

Chandoli National Park and Resettlement: Impacts on Local Communities in Maharashtra, India

*How has the Establishment of Chandoli National Park Impacted Local
Communities in the Warana Basin?*

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Preface

This master thesis is part of the EU sponsored LiveDiverse project and was supported by the Institute for Environmental Issues at the VU, Amsterdam. The thesis itself is part of the MSc Environment and Resource Management at the VU, and will be entered in the LiveDiverse database for future revision by all partner organizations and universities.

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Introduction

The number of protected areas created in the world with the aim of conserving biodiversity has increased tremendously in the last century. The need for protecting forests and other fragile ecosystems has been lobbied for by conservationists, and is increasingly recognized by national governments (MA, 2005). This is based on the assertion that protected areas are the most effective option for protecting biodiversity (Chape et al, 2005). The financing of protected areas often comes from international donors, who are primarily focused on the need to conserve biodiversity and to a lesser extent on local livelihoods which depend on this biodiversity as well (Orlove & Brush, 1996). The establishment of protected areas has therefore provided global dividends in the form of biodiversity gains, but has also caused losses in terms of local livelihoods in many locations (Cernea and Schmidt- Soltau, 2006). The number of protected areas is likely to increase in the future and therefore it is important to analyze the impacts that establishment of protected areas has on livelihoods as well as on biodiversity.

In this thesis the focus is on the Chandoli National Park in Maharashtra, India. It forms a part of the Western Ghats, which is one of the three biodiversity hotspots in India. This entails that it is home to endemic species which are not found anywhere else in the world (Western Ghats website, 2010¹). The area was upgraded from wildlife sanctuary to National Park in 2004, and the developments around the Park creation and the consequences thereof have not come to an end. The study areas for this paper include villages adjacent to Chandoli National Park in the Western part of the Warana Basin and resettled villages at the Eastern part of the basin. The Warana Basin is the area where the Warana River flows from inside the Chandoli National Park to the Krishna River near the city of Sangli. The eight red points on the map below indicate the study villages.

¹ <http://westernghatsindia.org/biological-diversity>

Map of Locations Research Villages



Source: www.maps.google.com

The issue of the establishment of the Chandoli National Park is a pressing concern in the Warana case study area in India because the livelihoods of various communities have been affected in different ways. Villages were relocated in order to preserve the environment, which is a positive step for biodiversity but it has also had substantial effects on local peoples' livelihoods. In this research, changes in socioeconomic vulnerability of resettled communities and communities living adjacent to the Chandoli, due to the establishment of the Chandoli National Park will be explored. This was operationalised by studying how the park establishment has changed the asset base of local people, such as access to natural capital, and how it has affected their adaptive capacity by weakening social networks, and affecting health. The Impoverishment Risks and Reconstruction (IRR) framework by Cernea (1997) was used to analyze the current situation. This framework provides a list of eight risks² often faced by communities which have been resettled due to establishment of National Park.

² Landlessness, homelessness, joblessness, social disarticulation, morbidity/mortality, marginalization, food insecurity and loss of access to common property

In order to conduct the research, I traveled to the local NGO partner SOPPECOM (Society for the Promotion of Participatory Ecosystem Management) in Pune, India. Subsequently I traveled to the selected villages inside and adjacent to Chandoli National Park and to the resettled villages in the vicinity of Kohlapur. In these villages, interviews were conducted and data was collected with the help and support of SOPPECOM.

The establishment of the protected area of Chandoli National Park has caused changes which have the potential to impact socioeconomic vulnerability of the various communities living in the Warana basin. The resettlement of villages which were situated inside the area which is now protected has had major impacts on livelihoods in these communities. The communities living inside and adjacent to Chandoli National Park have been restricted in their traditional ways of living. All of the communities face changes in land use, food security and access to natural resources which have impacted their socioeconomic vulnerability (LiveDiverse, 2009a).

This master thesis is based on research conducted as part of the EU sponsored LiveDiverse project. Various universities and NGOs are involved in this research project, including the Institute for Environmental Issues (IVM) at the VU. The objectives of LiveDiverse involve gaining insight into relationships between poverty, livelihoods and biodiversity, and trying to find options to balance the conservation of ecosystems with sustainable livelihoods (LiveDiverse, 2009a³). Research has taken place in South Africa, Vietnam, Costa Rica and India simultaneously.

Different themes are explored within the LiveDiverse project, which highlight the connections between local cultures, practices, and beliefs and the ways in which natural resources are used. The part of the conceptual framework which is at the center of this research paper involves the issues of biodiversity and socioeconomic vulnerability. The challenges which come up when trying to consolidate conservation and development are summed up in the conceptual framework, and will be elaborated on in the methodology section of this paper.

In the next section of this paper, a background of the research area and the main problems faced by the respondents will be sketched. Subsequently, the conceptual framework and methodology will be explained, followed by the results of my findings, a discussion of the results and in the last section I will present my conclusions.

³ http://www.livediverse.eu/?page_id=82

Background

The Chandoli National Park lies in the Western part of Maharashtra in India. It covers an area of 318.97 km², and is situated at the north Sahyadri range, forming part of the Western Ghats. The forest types include Western tropical hill forests, semi evergreen forests, and Southern moist mixed deciduous forest. Biodiversity in Chandoli National Park is high, including various endemic animal and plant species. Wild animals like Indian gaur, wild boar, sambar, leopard and tiger have been reported in Chandoli (Imam et al, 2009). The park was declared a wildlife sanctuary in 1985 under the Wildlife Protection Act. It was upgraded to the status of National Park in May 2004, and has been declared a tiger reserve since 2007. It is part of the Sahyadri Tiger Reserve that also includes Koyona and Radhnagiri sanctuaries. Since Chandoli is officially a National Park, restrictive rules apply in this area. Nobody is allowed to collect any biomass, including wood and other forest resources from inside the park (Rao, 2009).

The National Park was initially established to protect the watershed which is crucial to the functioning of the Warana Dam and to enhance the protection of biodiversity in this section of the Western Ghats. The dam was built in 1985 and a reservoir was created which submerged a portion of what is now the National Park area. The dam supports the extensive sugarcane cultivation downstream in the Warana basin. Chandoli National Park is under the authority of the Kohlapur environmental department, which is responsible for designing and carrying out the management plan for the park. This includes managing staff and resources and collecting information on the status of wildlife in the park (Rao, 2009).

Due to the construction of the dam as well as the establishment of Chandoli National Park, communities were resettled to other areas outside of the reservoir and park boundaries. The dam was created before the National Park was established, and hence, the villages in the dam catchments area were resettled first. These villages received monthly compensation as promised by the government after demanding access to irrigated land. They were involved in a large protest movement, Shramik Mukti Dal, of which Bharat Patankar is one of the leading activists. They should be receiving compensation until they have access to irrigated lands, although this has not been confirmed by the author (Omvedt, 2001).

