similarly, to support viable populations of tigers and other mega-species, Chitwan National Park was expanded in 1975 and people were forced to resettle. The first expansion of Chitwan was later deemed inadequate, and in 1984 Chitwan National Park was again expanded. Fortunately, this second expansion had little negative impact on humans, because the Parsa Wildlife extension had low human habitation compared to Chitwan. But even after the second expansion, there were only approximately 60 breeding tigers in Chitwan, and still more land was needed to support a viable population of tigers in the Park. Nepal's largest protected areas (Chitwan and Bardia National Parks)

are still too small and isolated, and have a high perimeter-to-area ratio that increases the likelihood of undesirable human-wildlife contacts.

As described above, forced translocation of villages to enlarge protected areas was an approach typically taken when a park was judged to be too small. But by the mid-1980s there was a growing backlash to forced translocation, so further expansion of Chitwan National Park was not an option. As the cost of ignoring people who live in and adjacent to protected areas was becoming well documented (West and Brechin, 1992), a new generation of conservationists began seeking ways to balance biodiversity conservation with human wellbeing (Dinnerstein et al 1999). Ultimately, academics and conservation organizations rejected forced translocation of people to enlarge parks due to the adverse socioeconomic consequences resettled people experienced in past conservation resettlement programs.

In Nepal, a new paradigm of voluntary resettlement began to emerge in 1981. At this time, the local community of Padampur (an enclave of Chitwan National Park) with approximately 12,000 residents, was isolated from markets, schools and a hospital. The community sought to resettle if the government would meet resident demands for land compensation and a single location for the entire village (Dhakal et al. 2011). When the area suffered from massive flooding in 1993, an even stronger sentiment for resettlement spread through the community. Authorities honored the local voice and desire to resettle, and in 1995, the resettlement process for this village began. Nine years later, resettlement was completed and the evacuated land was handed over to park management by the government of Nepal (Dhakal et al.2011).

The desire to voluntarily leave the area and resettle to other areas in Chitwan was largely influenced by the Padampur residents' understanding of the community-based conservation approach. Nepal has a history of introducing successful community-based practices for habitat restoration and supporting local livelihoods that can be traced back to at least 1989 (Dinerstein et al. 1991). Over a 15 year period (from 1989-2004), the Baghmara and Kumrose community forests and other community forests in Chitwan have been instrumental in restoring tiger and rhinoceros habitats.

The Padampur resettlement is an example of resident participatory resettlement to meet two goals: biodiversity conservation and the improvement of human livelihoods (Dhakal et al, 2011). In Chitwan National Park resettlement of Padampur has increased land area by adding 1600 ha of prime alluvial habitat that supports the highest density of tigers in South Asia. Incorporating Padampur into Chitwan National Park also reduced the boundary of natural resource and human-wildlife conflicts. Evidence of increased wildlife movement was observed by the author shortly after resettlement; within one year I observed fresh tracks of tiger and grazing rhinoceros in former agricultural lands. These lands are now part of the park and already support three breeding tigers (J. L. David Smith, pers. comm.).

My study explores the biological gains and resident perceptions about the change in wildlife habitats in the old and new locations of Padampur. It also explores community forest management in and around the new resettlement area. The purpose of this study was to document how translocation of residents from the old Padampur site resulted in recovery of a tropical habitat, increased local livelihoods in the post-resettlement areas, and increased capacity for local residents to manage natural resources after resettlement.

The following objectives were defined:

- 1) Compare tiger prey abundance in the evacuated area of the Old Padampur with abundance in the park core grassland habitat to assess suitability for tigers.
- 2) Document perception of Padampur residents on biodiversity loss and gain in the park before and after their resettlement.

2. METHODS

Study Area

The study area I chose for the prey abundance comparison is the grassland habitat in the park and the evacuated Padampur site (Figure 1 & 2). Chitwan National park (CNP) is situated in south central Nepal in the subtropical lowlands of the inner Terai⁸. The study area ranges in altitude from about 100 meters (330 ft) in the river valleys to 815 meters (2,674 ft) in the Churia Hills. Two major river systems, the Narayan in the north-west and the Rapti in the north-east occur in the protected area. These river systems also form a natural boundary for human settlements. The eastern border of Chitwan National Park is adjacent to the Parsa Wildlife Reserve. The park habitat is contiguous in the south, joining the Indian Tiger Reserve and Valmiki Tiger Reserve through the Barandhabhar Forest Corridor (BFC). This whole landscape is known as the Vakmik-Parsa-Chitwan Tiger Conservation Unit (TCU). The TCU covers a 3,549 km² block of alluvial grasslands and subtropical moist deciduous forests, and is considered the prime tiger habitat in the world (Wikramanayake et al. 1999).

⁸ Refer figure 1 of Chapter II

The New Padampur is located on the northern edge of the Brandhabhar Forest Corridor (BFC) in Nepal (Figure 4). This corridor connects lowland and mountain ecosystems from Chitwan National Park to the Mahabharata Mountain range, and is recognized for its importance to biodiversity (Gee 1964; UNDP 2007). The BFC facilitates the movements of migratory birds, aquatic wildlife and possibly ungulates. The corridor also provides a refuge for park animals when there is flooding in the low elevation areas of the park. In addition, the southern portion of the BCF provides important habitat for tiger, rhinoceros, four species of deer (chital, sambar, hug and barking), other animals and insects, and numerous plant species.

Estimating Prey Abundance

Prey abundance determines tiger habitat quality. As prey biomass of large ungulates increases, the carrying capacity for tigers also increases (Bagchi et al., 2003; Karanth et al 2004; Shrestha 2004; Smith et al., 2010). To estimate the relative carrying capacity for tigers in old Padampur compared to habitat inside the park, I utilized a Pellet Group Count as an indirect measure of prey abundance. This method has been widely used to determine the density, abundance and distribution of ungulate species (Neff 1968; Collins & Urness, 1984; Smith et al. 1998; Bagchi et al., 2003; Karanth et al, 2004; Shrestha, 2004), and was used in 2006 to assess prey abundance in Chitwan National Park grasslands (Gurung, 2006). Because I was comparing prey abundance in the evacuated area to that assessed in the Park grasslands by Gurung (2006), I refer to the evacuated area as the Treatment Area and the Park grasslands area as the Control Area. In my study, pellet counts were conducted in 2008.