Communities living inside the Chandoli area were smallholders who engage in subsistence agriculture and collect forest products to supplement their resource base. Many of them were also cow or goat herders. There were various castes living in and near the

forest, including people from the Dhangar community (shepherds). This tribal caste is part of the Scheduled Tribes classification at the bottom of the caste hierarchy in India, which makes this a particularly vulnerable group (Karade, 2008).

In 1995 the decision was made to relocate all of the villages located inside the boundaries of Chandoli National Park and letters were sent to villagers to inform them of the plans. They were urged to move to another location, and the actual process of resettlement began in 1997 (Khot, 2001, p 41). In total 29 villages have been relocated to areas outside of Chandoli National Park, and four villages are still remaining inside the park itself. In total nearly 7,894 individuals and a significant cattle population have been relocated out of the park (Niphadkar, 2008). Relocation of villages is currently an ongoing process, since suitable land must be found for the remaining villages in other areas.

The government plan is to relocate the four villages still located inside the Park (Rao, 2009). The villages which have already been resettled are mostly located a few hours drive from the Park itself. Additionally, there are villages directly adjacent to the park, which are not on the list to be resettled in the future.

The villages which were resettled due to the establishment of the National Park are in a different situation than the villages resettled due to the dam. Villagers were not consulted about the park or the resettlement process. Resettled communities expected that they would receive a house, land, and monetary compensation for each household. They assumed that the rehabilitation measures which dam resettled communities received would apply to them as well. However, in the study villages, households have received plots of land on which they could build a house, but often no more than this. Although there are laws in Maharashtra regarding rights of resettled people (as stated in the Maharashtra State Project- Affected Persons' Rehabilitation Act 1999⁴), in the case of the resettled villages the Act came a few years too late. Since these villages were relocated *before* 1999, when the Act was ratified, the compensatory measures do not apply to them. Before 1999 the Act was applicable to dam resettlement only, and the government could decide whether or not resettled persons from other types of projects such as National Parks could receive the same treatment. This is an important point for future developments since some of the remaining Chandoli villages will still be resettled. Currently, social NGOs⁵ are working on the fulfillment of these obligations with the remaining villages.

⁴ Mah. Act No. XI of 2001

⁵ Democratic People's Movement/ People's Movement

The government did give some monetary compensation for the loss of land and employment. This was 600 rupees per month per household under the Shiv Sena government, and after 1999, 400 rupees per month per household was given under Congress rule (Interview Bharat Patankar, May 15, 2010).⁶ There have been organized protests of various resettled villages lasting for up to one month at a government office in Kolhapur to demand the payment of this compensation. In some instances money was given to protestors, but the promises of the government have not always been kept.

Some families lived in self-made shacks for years after arrival to the resettlement location- without a house, land or monetary compensation. After mass protests in 2000/2001, villagers received money to build houses. Some households have access to land although most do not. Land was given to a small portion of people, and they received only a fraction of the land they owned in their former location. This is because authorities estimated the price of the land rather than the size, and land prices are much higher in the resettlement villages near Kolhapur compared to prices in Chandoli. This meant that the households that did receive some land got a much smaller area than they had prior to resettlement. The majority of households in the resettlement villages do not own any land however.

Aside from the negative impacts that resettled communities have experienced, a few positive impacts are also present. Due to resettlement, villagers are now closer to the city, educational and medical facilities which could improve their quality of life. These changes will also be incorporated in the assessment of how the resettlement has affected their overall socioeconomic vulnerability.

There are several threats to the biodiversity in the National Park area still present even though many villages have been resettled. Encroachment, shifting cultivation and the collection of natural resources from the Chandoli Park put pressure on biodiversity. The population of communities living near the park has also increased over the past few years, and this leads a rise in use of resources and land in the area. Threats which are not related to local populations include development projects such as the opening of a bauxite mine and setting up a hydroelectric project at the Warana Dam site (Khot, 2001).

⁶ Interview of Remco Kouwenhoven, researching rehabilitation process and policy regarding Chandoli National Park

Conceptual Framework

Research question

The objective of this study is to gain insight into the impacts that the establishment of the Chandoli National Park has had on communities living in or adjacent to the National Park as well as communities that have been resettled from the Park. The type of research can be classified as descriptive although recommendations are given in regard to improvements of the current situation. This thesis is embedded within a greater normative research framework however, since it may serve as evidence to improve the current situation in the future.

The main research question to be answered is:

- *How has the establishment of the Chandoli National Park impacted socioeconomic vulnerability of communities living in the Warana Basin?*

Sub questions to the question above are the following:

- *How have the communities formerly living in the National Park been impacted?*
- *How has the establishment of the national park impacted- food insecurity, loss of access to common property, and social disarticulation?*
- *How does current socioeconomic vulnerability compare to past socioeconomic vulnerability for communities in the Warana Basin? (In relation to food insecurity, loss of access to common property and social disarticulation)*

Socioeconomic vulnerability and the IRR model

Changes in socioeconomic vulnerability are a key concept of the broader LiveDiverse research project. Socioeconomic vulnerability can be defined as: “the vulnerability of individuals, households, and communities to external perturbations, measured in terms of changes in, for example, household assets and the variability of household income, nutrition and health” (LiveDiverse, 2009c). Vulnerability in this sense means the susceptibility to external risks. This includes both risk exposure and adaptive capacity when exposed to risks. Increased risk and a decrease in adaptive capacity are indicators that socioeconomic vulnerability has increased. Vulnerability and poverty are closely related since poor people are by definition more vulnerable due to the fact that they do not have the means to protect themselves from risks. To study the risks that selected communities face due to the establishment of Chandoli National Park, Cernea’s Impoverishment Risks and Reconstruction model will be used. Changes in adaptive capacity are also measured by this model, since the

framework includes health, social disarticulation, and income, which constitute adaptive capacity (Bouma & Huitema, 2009).

The *Impoverishment Risks and Reconstruction model* (IRR) developed by Michael Cernea (1997) is used as a conceptual framework in this thesis to structure the risks that communities face in a coherent format. The IRR was developed during the 1990s in a series of studies and has been applied to hundreds of resettlement situations, including several World Bank projects, for example in Vietnam, India, and China. The model is theoretical and empirical since it is based on modern resettlement research studies as well as empirical evidence from different countries (Cernea & Schmidt-Soltau, 2006). This framework is used because it is recognized as a concise framework which allows researchers to analyze the risks people face who have been resettled due to the establishment of National Parks (Mahapatra, 1999).

The IRR includes risks which highlight the interdependence between displacement of communities and poverty. It can be used as a predictive, diagnostic, research or problem-resolution tool before or after resettlement situations. In this paper it is used as a research tool in theory led investigation (Cernea & Mcdowell, 2000). Some of the eight fundamental risks included in the IRR are valuable in the analysis of the situation the respondents of the current study face due to the creation of the national park. The eight risks are: landlessness, joblessness, homelessness, marginalization, food insecurity, increased morbidity and mortality, loss of access to common property and social disarticulation.