In both my study and Gurung (2006) pellet count surveys were conducted exclusively during the dry season (April – May) so that fecal standing crop could be compared to previous prey surveys conducted in the same season. In the Treatment Area, the evacuated Padampur was a contiguous area, and divided into three Treatment Blocks (TB) for pellet counts (TB1 = Simara Ghole to Bangain; TB2 = Bhimpur to Jitpur, and TB3 = Jitpur to Amrite) (Figure 2). Within these blocks I placed transect lines of varying lengths (ranged in distance from 20 meters up 1,400 meters) with an east-west orientation every 300 meters to provide uniform coverage of the Padampur. Within each transect, I established between four and sixteen 10 m² plots spaced at 100 m intervals (Smith 1984; Wegge 1976; Shrestha 2004); number of plots established was relative to transect length.

For the 2006 pellet counts conducted in the park, a similar protocol was used, with the following exceptions. Transect locations were chosen randomly; transects surveyed were of the same length (650 meters); and within a transect 10 m² pellet count plots were conducted every 25 meters. I assumed that the pellet counts conducted in 2006 and 2008 were similar in their ability to assess prey abundance because both methods provided adequate coverage of areas. The Park grassland habitat surveyed included grassland adjacent to Padampur, and was an area that had been previously defined (Smith 1984; Wegge 1976; Smith et al. 1998; Shrestha 2004). The entire park area was divided into three Control Blocks (CB; CB1 = Patch no. 1 to Ghatgain; CB2 = Kasara area and CB3 = West of Kasara to Amaltari) (Figure 2) Because the grassland area within the park is not contiguous, the control blocks included both grassland and forested areas.

Within the Treatment Area, each sampling team consisted of three persons: one to confirm distance between plots by pacing along a fixed bearing, one to record data, and one to count the pellet groups in the plot. Based on size of fecal pellets, I defined small, medium and large classes of prey size. The small prey class included barking deer (*Muntiacus muntjak*), the medium sized prey included chital (*Axis axis*) and hog deer (*Axis porcinus*), and the large prey class consisted of sambar (*Rusa unicolor*) (Shrestha 2004). Droppings of rhinoceros, wild elephant, tiger, sloth bear and gaur were recorded as evidence of these species' presence. Scrapes and other markings of tigers were also recorded to detect their presence in the evacuated area.

Because Sambar is the main prey species for tiger and the largest tiger prey, weighing approximately 300 kg, it is frequently used as the measurement unit to which the body mass index of other prey species can be compared and calibrated (Smith, 1984). Therefore, all prey species detected within each pellet count plot were converted into Sambar Units (SU). For SUs, the body mass index of a Sambar is 1, so for example, a spotted deer (Chital) with an average weight of 55 kg was 0.28 SU, while the smaller barking deer was 0.11 SU (Shrestha, 2004; Smith, 1984). We then used a nested analysis of variance model (ANOVA) to examine SU variability under fixed and random factors. The pellet plots are nested within transects, transects are nested within blocks and blocks are nested within respective Treatment and Control areas. In the analysis, Treatment and Control blocks were considered the fixed factors, and transects and pellet plots were random factors. We ran ANOVA treating SU as the dependent variable and compared variability within and between groups.

Pre- and Post-Resettlement Perceptions of Biodiversity Restoration

In 2005, I conducted a household survey to assess how villagers perceived post-resettlement biodiversity losses and gains within the expanded park area due to resettlement. Respondents were asked about their engagement in the park for collection of fuelwood, fodder and minor forest products while they were in the old Padampur. Similarly, I assessed their perceptions about the use of the forest in and around the new Padampur residence and how this use was impacting the existing biodiversity in and around the new settlement area.

In 2008, I conducted focus group meetings in nine community forests in and around the new Padampur resettlement site to evaluate participation in conservation and sustainable forest management post-resettlement. The focus group meetings were conducted with forest management committee members, forest users, forest guards and village representatives in each community forest. My questions were: 1) What is the status of your community forest (CF) now? 2) Is there any disturbance in the forest as a result of new settlement? And, 3) what are the costs and benefits of CF to local livelihoods? Following the discussion we visited the community forests to determine how participatory forest conservation has been helpful in both maintaining existing biodiversity and generating economic benefits. The themes of analysis were: i) reliability of wildlife habitat; ii) economic benefits from the forest; and iii) importance of new resettlement in conservation.

In terms of measuring human-wildlife conflict in the old Padampur, I utilized data collected from Chitwan National Park between 1993 and 2003. These data included periodic reports on wildlife poached or killed, illegal logging events, and number of

Padampur residents apprehended or jailed. I also acquired data on number of people wounded by tiger, rhinoceros, leopard, sloth bear, wild boar and wild elephant. Finally, I also obtained data on the number of people killed by tiger, wild elephant and rhinoceros.

2. RESULTS

Prey Abundance

In 2008, I assessed prey abundance in the recently evacuated old Padampur (Figure 1) and then compared with the prey abundance across Chitwan National Park, that was assessed by Gurung (2006) (Figure 2). Relative prey abundance as measured by the number of standing crop pellet groups was 0.31 pellet groups/10 m² plot (range 0.16 - 0.52). Comparatively, the recently evacuated old Padampur (Figure 1), assessed in 2008 during this study, had a significantly higher relative abundance of 0.84 pellet groups/10 m² plot (range 0.70 - 1.00) (Tables 1 and 2).

Both in Chitwan National Park and in Old Padampur, I found significant differences in prey abundance measured in SUs between blocks within an area as detected by ANOVA. However the range of relative abundance between treatment and control areas do not overlap (Tables 1 and 2).

I also recorded the presence of several large mammals such as tigers, sloth bear, wild elephant, one-horned rhinoceros, wild boar and guar (Table 3). This additional evidence demonstrates that all large mammals found in the park also use habitat in the Old Padampur, indicating vegetation recovery.

Benefits for wildlife/biodiversity

In our 2005 survey the majority of respondents agreed that the resettlement program has enhanced biodiversity in the evacuated area. They categorized the biodiversity improvements as 1) an increased core area of the Park (86%, n = 278 households), 2) a likely increase in wildlife numbers (76%, n = 244 households), 3) reduced poaching (40%, n = 128 households), and 4) reduced human pressure (52%, n = 168 households).

The Old Padampur respondents kept more local cattle than they currently do and they relied on free grazing inside the park as the main source of fodder. Livestock numbers measured in Livestock Units (LU)⁹ decreased in New Padampur. More importantly, free grazing livestock in Old Padampur, which consisted of 4 LU / household was reduced to 0.8 LU/household in the new site.

Reduced Conflicts Between Park and People

Of 322 respondents, 144 said they visited the park daily when they were living in the old Padampur. Of these 74% spent 1 to 4 hours inside the forest on a daily basis, 20% spent 5 to 8 hrs, and 6% spent 9 to 12 hours inside the forest daily. Their time was primarily spent collecting fodder, fishing, and harvesting medicinal herbs and other minor forest products for their daily needs. Since the resettlement these human activities inside the park have stopped. However, park authorities allowed indigenous healers to continue to collect medicinal herbs, seedlings and seeds.

⁹ The conversion factors – Buffalo (1), Cow (0.7), Sheep/Goat (0.1) were adapted from (Bride, 1983; Jahnke, 1982 cited by Saetre, 1994 then cited by Regmi, 1998).

Biodiversity Status in the New Area

Negative aspects of wildlife in the new area were reported as follows: 17% of respondents (n = 56 households) reported crop depredation; 9% (n = 28 households) reported livestock depredation; and 1.6% (n = 5 households) reported human injury. However, Padampur residents realized the potential scarcity of natural resources at the new site and because they valued the adjacent forest resources and were interested in preserving biodiversity, many incorporated more sustainable actions in their daily routines. Respondents reported developing community forests (86% of households), provisioning of alternative energy sources (33% of households), and reducing the number of cattle (60% of households). Respondents also predicted that some potential impacts of the resettlement project could occur to the BFC. These included increased human pressure (65% of households), air pollution (17% of households), increased road traffic¹⁰ (22% of households) and a decreased width of the corridor (55% of households).

Participation in Conservation and Sustainable Forest Management Post-Resettlement

With the initiative of the Tiger Rhinoceros Conservation Project (TRCP)¹¹, three community forests were established north of the new settlement (Figures 5). As elsewhere in Nepal, these community forests are managed by a local community forest council in accordance with the community forest management prescription. People are allowed to collect dead wood for fuel, which is gathered communally and then distributed

¹¹ TRCP is an integrated conservation and development project funded by GEF, UNF and UNDP. The project is still going on and executed by KMTNC. The aim of this project is to ensure conservation of endangered Tiger and Rhino on a landscape level by conserving the Barandhabhar Forest Corridor..

among all community forest users. Villagers can also visit the forest every day to collect fodder and other minor forest products on a regulated basis. Restrictions to limit forest use were established by user group committees and offset by increased community services generated by funds from community forest activities.

Results of my 2008 interviews indicate that people's activities were highly organized in the new location (Table 4). Known patterns of local natural resource collection and consumption in the old location were far less organized. In the new location, people only entered the forest at specified times as registered members of the community forest, and it was apparent that capacity of the new Padampur residents to manage the community forest had improved. Additionally, residents increased the area of the community forest and undertook activities that enhanced local biodiversity in the new area. Residents reported observations of tigers, indicating that their actions had transformed the area into habitat that could once again support this species. Of nine CF committees surveyed, all reported that tigers had visited forests at least once in a year. Two of the CF committees reported tigers killed by poisoning in their forests as revenge for killing buffalos and goats (Table 4).

The community forests were financially capable of implementing local level conservation and development activities. Residents said that their active participation in adjacent community forests contributed to local biodiversity and generated substantial revenue from fallen logs (Table 4).

3. DISCUSSION AND CONCLUSION

Padampur - A Potential Habitat for Tigers

Compared to other lowland protected areas in Nepal, Chitwan National Park possesses the highest diversity of grassland species (Peet et al. 1999). After the Old Padampur area was evacuated, Chitwan National Park identified the site as a management priority and initiated grassland and wetland management activities. A grassland monitoring research program has also been initiated for this site as part of the Terai Arc Landscape Conservation program (Bhusal, 2005). Understanding grassland ecology, threats and influential factors for grassland succession (e.g., flooding and human activities like fire, cutting and grazing) are important elements in protected area management (Lemkul, 1994; Peet et al. 1999). Additionally, assessment of post-resettlement grassland restoration is important in understanding habitat regeneration for prey animals. (Johnsing and Negi, 2003; Karanth 2007; Harihar et al. 2008; Smith et al. 2010). Though not included in my analysis, I collected data on plant succession at the site after evacuation, and one of the first plants to return was *Saccharum spontaneum*, which is the common diet for wild deer such as Sambar deer, Hog deer and Spotted deer. Abundance of these ungulates indicates a substantial prey base for tigers is present.

The evacuated site provides potential habitat for tigers and rhinoceros. The prey abundance I documented in this study may be due to: i) the large size of homogenous grassland area inside the Chitwan National Park; ii) visibility and openness of habitat, which enables prey animals to maintain vigilance for predators, and iii) abundance of short grass (*Saccharum spontaneum*) favorable for supporting prey species of tigers and

leopards. Data obtained from a radio collared female tiger with four cubs that was continuously tracked for one year indicated that the forest fringe area south of the evacuated Padampur was occupied by this animal (Smith 1999). The additional habitat and forest edges in this area can comfortably support two female tigers (J. L. David Smith pers. comm.)