- The risk of *landlessness* is often present in resettlement situations, and is a direct form of impoverishment. Land is frequently not replaced or compensated, which removes the foundation on which many rural people build their livelihoods.
- *Joblessness* refers to loss of wage labor, which impacts the income level of resettled persons. Creating new employment opportunities is a way to manage this risk, although substantial investment is necessary to do this.
- The risk of *homelessness* can be temporary or chronic, and can cause loss of family cohesion and mutual help patterns if families are dispersed in the resettlement location.
- *Marginalization* is present when families lose socioeconomic status- for example when middle income landholders become smallholders in their new location. This is often paired with social and psychological marginalization such as loss of social status or confidence in society.

- When self sufficiency is diminished and local arrangements for food supply change due to resettlement, the risk of *food insecurity* can be present. This can become chronic and result in insufficient calorie-protein levels.
- *Increased morbidity and mortality* can be the result of stress, psychological trauma, as well as outbreaks of diseases. Unsafe water and sewage systems can also decrease health levels. Increased incidences of diseases also fall under this risk.
- *Loss of access to common property* refers to loss of access to forests, water bodies, grazing lands, and other natural resources. Using more time and/or effort to gain access to resources is also regarded as loss of access to common property in this framework.
- A loss of social capital in the form of dispersion of networks and loss of social organization is captured in the risk of *social disarticulation*. This can result in disempowerment and impoverishment. The loss of status of the village leader is also seen as an indicator of social disarticulation.

It is important to note that the risks specified by the IRR framework are interlinked and influence each other. For example, *landlessness* effects *food insecurity* since lack of land leads to a decrease in self sufficiency. If the framework is used as a problem-solving tool and *landlessness* is addressed, this can reduce *food insecurity* (Cernea, 1997).

A few of the IRR risks, namely landlessness, food insecurity, loss of access to common property, and social disarticulation will be focused on in the analysis due to their overlap with socioeconomic vulnerability. The risks of homelessness, joblessness, marginalization, and increased morbidity and mortality were not specifically addressed in interviews, although health issues did come up during open ended questions. The reason for focusing on a select number of risks was due to the time constraints of the research. Recall questions were used in order to compare past socioeconomic vulnerability with the current status.

Since only one of the two study groups includes villages which have been displaced, the model does not fit precisely with the situation of each village since the IRR was developed to analyze resettlement situations. The framework will still be applied to both groups in order to facilitate the comparative analysis.

Methodology

Interviews

Data collection in and around the Chandoli National Park, as well as in the Warana basin was done by conducting household surveys and qualitative interviews. A translator was necessary during all interviews since the interviewer does not speak the local language (Marathi).

For this study, household surveys were conducted in order to collect quantitative data, and additionally qualitative interviews were conducted to collect data pertaining to the research focus of resettlement and socioeconomic vulnerability. Literature research was conducted to enhance the study as a whole.

All of the interviews were conducted in the fieldwork period between April 14, 2010 and June 1, 2010.

Household Surveys

A total of 509 household surveys were conducted by a research team in 8 different villages in the Warana Basin. The team was composed of 13 college students and 3 members of the local NGO, SOPPECOM. The SOPPECOM team selected the college students from two different colleges in the Warana basin. Students who had family in any of the selected villages were exempt from the research team to ensure anonymity of respondents.

The household surveys conducted will form a part of the international LiveDiverse database and serve as data for a broader comparative research which encompasses India, South Africa, Vietnam, and Costa Rica. The closed- answer questions in the survey are based upon the Conceptual Framework of the LiveDiverse Working Package 6 (Bouma and Huitema, 2009).

SOPPECOM selected the villages where the household surveys were conducted. This was based upon watershed areas in the Warana basin. 4 villages were selected from the high rainfall area, 2 from the medium rainfall area, and 2 from the low rainfall area. In each area one or two villages were near the Warana River, and one or two were far from the river.

The “household” was defined as all people eating from the same pot/kitchen and who were normally resident at least 15 days per month in the village. Households were selected using the random sampling method. Lists of households in every selected village were collected before the research team came to do the interviews. Every 5th household was then

selected from this list and interviewed. A supplementary list was created as a back up in case household heads were not home or did not wish to cooperate in the research.

Only a handful of the questions were used for the analysis documented in this particular thesis⁷. Out of the 8 villages where household surveys were conducted by the research team, only 3 villages were used for this study. This is due to the discrepancy between the type of data needed for the general LiveDiverse analysis and the data necessary for this thesis. One of these villages is located inside the National Park, one is adjacent to the park, and another is a village of resettled persons from the Park.

Additional villages were studied for the purpose of this thesis, since data was needed from villages which had been resettled from the park. The selected household interview questions in Appendix 1 were also asked in these villages in order to have comparative data. The answers to the household survey questions were analyzed using Excel for Microsoft Windows.

Qualitative interviews

As an addition to the household surveys in the Warana basin, semi-structured qualitative interviews were also conducted in order to gain insight into issues specifically related to the resettlement of persons from the Chandoli National Park. The eleven open questions asked⁸ relate to the IRR theory and the operationalisation of socioeconomic vulnerability as discussed above. The questions were formulated by the author of this thesis. The main issues which were measured were the loss of communal lands and social disarticulation. Other issues which are part of the IRR framework were also brought up by respondents during interviews, and these points will also be discussed in the results section.

The qualitative interviews took place in two of the villages in which the SOPPECOM research team carried out household surveys, and in six additional villages. In total, four villages were in or adjacent to the Chandoli National Park, and four other villages were resettlement villages close to the city of Kolhapur. Village selection occurred at random and through snowball sampling since there was no comprehensive list of resettlement villages at the time of fieldwork. The objective was to reach a variety of villages in order to get a broad view of changes in socioeconomic vulnerability of the different communities living either next to the park or in resettlement villages.

⁷ Appendix 1

⁸ Appendix 2

A total of 46 interviews were conducted of which 24 were completed in 4 villages in or adjacent to the National Park, and 22 interviews were completed in resettlement villages. Since no lists of households could be obtained for six of these villages, random sampling was done by approaching every fifth house in the village. Since household heads in India are most often men, and these were interviewed for the quantitative surveys, women were also interviewed for the qualitative data collection in order to find any differences in opinion. An effort was made to interview an equal number of women and men in each village, although this was difficult since often women felt they did not have enough knowledge about the issue, or males would take over automatically. A criterion for participation in the resettlement villages was that the respondent had lived inside the National Park prior to being resettled, which led to exclusion of young people and women who had been married into the village. The questions asked in the qualitative interviews were subject to written interpretation.

Ethical issues

Due to the fact that this research deals with sensitive issues such as the illegal procurement of resources from the Chandoli National Park, it is important to underline the measures taken to ensure anonymity. Before both the quantitative and qualitative interview sessions started, meetings were held with village heads and elders to explain the nature of the research and to explain how the process would commence.

Before every interview, respondents were informed of the fact that their names would not be used in relation to the reporting of the research. For the qualitative interviews, names were not taken down; only numbers were assigned to respondents to facilitate data analysis. Information was given regarding the nature of the research and the respondent was welcome to ask questions about the research to clarify anything if necessary. Additionally, respondents were informed that the results of the research will be presented to them once analysis has taken place. This will be done by members of SOPPECOM once corresponding reports have been finalized (in 2010 or 2011).