Based on our data the additional area from the Padampur resettlement contributes to tiger conservation at the Asian landscape-scale. The prey abundance assessed in this study clearly indicates that the evacuated area provides viable habitat for tigers, rhinoceros and other wildlife species (e.g., large and small carnivores). The added habitat may result in a 5% increase in the tiger and rhinoceros populations (Dinerstein et al. 1999).

This study indicates that additional habitat for the tiger can be expanded if people are willing to resettle outside of the protected areas, which they may be if their standard of living can be improved. Compared to past forced resettlements and displacements, the Padampur resettlement sets an example of incorporating human needs in conservation resettlement decisions. This resettlement program also provides guidelines and a solid format through which residents can fully participate and be fairly compensated in conservation initiatives (Dhakal et al. 2011). The Padampur resettlement is a win-win situation as people chose, and were not forced, to leave their original village to obtain a better standard of living and simultaneously biodiversity was enhanced. Conservation resettlement provides the best result when residents are made aware of advantages and can voluntarily decide to move

Perceived Biodiversity Loss and Gain

In the Old Padampur

Human-wildlife conflicts were primarily due to crop and livestock depredation. During the rice harvesting season, approximately 43% of the Rhinoceros's diet consisted of crops (Jnawali 1989). In one study, villagers nearest to the park reported that in some years 80% to 90% of all their crops were lost to wild animals. Farmers responded by abandoning farming near the park boundary (Milton and Binney, 1981).

Fuel wood demand from a growing population was a major cause of human-wildlife conflicts. In spite of legal restrictions on fuel wood gathering, park authorities made compromises and allowed people to collect fuel wood from the Park. Some people went to the Park daily to bring fuel wood home for cooking. There was no convenient supply of alternative fuel so nearly 100% came from either the Park or from crop residue (Sharma, 1990). After resettlement this fuel consumption completely stopped.

When the Old Padampur was inhabited, conflicts between people and wildlife were frequently reported. The 1993 - 2003 Chitwan National Park record indicated that people and or their livestock were frequently killed or wounded by park animals (Figure 4) and residents occasionally engaged in illegal activities. During this period, park records indicate a total of 99 Old Padampur residents were apprehended, with 24 of them sent to prison for poaching and illegal logging.

Although poaching has not been reduced in the park or in the buffer zone surrounding the park, the use of poor, disadvantaged and ignorant Padampur residents in illegal activities has stopped. Between 2007 and 2008, a total of 13 rhinoceros were poached. One incident of poaching occurred in Jayamangala Ghol at the evacuated

Padampur area. According to the Park authorities, the poachers apprehended for these incidents were mostly from the villages located in the eastern sector of the park, and not from the Padampur (DNPWC 2009).

Data collected in this study indicate that both tiger and rhinoceros utilized the evacuated Padampur village; however, if economic conditions in the new Padampur degrade, the risk of Padampur residents once again assisting poachers is high. To reduce this risk, I highly recommend that a program guaranteeing economic incentives to the newly resettled Padampur be introduced, at least for some initial predefined time period.

In the New Padampur

After resettlement, Padampur residents positively viewed wildlife conservation and believed that human-wildlife conflict was no longer an issue. The causes of conflicts (e.g., cattle grazing, human injury and death, poaching and illegal logging) stopped after coming to the new Padampur.

In Old Padampur, few residents kept improved breeds of stall fed livestock (0.012 LU¹²/household); however, in New Padampur, more residents shifted to hybrid cattle, with a 20 fold increase (0.24 LU/household. Thus the percentage of fodder from the forests was reduced, which allowed Sal (*Sorea robusta*), a tree species highly valued for timber, to regenerate. In our 2008 survey of 303 respondents, 90% of households agreed that the livestock number was reduced after arriving in New Padampur. Having fewer cattle at the new site could be viewed as an economic cost of resettlement, but this was

¹² The Livestock Unit (LU) and its conversion factors – Buffalo (1), Cow (0.7), Sheep/Goat (0.1) were adapted from (Bride, 1983; Jahnke, 1982 cited by Saetre, 1994 then cited by Regmi, 1998).

not the case. Productivity of livestock increased and residents appreciated having fewer livestock because more members of the household were freed from serving as livestock herders. Reduced numbers of cattle resulted in an overall decline in forest use in the region. It is important to note, however, that even when villagers would like to reduce the number of less productive livestock, it is not easy to do so because of the Hindu reverence for cows.

After settling in the new location, only 19% of residents said they were self sufficient in fuel wood. Other households relied on collecting or buying fuel wood to fulfill their energy need. Nevertheless, fuel wood was still a major part of the household energy. In our 2008 survey, 77% of respondents used fuel wood for cooking and 100% used fuel wood for heating the household and cooking animal feeds. Reduced harvest of fuel wood had a negative impact on households, and residents now need to purchase fuel wood or find alternative sources for cooking and heating. However, gathering fuel wood is an extremely time consuming activity, and villagers reported that they would prefer a cheaper alternative for fuel wood if available, such as affordable bio-gas plants¹³.

After resettlement Padampur residents actively managed the community forests located on the northern side of the new settlement. About 1,337 ha of highly degraded area have now been restored as community forests. These forests generate approximately 2 million Nepalese rupees (US\$ 26,666) in revenue from selling fallen and dead wood, sand, gravels and other minor forest products.