As a last ethical note, it is questionable whether data collection was intrusive or not, due to the large team of researchers moving around as a group to complete the quantitative interviews. The size of the research team and the inevitable stretch jeeps used for travel could have been an overwhelming sight for many villagers. Only a single night was spent in most villages, and a maximum of two days to finish interviews. This may not have been enough time to gain the trust of villagers and to recover honest responses. It should be noted however

that SOPPECOM had already established contact with these villages before research took place, and talked to villagers about the study.

Limitations

Limitations in this research project included time, health, and gender. Since the monsoon in India started in the beginning of June, I was restricted in the time available to do the interviews necessary for my research. The villages located in and near the National Park are remote and almost impossible to reach by vehicle when the monsoon starts. My schedule for visiting these villages was thus adapted to these conditions. Health was also a limitation since I was sick for some time in the field, which further restricted time available to do research. Lastly, since I am a female, this had an influence on the types of responses I received from respondents and the way that they reacted to my presence. I tried to be as modest as possible by wearing clothes which are considered suitable in the region.

Additionally, though there was an explicit attempt at preserving the anonymity of respondents, there is clearly an issue with the fact that one of the villages was inside the Chandoli National Park itself. Since the use of resources from the park is prohibited, and the villagers almost all stated that they use resources from the park, this information can easily be traced back to this single village. It is important that no measures are taken related to the collection of this information.

Results

The results of the qualitative interviews are presented in this section, supported by quantitative data collected during the household surveys. These are divided according to the two groups of villages where research was conducted- first villages adjacent to Chandoli National Park (Gothane, Ambaichiwadi, Kundlapur, Mandur wadis), and subsequently the resettled villages (Pargaon, Pethwadgaon, Wathar Wasahad, Narende) will be presented. A description of the physical surroundings relevant to respondents' livelihoods is given, followed by a summary of the impacts that the park has had on the villages. Subsequently the risks of loss of access to common property, social disarticulation, health, food insecurity and landlessness will be discussed one by one under sub headings to analyze the impacts that the establishment of Chandoli National Park has had on respondents.

For the quantitative data, the total number of respondents is 92, of which 49 live in Chandoli villages, and 43 in resettlement villages. The average income of households in Chandoli villages is around 1000 Indian Rupees per month, and the average household income in resettlement villages is around 2000 Indian Rupees per month.⁹ The difference in income levels can be attributed to the fact that households in Chandoli are self sufficient and only make money by selling some natural resources, whilst resettlement households are almost completely dependent on wage labor. Both groups have average incomes which are under or around the international poverty line of 1 dollar per day, whilst these averages are cumulative per household and not per capita (Bouma& Huitema, 2009). Although resettlement households have twice as much income as Chandoli households have, this does not mean they are necessarily wealthier in relative terms. Since they have to use money to consume basic commodities such as food and fuel, this additional income merely compensates some of the loss of self sufficiency. Data on land size can support this argument, since average size of land was 7.5 hectares in Chandoli villages compared to 0.5 hectares in resettlement villages. The median in resettlement villages was 0 hectares, which shows that the majority of households do not own any land.

⁹ Exchange rate was 57 Indian Rupees= 1 Euro during the research period.

Chandoli Villages

The villages in and adjacent to Chandoli National Park have various characteristics in common. Houses are built out of mud and cow dung with thatched roofs. There is no electricity in most villages and people carry water from natural sources close by. The exception is Kundhlapur, which has electricity after 8 pm and water pumps which were placed there by the government. It is the only village connected by a daily bus which goes into a nearby village with a market. The reason for this is that it lies in the “touristic” area of Chandoli and is not on the list of villages to be resettled as it is outside of the National Park area (Khot, 2001). All of the Chandoli villages have an agreeable climate due to the high altitude and vegetation.

In these villages people are restricted in their use of the resources in the National Park. Officially, people are not allowed to enter the protected area or collect any resources such as wood and fruits from the Park. Grazing of cattle inside the park area is also illegal.

There has been an increase in the human-wildlife conflict in all of the villages. Especially an increased presence of the Indian Gaur has been noted, which is a large mammal in the bison family that eats seedlings and tramples crops. Wild boars also enter the fields and eat crops, whilst leopards are known to kill cattle, chickens and goats. The increase of the wild animal populations in the park has also been observed by the Kolhapur environmental department (Niphadkar, 2008).

Social networks have been impacted because many neighboring villages have been resettled. In some cases the status of village leaders has also decreased, which is an additional threat to social cohesion since a strong leader can be an important advocate for villagers rights. Opportunities for labor have diminished, which has had an overall negative effect on respondents.

Loss of Access to common property/ Food insecurity

Respondents in all of the four Chandoli villages say that they have less income and food now than before the NP was established. This can be placed under the indicators of *loss of access to common property* as well as *food insecurity*, since the two are interconnected in this area. The forest is common property whilst it is simultaneously a source of food.

It is important to mention that many respondents admitted to entering the Park and collecting resources illegally. Sometimes a forest guard is bribed with a bundle of firewood, and the trespasser is allowed to take his or her collected items home. Villagers are officially

booked occasionally however, and have to pay a fine and give all of the collected items to the forest officer. Not all of the respondents admit to entering the park, but it costs the people who do so more time, and the costs of entering are higher as well.

25 out of the 49 Chandoli households admitted to collecting various resources from the National Park. This figure indicates that illegal collection is taking place, and the figure may be higher in reality since the question is quite sensitive. The main resources collected were fuel/fodder for own use, timber and materials for own use, fruits and berries for consumption, and mushrooms and vegetables for consumption. These data not only show that illegal resource collection is taking place, but also that forest resources support food security and are used for basic needs (food and shelter).

Villagers used to collect a variety of resources from the forest for their own use or for selling on the market. Collecting firewood, construction materials, and food items are mentioned as very important activities which supported livelihoods before the National Park was established. Some respondents said that this was actually their only source of income and supplement to subsistence agriculture. The collection of resources is now prohibited, so villagers cannot profit from these activities any more unless they enter the forest illegally.

The wild animals which enter agricultural lands and destroy crops create additional pressure on food security and amplify the negative effect of restrictions. Villagers used to kill animals which came into the fields, but now this is prohibited, so they feel they do not even have the right to protect themselves and their food source anymore. The destruction of crops which leads to a loss of harvest has a negative impact on food security. Some respondents commented that placing a fence around the park could be a solution to this problem.

When looking at the quantitative results of the household survey question “Does your household usually have enough to eat?”, results show that most households have enough to eat, although some respondents do indicate a lack of food during some parts of the year. 61% of respondents answered that they always have enough to eat. The other respondents indicated that there are moments when food insecurity is present, as can be seen in table 1 below.