Although the Padampur resettlement further narrowed a portion of the BFC (Figure 5), and conservation activists and wildlife professionals were initially concerned

¹³ Low cost methane digester where local villagers deposit animal dung to produce gas for cooking and heating. This practice is common in most rural areas of Nepal.

that the new village location would reduce the frequency of wildlife movements and the corridor's value as habitat, resettlement did not appear to affect biodiversity in the new area. The increased understanding of residents in regards to natural resources and their ability to sustainably use ecosystem products likely offset potential impacts to biodiversity. The increased economic benefits and joint (government and people) forest management practices at the edges of the forest corridor have made anthropogenic pressure in the BFC virtually non-existent

The increased capacity of residents to manage natural resources has led to an improved standard of living compared to their previous status in the old location, and the overall success of the Padampur resettlement has several measures by which it can be judged. 1) Restoration of degraded natural habitats in the old Padampur area has occurred. 2) Increased awareness and enhanced capacity of resettled residents to manage natural resources around their neighborhood has engaged them in more sustainable ecosystem practices. 3) Revenue generated from Community Forests has been utilized to develop village infrastructure, employment opportunities and micro-enterprises to generate income. 4) The success of the Padampur resettlement model can also be judged by requests from other communities for resettlement outside of the reserve.

To date, there is no policy formulated to address either the safe stay of residents within the protected area or the resettlement of people with a mechanism in place for fair compensation. Neither conservation nor development agencies can guarantee residents' wellbeing. The risk of eviction is always on the horizon if villages remain inside the park or protected area (Agrawal and Redford 2009). Results of this study support the idea of collective action from conservation organizations to develop a win-win policy that

incorporates both the needs of biodiversity conservation and the socioeconomic wellbeing of people. Successful conservation strategies must secure critical wildlife habitat as well as enable people to achieve acceptable and sustainable lifestyles. I suggest conservation and development organizations focus their attention on finding common ground where both socioeconomic and conservation needs are met through bottom-up and participatory resettlement planning.

Increased ownership of the adjacent forest through the community forest management model helped to protect the existing forest adjacent to the New Padampur. All community forest groups should be trained to monitor wildlife movement, and their capacity for guardianship of critically endangered species such as the rhinoceros and the tiger can and should be developed. In the end however, conservation will only be fostered if local communities can maintain their economic base without needing to deplete natural resources.

In summary, the evacuated area adjacent to the park will regenerate and return to a natural state. Conservation resettlement may be a viable option to achieve a win-win situation in endangered species conservation (Joshi and Pande 2007). Voluntary and participatory resettlement programs bring more positive results in achieving a win-win situation even with lesser financial input (Dhakal et al. 2010). I suggest periodic biodiversity monitoring in the evacuated area to assess change in grassland habitat and wildlife population dynamics. Local understanding of the importance of wildlife has to be increased and community capacity for wildlife and biodiversity management has to be developed to ensure that conservation programs are sustainable. Community participation in habitat restoration will always be important for ensuring long term conservation of

endangered species such as the tiger. Because Nepal is committed to doubling the number of tigers by 2022 (GTF 2010), this voluntary approach to habitat restoration should be given high priority as a strategy that both secures wildlife habitat and improves residents' wellbeing.

TABLES AND FIGURES

Table 1. Mean and standard deviation of Sambar Unit (SU) between treatment and control blocks

Blocks	Blocks	N (SUs)	Mean SU	St. Dv.	F	p
Treatment	1	141	0.70	0.66	4.509	0.012
	2	96	1.00	0.83		
	3	67	0.82	0.74		
Control	1	175	0.16	0.32	13.664	<0.001
	2	97	0.25	0.51		
	3	175	0.52	0.93		

Table 2. ANOVA Sambar Units as dependent variable against treatment & control blocks

Sambar Unit	Within/Between	Sum of Square	d.f.	Mean Square	F	p
Treatment & Control	Between Groups	43.38	1	43.38	86.91	<0.001
	Within Groups	374	749	0.499		

Table 3. Large mammals' sign recorded in evacuated Padampur

Wild Animals	Signs Observed
Tiger	Scrape - 2, Scat - 1
Sloth Bear	Scat - 2
Wild Elephant	Dung piles - 2
Gaur Bison	Dung pile - 1
Wild Boar	Scrape - 5
One Horned Rhinoceros	Dung pile - 8

Table 4. Community forests around the New Padampur and their potential for income and habitat management.

SN	Name of the CF	EC Members				Forest Type	Area in Ha	Wildlife Presence	Income / Yr in NRs.	Activities and Plan of Action	Any pressure/disturbance from New Padampur
		M	F	DAG	Total						
1	Rambel	14	3	7	17	Sal	556	Tiger, Rhino, Chital & Sambar	11,00,000	Habitat management, Eco-tourism Dev. Income generation. Local Infrastructure	Increased road traffic, vehicular air and noise pollution
2	Panchakanya	12	5	6	17	Sisoo, mixed and Riverine	850	Rhino, Leopard and Sloth bear	13,00,000	Habitat mgmt. Eco. Tourism Dev. Capacity development.	Vehicular traffic and air and noise pollution Occasional grazing by cattle
3	Chaturmukhi	7	6	11	13	Sal, Sisoo mixed forest	500	Rhino, Tiger and Chital.	6,50,000	Hybrid livestock rearing, Infrastructure Dev.	
4	Thangkhola	15	4	3	19	Riverine	631	Tiger, Rhino (with cubs), Chital, and Sambar (tiger with cub Poisoned)	6,00,000	Women awareness campaign. Forest management Ecotourism poaching control	Not a problem
5	Jaldevi	9	8	7	17	Sal	424.5	Tiger (1-2), leopard, wild boar and Chital (Tiger poisoned)	21,00,000	Skill training, Forest guard training, Forest management training.	Not a problem

6	Padampur	8	5	9	13	Riverine	318	Tiger, blue bull, leopard, Chital and Rhino.	9,00,000	Forest mgmt. plantation, road construction, nursery management, income generation. Five forest guards involved in forest monitoring daily	Not a problem
7	Bhimbali	15	2	6	17	Riverine	388	Tiger, wild boar, Chital, Rhino (m &c).	4,00,000	Forest mgmt, wood collection, daily forest monitoring by 4 FG.	Not a problem
8	Nawajagriti	15	2	2	17	Sal	1083	Tiger, Rhino, Sambar, Chital, birds.	32,50,000	Wetland development, picnic area, grazing control, income generation, school support	Road traffic, dust, air and noise pollution
9	Satanchuli	14	3	4	17	Sal	1413	Tiger, Rhino, Chital, barking deer, Sambar, Wild boar and leopard	57,00,000	Picnic spot dev., cooperative for ginger cultivation, forest fencing, 5 forest guards, user's monitoring	Not a problem