Answer	Chandoli villages %
Yes always	61
Most of year	26
Not always	8
Often not	5

It is important to note these quantitative results, since they show that food insecurity is present for some households, although not for others. Since there is no comparative data for this question prior to the establishment of Chandoli National Park, it is not possible to judge whether the food insecurity has increased or remained at the same level. From the qualitative data it was clear however that an increased amount of land is used for planting crops which are not for consumption which decreases the area used for food. Also, the risk of entering the forest has increased although it does take place, making the procurement of edible resources from the forest increasingly difficult. These two changes are due to the restrictions on entering Chandoli, and do impact food security of respondents to a certain extent.

As mentioned in the conceptual framework, Cernea and Schmidt-Soltau (2006) view the increased expenditure of time and effort to collect necessary resources as another way of measuring the loss of access to common property. This is also the case for the four villages adjacent to the National Park. All of the respondents take more time and effort to collect resources needed for their livelihoods. In most of the villages respondents explain that they now plant certain plant species on their agricultural lands so that they can harvest and use them as construction material- this costs a lot of extra time in comparison to walking into the forest and collecting the resource directly, without using valuable space on agricultural lands.

Social Disarticulation

In the case of the four villages adjacent to the park, social networks have been weakened and the status of the village leader has changed, which has increased the risk of social disarticulation.

In all four villages, respondents indicated negative changes in social networks compared to the situation before the park was established. Family members, friends, and neighbors living in villages nearby have been resettled, and communication with them is difficult. Since most villagers are self-sufficient and do not have a steady monetary income, travelling or making telephone calls is considered too costly.

Respondents explained that they feel there are fewer people to rely on now since many people have moved away due to the park establishment. Aside from the obvious social repercussions, this has had more substantial effects on livelihoods as well. There are fewer laborers to help out in the fields, and there are also less landowners where respondents can help out in the fields. Helping each other out was common practice when more villages were located inside Chandoli and when there was too much work on the fields for one household to

do alone, and then they received some of the harvest in return. Marriage issues have also been affected, because some of the villages traditionally married off their daughters and sons to certain villages which have now been resettled, and they must resort to other marriage partners in villages which they do not trust.

Next to the general situation regarding changes in social networks, the loss of status of the village leader is a sign of social disarticulation as well. Especially in a hierarchical society this point can have a large influence on the wellbeing of communities. In the Chandoli villages, the opinion regarding this subject was ambiguous. Some of the respondents commented that the status of the village leader has actually improved since the National Park establishment because he takes the decisions for the village, which has become an increasingly important task. Other respondents said that the village leader has lost respect and status because villagers feel that the government has all of the power and that their village leader cannot influence what happens to the village in regard to resettlement and other issues around the National Park.

The weakening of social networks has led to a higher degree of social disarticulation compared to the situation before the National Park was established. The status of village leaders in these villages remains ambiguous however, since some leaders actually gained status whilst others lost it. This can be due to the fact that questioning the status of the village leader is a sensitive topic, or that the fact that the village was not relocated is seen as a victory for the leader, and respondents are happy about this. In this aspect it becomes clear that the IRR is not completely applicable, since these villages actually have not been relocated.

Health issues

Health issues came up occasionally during interviews in the Chandoli villages. The health issues which pertain to the park are all related to human-wildlife conflicts. Some people have been attacked by tigers, gaurs, and leopards when they were inside the National Park. According to some villagers, gaur attacks have become more frequent since the establishment of the National Park. Respondents now prohibit women from going inside the Park alone because they think it is too dangerous, so women always go in groups or accompanied by a male. Since the animal populations are increasing, the amount of human-wildlife conflicts could increase in the future.

Landlessness

The landlessness risk was not present in the Chandoli villages. Since the villages have not been resettled, this is not a pressing issue. Most households own private land, and use this for subsistence farming. The only issue is that they use more of their lands to plant non-food crops for building materials or firewood, which consumes area on their fields. This is a direct result of the restrictions on entering the Park but is an effect related more to food insecurity rather than landlessness.

General

In the four villages adjacent to Chandoli, respondents are generally negative about the establishment of the National Park. They see it as something created by and for “the government” and that they are powerless when it comes to influencing the future. In respondents’ eyes, the park has been detrimental to their livelihoods- one of the village leaders called the park “wrong and dangerous” for the people. The only positive effect noted by some respondents referred to the status of the village leaders in two villages, which have gained status because they have to take important decisions now regarding the village. This point will be discussed further in the discussion section.

Resettlement Villages

In contrast to the Chandoli villages, houses in the resettlement villages are made out of concrete with tiled roofs. The government has placed open sewers along the streets, and there are concrete toilets placed in different parts of the villages. This is an improvement to the previous living situation in respect to hygiene. All of the houses have electricity and access to piped water. The climate is much hotter than in Chandoli since these villages are located in the lowlands rather than in the mountains.

The impacts of the establishment of Chandoli National Park have been drastic for the resettled villages since all of the inhabitants had to move more than 3 hours from their homes to villages located near the city of Kolhapur. They were relocated and given plots of land on which they could build houses, as explained in the background section above. Many did not have the money to build a house, so they lived in self made shacks for several years before houses were built by the government after villages protested. Agricultural land and monetary compensation was not given, and therefore respondents are now engaged in wage labor to provide for their daily consumption needs.

Many changes have taken place and have caused villagers to integrate in a new society away from their rural existence in the forest. Although many negative effects have taken place, there are also some positive developments which will be noted.

Loss of Access to common property/ Food insecurity

Respondents in the resettlement villages underline the fact that they were self sufficient whilst living in the Chandoli Park, and that they have lost this essential part of their livelihoods. In the current villages most people do not own land, so they have to exclusively work for a landlord in order to earn money. They have to buy all of the resources necessary including food, firewood, and animal fodder. Proportionally, they have fewer resources now than before since they do not have access to common property (in the form of the forest) and agricultural land.

Most respondents work as agricultural laborers, and their wages are low. They indicate that they have a difficult time making ends meet, and that this was not the case in Chandoli. They used to collect firewood and food from common property, and produced food from their own lands. This is no longer possible, and the villagers have a difficult time adapting to a situation without common property and with less food security due to the loss of agricultural lands.

Respondents in the resettlement villages all indicated that they have to take more effort and time to collect resources. This is due to the fact that they work for money to buy what they need. Some people avoid the cost of buying firewood by collecting sugarcane roots (which are flammable and can be used for cooking) if the land owner lets them. This is free, but it is time-consuming and hard physical work. Additionally, many respondents explained that they sold their cattle because they cannot afford to buy food for them. This simultaneously results in a loss of part of their asset base.

Social Disarticulation

In contrast to the villages near Chandoli, resettlement villages not only lost most of their neighbors, but also moved to a completely new location. Most of the villages were split up due to internal conflicts as a result of the resettlement process so that neighbors, friends and family members were dispersed. Many of the respondents indicated that it is too expensive for them to take a bus to see their relatives or friends, so this is only done in case of emergencies. Even within villages joined families were split up because land was allotted in

different areas to the corresponding household head. According to respondents this has caused changes in village dynamics and social networks.