Note: Income per year are all in NRs: The exchange rate US \$ 1 = 72.00

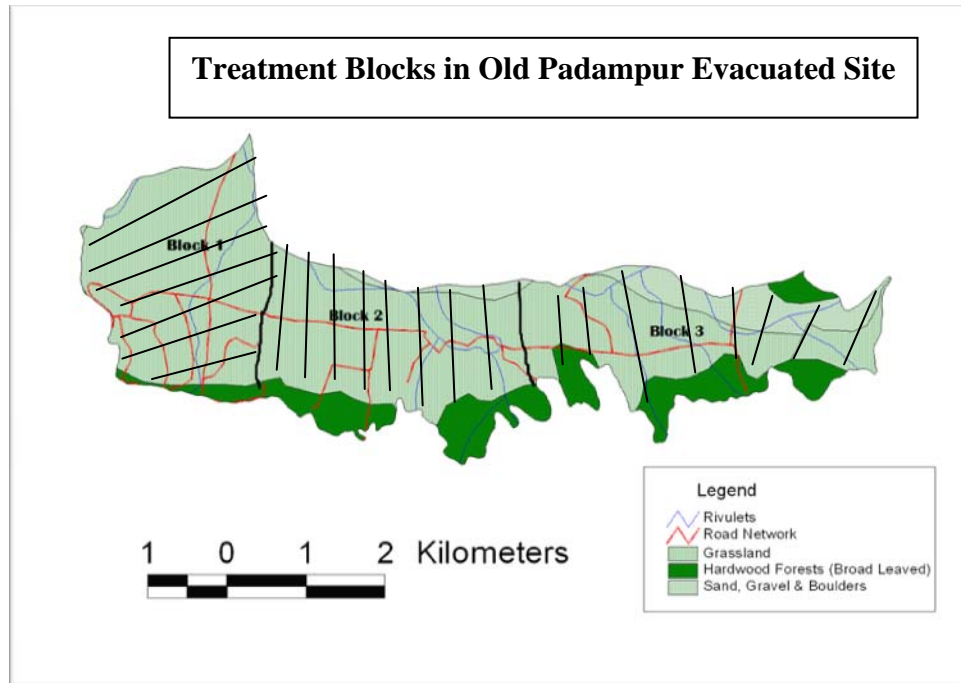


Figure 1. Pellet group survey blocks in the evacuated Padampur (Treatment Area).

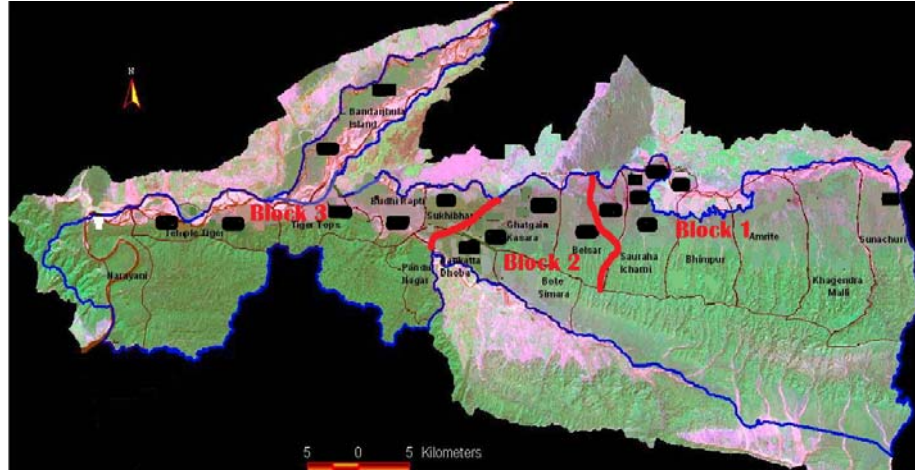


Figure 2. Pellet group survey sites in the core area of the Park (Control Area)