Some of the respondents do not see a great change in how they deal with problems when they need help- they simply rely on their new neighbors more than family or friends living further away. On the other hand, some respondents have observed that people are less reliable now and relationships have changed since they were resettled. Respondents have indicated that people are focused on personal gain rather than on the community's wellbeing as a whole since they moved to the resettlement village.

The village leaders in most resettlement villages have lost respect and status since the resettlement. According to some respondents, people have become increasingly individualistic since moving and therefore they do not listen to the village leader in the same way as before. There is also political fragmentation since villages are now dispersed and not resettled as one coherent group. Internal conflicts due to resettlement have led to villages splitting up and this inevitably led to leaders losing face. The younger generations are also more exposed to the outside world and media, and they are starting to challenge the authorities, including village leaders and elders. This is not necessarily a negative change, but it creates more friction and conflicts with older generations in a relatively new livelihood situation.

Landlessness

Respondents in the resettled villages explained that they were promised land by the government, but most people in all of the villages have not received this. Land is one of the most important assets for these people, which makes the situation quite poignant. This is essential to the resettled villages, since people were completely dependant on the forest and their agricultural land before. By assuring that they have land in the resettlement villages, they can at least produce some of the food for themselves, rather than having to rely on wage labor.

Respondents in the four resettlement villages mostly did not own land even when they had had large land holdings in former villages. Protests are held annually to demand monetary compensation and land, but according to respondents only occasionally some money was given. This situation corresponds with the landlessness indicator of Cernea.

Health Problems

In all of the villages, respondents said that health problems have been on the rise since they moved to the resettlement villages. Some villagers report an increase in stomach problems, kidney stones, diabetes, and heart problems. It can be observed that the villagers residing in the resettlement areas are plumper than the villagers near Chandoli. This could be a positive change, since undernourishment is a serious issue in various parts of India. On the other hand, it could also be a cause for increased health problems.

Villagers attribute the health problems to changes in diet, the water quality in the villages, and the climate. For example, in all of the villages there is a small shop which sells cookies, chips and soft drinks. The (relatively wealthy) village leader in one village indicated that his family never ate this before, but now they eat cookies for breakfast everyday. The water quality is also inferior to the quality in Chandoli, which can certainly be a reason for the increased stomach problems. The villages are situated near Kolhapur, where water quality is low, especially in comparison to the natural water sources in the mountains of Chandoli National Park (Chiras, 2006; FAO, 2010). The climate is also harsher in the resettlement villages because there is no shade from large trees, and they are located on a lower altitude.

Positive impacts

Aside from the negative impacts of the resettlement process in the form of risks as presented above, a few positive changes can be acknowledged. The fact that the villages are now located near a large city, schools, and health care providers set the stage for new possibilities. The exposure to the media and the outside world, as noted under the social disarticulation risk above, can also have positive influences. Information and new opportunities can be encountered through (media) exposure, and even exposure to the Hindi language could be a positive influence. In the Chandoli villages only Marathi is spoken, and improving Hindi could help in future employment options for example.

School accessibility is another positive change, since some of the villages in Chandoli were so remote that teachers sometimes did not even come, and the schools only catered to students under the age of 14. In the resettled villages it would be possible to finish school and even attend college if the financial situation in the household would allow. Similarly, health care providers such as hospitals, doctors and pharmacies are located much closer now than in Chandoli. In medical emergencies, help can be sought quickly and at a lower cost than in the previous remote location.

General

The respondents in the resettlement villages mostly have a negative opinion on the national park, and all of them are negative about how the process of resettlement went. The biggest issue in these villages is that people did not receive agricultural land whilst this was promised to them by the government. They did receive a small plot of land for building a house, but they did not receive the monetary compensation the government had promised. Money was mostly received after protesting annually at the collector's office in Kolhapur.

Opinions on Chandoli establishment

The question that was asked in the household survey which is key to the research question of this paper is “Would you say that the effect of the establishment of Chandoli National Park has been mostly positive, negative, or neither?”. In both groups, the majority of the respondents replied that the Park has had a “mostly negative” effect or “more negative than positive effect” on their life. The tables below show the number of respondents that answered, and the percentages derived from this data¹⁰.

Impact of Park	Village groups	
	Chandoli (#)	Resettled (#)
Mostly positive	5	3
More Positive than Negative	0	5
Neutral	3	1
More Negative than Positive	18	9
Mostly Negative	17	22
Total	43	40

Impact of Park	Percentage of Village groups	
	Chandoli %	Resettled %
Mostly positive	11.11	7.5
More pos than Neg	0	11.11
Neutral	6.67	2.5
More Neg than Pos	40	22.5
Mostly Negative	37.78	55.56

¹⁰ 'No answer' has been removed

In both Chandoli villages and in resettlement villages almost 78 percent of respondents feel that the effect is negative or more negative than positive. Some respondents replied that the effect was “more positive than negative” or “mostly positive”, which can be explained by additional factors. These respondents have an income which is (highly) above average, or land sizes and land productivity which is larger or higher than other households.

A Chi-squared test of independence was done on the data in Table 1. The Chi Square is 10 with 4 degrees of freedom, and the H_0 hypothesis is that the two variables were independent of each other. This hypothesis can be rejected at the 0.05 probability level, since 10 is larger than 9.488 in the chi-squared distribution table. Consequently, this means that the two variables are related- being positive or negative about the impact of the park is related to living in Chandoli or resettled villages.

These data support the qualitative data presented above, and give a numerical image of the overall opinion regarding Chandoli National Park in the research villages.

Discussion

From the interviews conducted in eight villages adjacent to Chandoli National Park and in the resettled villages, it seems that the risks described by Cernea (1997) have increased due to Park establishment. In both groups (Adjacent to the park/ Resettled villages), respondents indicate that the park has had a negative impact on their livelihoods. People are generally unhappy about the National Park and are disappointed about the establishment process and their current situation. These general statements made by respondents are supported by the results from measuring the following risks that they face according to the IRR model. Although most of the respondents underlined the negative aspects of resettlement, a few positive changes have presented themselves, which could be a basis for a brighter future.

Loss of Access to Common Property

The first risk measured was loss of access to common property. This risk highlights the fact that the respondents who lived in Chandoli before the National Park was established were dependent on the forest and have now lost an essential part of their livelihoods. All of the respondents in both groups indicated that they were either fully dependent upon forest products next to subsistence agriculture, or that the forest was very important for their livelihoods. Now the access to the forest and forest products has been restricted- both groups theoretically have no access to any resources from the National Park, and hence there has been a loss of access to common property.

There is an important difference between the two groups here however. The respondents living in resettlement villages are about 3 hours driving distance from Chandoli, so that it is virtually impossible for them to collect resources from the Park. The other group of respondents living adjacent to or inside the park is in a slightly more ambiguous situation. They are aware of the rules regarding the park, but many respondents still do collect items from Chandoli. As mentioned earlier, this is possible by bribing forest guards or, as some respondents indicated, by running away from them very quickly. This indicates that there is a certain amount of corruption present and the rules of the park are not enforced sufficiently.

Since collection is still continuing- although the extent of this was not quantified, alternative management options could be explored. If some form of community management scheme were in place, a win-win situation may be plausible, rather than the lose-lose situation

which is currently present. At the moment, people are collecting resources from the forest, which puts them at risk of being caught and paying fines, but it also increases the vulnerability of the forest, since it is not protected sufficiently from human impact (Garnett et al, 2007).

Food Insecurity

Food insecurity was also measured as a risk for the two different groups of villages. This partially overlaps with the previous 'loss of access to common property' risk, since common resources were one of the main food sources used by the respondents. There is a difference though, since both groups were accustomed to producing their own food through subsistence agriculture, and this aspect of their livelihoods has been negatively affected by the National Park in both cases.

Respondents in the resettlement villages have now been integrated in the monetary economy, which is a shock in itself. Since land has not been given to most families, crops cannot be grown for subsistence agriculture. This forces resettled communities into wage labor so that they can consume food and other resources on markets. Respondents claim that they had more food when they were dependent on subsistence agriculture than in the current situation. They were able to manage their time freely and did not have to depend on a land lord to make money to buy food. The wages for labor on other people's lands are low, and there is no security that respondents can work every day. Respondents explained that laborers gather in the village each morning, and often there is not enough work for everyone. This makes their source of income and consequently their food security unstable.

The communities living adjacent and inside Chandoli National Park face different problems in regard to food security. The quantitative data presented in the results above show that a majority of households do have enough to eat, although this data cannot be compared to the situation prior to park establishment. Even though most respondents indicated that there is enough food, there have been negative impacts due to Chandoli which seem to have an affect on food security in these villages. Aside from being restricted in their use of forest products, the increased human- wildlife conflict has a negative effect on food security. When crops are trampled or eaten by gaurs or wild boars, they can loose their whole harvest. In the past, the number of animals entering fields was significantly less according to respondents, and the increase of wildlife is making life difficult for them. The numbers of gaurs and wild boars in Chandoli have increased according to the government as well. Since there used to be a greater

number of villages inside Chandoli, perhaps the animals were more dispersed before and had a larger selection of fields to visit. Now the number of fields has diminished significantly, so more animals visit the same fields to eat.¹¹

Both respondents in resettlement villages and in the Chandoli villages face problems of food security for different reasons. Resettling villages in a new area without land and an increase of wild animals that destroy crops are both direct and indirect consequences of the establishment of the National Park. Additionally, the loss of access to the resources in the National Park itself is an issue which affects the food security of both groups.

Social Disarticulation

In the IRR, social disarticulation can be identified in different forms. Changes or loss of relationships with family, friends, and neighbors is a key indication that social disarticulation has taken place. The change in the status of village leaders or elders is another point which can indicate the same risk.

In both the resettled villages and the Chandoli villages, relationships have changed a great deal. The cause of the changes is reversed for both groups- Chandoli villages watched as people moved away, and resettled villages were moved to new locations far from Chandoli and their old neighbors. In both cases, communication has weakened or stopped completely between respondents and people in formerly neighboring villages. It is also too costly for both groups to travel and see each other, so contact between distant friends and family is minimal.

In the Chandoli villages, the issues brought up referred mostly to labor and marriage problems due to the loss of social contacts. When there was extra work in the fields, villagers were accustomed to hire laborers which helped out in exchange for some food. Vice versa, when there was work in neighboring villages, respondents used to help out and thereby receive extra food. Now that many villages have been resettled this is no longer possible.

Arranged marriages are common practice in India, and this has become more difficult to realize for people living near Chandoli. Aside from a formally recognized basis to build a life upon, it is an important form of economic security for both families. Respondents were used to marrying off their daughters to families in nearby villages which have been resettled. Now they resort to other locations where they do not trust the people as much, and it is felt

¹¹ Interview with Professor Jay Samant- Director, School of Environmental Sciences, Shivaji University, Kolhapur (Expert on biodiversity in Maharashtra)

that they do not have much choice in marriage partners and hence, a good future for their children.

For people in the resettled villages, the situation is quite different. Marriage issues are not highlighted by respondents, which may be because the villages are located near highly populated areas, which makes the choice of marriage partner easier than in the sparsely populated fringes of Chandoli. On the other hand, this could still be an issue which was not brought up since marriages most often take place within one's caste and sub-caste and could be negatively impacted because of fragmentation. Main problems include the fact that villagers lost neighbors and friends by being resettled and internal conflicts due to the resettlement process have caused tension between villages and families. Some respondents observe changes in relationships and say that people are becoming more individualistic and less reliable. On the other hand it has become clear that respondents in resettlement villages do their best to cope with what they have and merely adapt to the situation. If there is a problem they go to their (new) neighbors for help rather than their friends or relatives who live far away.

In both groups, there are varying opinions regarding the statuses of village leaders. It must be noted that this is a sensitive topic, and truthful answers cannot be expected from relatives of the village leaders or people who are being interviewed next to the village leader himself (which was sometimes the case). In the Chandoli villages, respondents gave varying answers in regard to the status of the village leader- some commented that he has gained status whilst others did not feel this way. The respondents who commented that the status had improved said that in these times of change, difficult decisions have to be made, and so the village leader gains importance. In some villages however, the village leader is doing little to improve the position of villagers, and therefore respondents feel that the government has all the power and that they cannot influence what happens to their village.

In the resettlement villages, the results of the interviews are in line with the IRR. Village leaders have lost respect and status, which weakens the position of, and social cohesion in the villages. Various conflicts related to the resettlement process have driven neighbors and even families apart. Perhaps the leaders are not strong, and this is why they have lost respect. Having strong leaders in the resettlement locations could be an important factor in managing the future of these villages and arranging better compensation. Since village leaders have lost status and trust this can have a negative effect on the wellbeing of people who are dependent on them for guidance and representation.

Landlessness

Respondents in the Chandoli villages almost all owned land. Although there are issues with human-wildlife conflicts in the area, land ownership usually allows the people living near the park to produce and consume the food they need. It is an essential part of their livelihoods, and the importance of this land has increased since villagers were restricted to use resources from the National Park.

Respondents in the resettled villages mostly do not own land, although they had large land holdings in their former village in Chandoli. This affects their food security since they have lost their self sufficiency, and causes villagers to engage in wage labor.

Morbidity and Mortality (Health Problems)

In the Chandoli villages, health problems have only increased in regard to increased attacks by wild animals. Respondents still live in the same villages where they have been for generations and no major changes in diet or lifestyle have taken place. They live far from doctors and hospitals, but this is the same situation that existed before the National Park was established. This issue was brought up during interviews in the resettlement villages, without being one of the risks measured with direct questions.