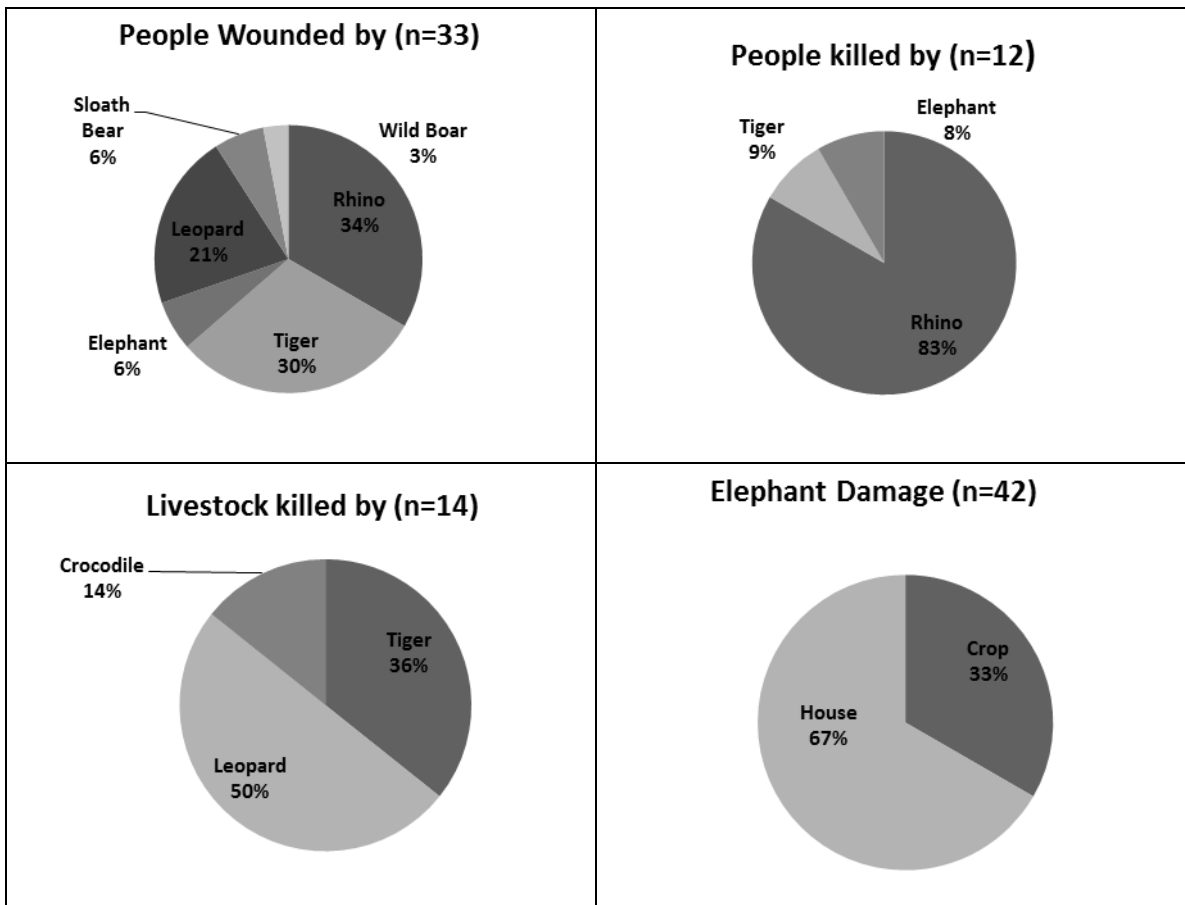


Figure 3. Human and livestock damage y park animals

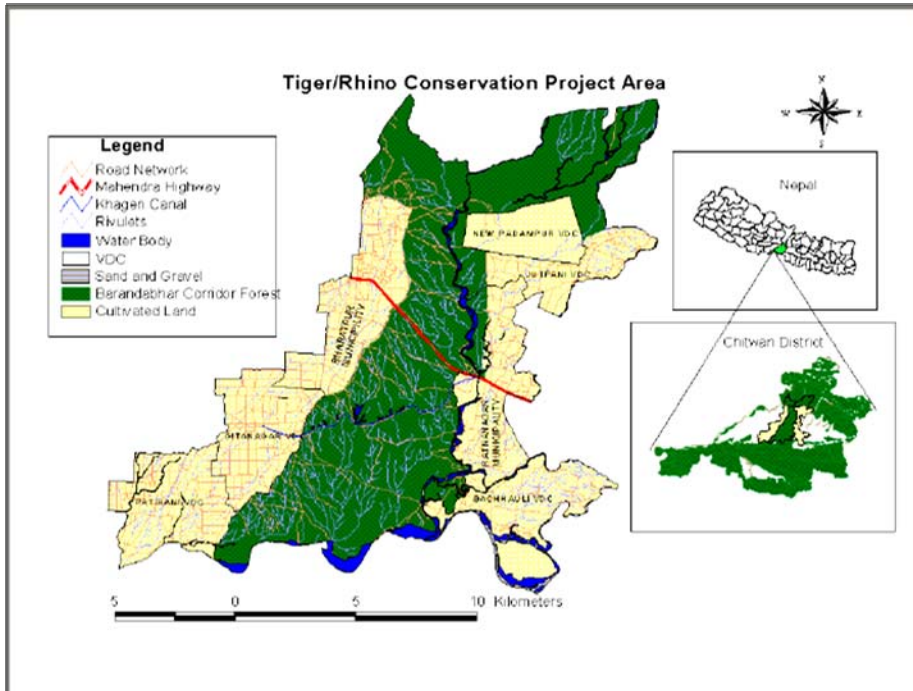


Figure 4. Barandhabhar Forest Corridor and the bottle-neck created by the new Padampur site (Source: UNDP/GEF/ UNF/NTNC Tiger Rhino Conservation Project)

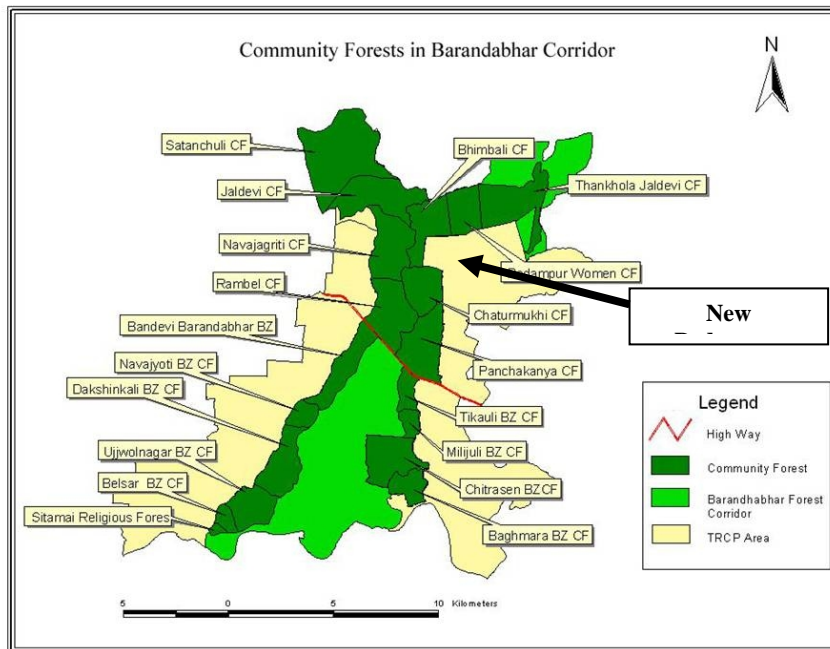


Figure 5. Community forest around Barandhabhar Forest Corridor and the new Padampur site (Source: UNDP/GEF/ UNF/NTNC Tiger Rhino Conservation Project)

CHAPTER V

CONCLUSION

Amid growing concern for securing wildlife habitats, especially for tigers, this study provides some guidelines on the importance of voluntary resettlement for balanced conservation and livelihood development programs. The voluntary resettlement program has not been recognized as a successful policy option for conservation due to previous experience of forced resettlement that was detrimental for the people's livelihood. I investigated residents' wellbeing before and after voluntary resettlement program in Padampur Nepal, assessed post resettlement economic wellbeing, analyzed perceived and recorded biological losses and gains of Padampur resettlement in Chitwan National Park, Nepal. I found participatory planning, fair compensation mechanisms, increased access to services and market existed for Padampur resettlement. I also documented increased core wildlife habitats for critically endangered species as a result of the resettlement.

Conservation efforts to prevent the loss of endangered species such as tigers and rhinoceros have raised numerous concerns regarding local people's socioeconomic development. Past conservation programs have not been able to provide desirable benefits for communities living inside or on the fringe of protected areas. Cernea (2005) points out that global conservation gains are costly for the local people, primarily in regard to their social and economic wellbeing. In many developing countries such as Nepal and India, people's economic wellbeing is directly or indirectly connected to the biological resources surrounding to their homes. People's dependency on these forest resources for their livelihoods often competes with the conservation rules and regulations designed to protect wildlife. In these circumstances it is very difficult to achieve

conservation goals to ensure long term species survival. Fulfilling peoples' socioeconomic needs will enhance local guardianship of endangered species that are at the brink of extinction. People living in enclaves within parks and protected areas often suffer from economic hardship due to a strict protection policy, and a lack of basic physical infrastructure along with ongoing human wildlife conflicts. Natural disasters such as floods, hurricanes and earthquakes make residents' living even harsher due to a lack of basic physical infrastructure. Due to adverse conditions people may choose to resettle to a safer place.

When evaluating resettlement formalities, it is necessary to strike a balance between conservation and sustainable economic development. In this study I found the majority of respondents expressed that their livelihoods were being better off in the new location as compared to the old. The reason for this improvement was due to the access to and provision of health, education and market opportunities. Economically people were progressing by utilizing their land for multiple benefits, introducing alternative economic options and increasing access to employment. There were more off-farm employment opportunities than in the past. While residents were able to maintain their agricultural practices on the land they received from compensation. Some residents in the new site have also developed their entrepreneurial skills. They introduced farm based economic enterprises such as dairy production, mushroom farming, and wool production. This suggests a gradual transformation from predominately and agro based economy to a cash and market based economy.

Although I did not evaluate this resettlement program through the poverty lens, I found that the resettlement helped the household economic problems for the poor and landless residents. Every land less household got a minimum area of land sufficient for building their home, get involved in micro-enterprise, and grow food. This indicates if resettlement programs designed in a participatory and transparent manner this may help to solve the equity issues in economic development.

One important limitation of this resettlement program was water. The water shortage prevented resident from utilizing their land for optimum agricultural production. In any resettlement program I argue that provision of basic need such as water to be given top priority. Water scarcity will slow any post resettlement economic progress as well as contribute to the deterioration of basic health and hygiene of the residents. In the new Padampur, despite availability of potential water sources, water shortage became one of the constraints in post resettlement economic development. Government and non-government institutions should put their efforts toward supporting community projects to harness freshwater for food production and small scale enterprises. Water shortages can also be minimized by introducing drought prone crop management practices and the optimal utilization of rain and surface water.

Evaluating the comparative resettlement from a biological stand point, there is no doubt resettlement contributed to the habitat extension for tigers and rhinoceros with more abundant prey species in the evacuated site. To safeguard the tiger population going extinct in this millennium, conservation experts and managers emphasize extending habitats by connecting isolated forest patches, resettling enclaves from national parks where tigers exists, reducing poaching and increasing local guardianship of endangered

species (Mathur 2010; Harirar et al 2009; Wikramanayake et al 1999; Dinerstein et al, 1999, Smith et al, 1999; Smith et al 1998). Based on this study I conclude that voluntary resettlement defined as respecting people's voice and participation, developing capacity for their economic benefits can produce better conservation and human wellbeing results than forced and unplanned resettlements. The Padampur model provides guidelines for planning and delivering participatory and transparent voluntary resettlement. Lesson learned from the Padampur model can assist enclave with improving settlement programs in general.

To compare improvements of resettlement projects, we must develop social and economic methods for resettlement planning. This study contributes the need for economic and biological methods for evaluating post resettlement impacts. But there is a need for more spatial and quantitative data analysis for monitoring biological factors such as vegetation succession, predator prey density and movement in the evacuated site. Many gaps exists in periodic monitoring in post resettlement biological succession. To investigate whether resettlement really contributed to the biological gains, monitoring studies are necessary to evaluate conservation resettlement success.

In summary, I recommend a few guidelines for future conservation and resettlement planning and management. First, respect residents' views about living in parks and protected areas. Begin any resettlement program by conducting, participatory survey to understand the residents' values, attitudes and sentiments about the place they are living. If the people are strongly attached to the place and do not want to move. Conservation professionals should develop strategies to improve their livelihoods without resettling. If people had experienced hardship while living in the park and protected areas

and face difficulties in maintaining their health and wellbeing, then it will be worth forming a participatory resettlement committee to generate voluntary resettlement plans. Second, develop fair compensation package incorporating land, housing, physical infrastructures. Third, prepare resettlement master plans, and propose post resettlement economic planning. Fourth, conduct a base line studies to evaluate post resettlement success or failure and coupled with monitoring periodic economic wellbeing.

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