As mentioned in the results section, there has been an increase in various health problems in the resettlement villages. It is noted in the IRR that people who are resettled often are located closer to formal healthcare services, which can be a positive effect and can actually reduce risks. It also explains that unfortunately many resettled people cannot afford this healthcare. This is also the case for the research villages, since user fees are in place in Maharashtra, which often makes healthcare too expensive for respondents (Mahal & Veerabhraiah, 2005)

Summary

The following chart shows the five risks measured and which study group has been affected by the risks:

Table 2: Increase of risks due to Chandoli National Park?		
Risks	Chandoli Villages	Resettlement Villages
Loss of Access to common property	Yes (But still some illegal use)	Yes
Food Insecurity	To some extent	Increased
Social Disarticulation	Yes	Yes
Landlessness	No	Yes
Morbidity/ Mortality	To some extent	Yes

The three risks in the IRR framework which have been measured explicitly are present in all eight research villages. The two extra risks of landlessness and morbidity/mortality are present in the four resettlement villages. This was to be expected due to the fact that the IRR framework is developed on the basis of empirical data gathered from various resettlement processes. The Chandoli villages do not face the same risks as the resettled villages since they are only excluded from the National Park rather than being relocated completely. They still have their land and some (illegal) access to the resources inside of the National Park.

In sum, both groups of villages are facing risks and have been negatively impacted by the establishment of Chandoli National Park. The Chandoli villages face the risks of loss of access to common property, food insecurity (to some extent), and social disarticulation. Resettlement villages face all of these risks plus the additional risks of landlessness and morbidity/mortality. The resettlement villages seem worse off when it comes to the risks they must face and try to eliminate in order to reduce their vulnerability. On the other hand, the people living in resettlement villages are more exposed to new opportunities which could increase possibilities for the future. Access to education is easier, as well as access to health care facilities. Exposure to media and other cultures is by definition a great change which will have a large impact on villagers' lives.

Recommendations

There appears to have been a serious increase in livelihood risks for both groups of villages, and addressing some of these risks could lead to a better future for the research villages. Although the previous section has focused on the risks for people impacted by the Park, we must keep in mind that the reason for resettling and excluding them from the National Park is part of the broader plan to conserve biodiversity. As the results and discussion sections above have shown, conserving biodiversity in this area has led to increased risks for the local communities. In order to balance biodiversity conservation and risk reduction, there need to be some large and perhaps costly changes made to the current management practice.

To conserve biodiversity in an effective way, authorities need to address the illegal use of resources from the Park. Either there needs to be increased surveillance of the area, or a different approach can be taken. Instead of excluding adjacent communities altogether, it might be possible to integrate them in a sustainable resource use project. Many conservation and development schemes have failed in the past, but at the moment there is no effective conservation and no development taking place, so this might be a good opportunity to investigate multiple possibilities (Garnett et al, 2007; Bawa et al, 2007). In one village, respondents were eager to help out by planting trees or engaging in other activities related to the park in exchange for compensation. These opportunities need to be researched further, since total exclusion is not effective at the moment.

On the socioeconomic front, different things can be done regarding situations of Chandoli villages and resettlement villages respectively. Chandoli villages could either be resettled in a way which ensures that the risks of landlessness, food insecurity and social disarticulation are minimized. This means that monetary compensation, agricultural land and housing in a new area should be made available. Fulfilling these requirements is a costly matter, and perhaps it would be cheaper and also logistically easier to investigate a sustainable resource use scheme as suggested above.

In the resettlement villages, the main recommendation which could decrease socioeconomic vulnerability would be to give villagers access to fertile agricultural land. This could decrease food insecurity and take away the risk of landlessness. As a secondary effect it reduces the impact that losing access to common property has had, since villagers can produce their own food and become increasingly self sufficient. Once again, this is a matter of

money and political will, which both need to be available for real changes to take place on the local level.

Conclusion

The purpose of this research project was to investigate how the establishment of the Chandoli National Park has impacted the socioeconomic vulnerability of local communities. Changes in livelihood risks were measured in order to understand the current socioeconomic situation for communities living adjacent to Chandoli National Park as well as resettled communities. In particular, food insecurity, loss of access to common property, and social disarticulation were measured.

The results of the qualitative interviews show that socioeconomic vulnerability has increased for both research groups. This has been shown by testing if selected risks given by Cernea in the Impoverishment Risk and Reconstruction Model were present in the two different research groups.

In the case of villages next to the Chandoli National Park, food insecurity has increased to some extent and loss of access to common property and social disarticulation are present. In these villages, there is slightly more room to maneuver since illegal procurement of resources is still going on, which is not monitored in an efficient manner. In the resettled villages, all of the risks measured were also present. Additionally, the risks of landlessness and morbidity/mortality were identified during interviews.

Both groups of respondents face risks which are interdependent, making them more vulnerable and reducing their capacity to deal with future risks. Their socioeconomic vulnerability has increased in comparison to their previous situation whilst living in Chandoli National Park without restrictions.

Options for integrating villagers living adjacent to the Park into conservation and development projects need to be investigated with caution due to previous failures. The options should be investigated however, because these communities are in a vulnerable situation due to the establishment of the National Park. People in the resettlement villages need to be given full compensation and land in order to reduce risks and their overall socioeconomic vulnerability.

Bibliography

- Bawa, S., Joseph, G, Setty, S. (2007) Poverty, biodiversity and institutions in forest agriculture ecotones in the Western Ghats and Eastern Himalaya ranges of India. *Agriculture, Ecosystems and Environment*. 121:287–295.
- Bouma, J., & Huitema, D. (2009) Socio-economic Vulnerability: Conservation-Development Tradeoffs and Agency in Multi-level Governance Processes. *LiveDiverse Conceptual Note WP6*. VU University- Institute for Environmental Studies, the Netherlands.
- Chape, S., Harrison, J., Spalding, M., Lysenko, I. (2005) Measuring the Extent and Effectiveness of Protected Areas as an Indicator for Meeting Global Biodiversity Targets. *Philosophical Transactions: Biological Sciences*, 360:1454, 443-455.
- Chiras, D. (2006) *Environmental Science*. (p 467) Jones & Bartlett Publishers Inc.: Boston.
- Cernea, M. (1997) The Risks and Reconstruction model for resettling displaced populations. *World Development*. 25: 10, 1569-1587.
- Cernea, M. & McDowell, C. (Eds.) (2000). *Risks and Reconstructions- Experiences of Resettlers and Refugees*. Washington: The World Bank.
- Cernea, M., & Schmidt- Soltau, K. (2006) Poverty Risks and National Parks: Policy Issues in Conservation and Development. *World Development*. 34: 10 pp.1808-1830.
- FAO (2010) Aqua stat report India: Environment and Health. Retrieved on August 10, 2010 from <http://www.fao.org/nr/water/aquastat/countries/india/index.stm>.
- Garnett, S. T., Sayer, J. and du Toit, J. (2007). Improving the effectiveness of interventions to balance conservation and development: a conceptual framework. *Ecology and Society* 12 (1): 2 (online)

- Imam, E., Kushwaha, S., & Singh, A. (2009) Evaluation of Suitable Tiger Habitat in Chandoli National Park, India, Using Multiple Logistic Regression. *Ecological Modelling* 220:3621–3629.
- Karade, J. (2008) *Development of Scheduled Castes and Scheduled Tribes in India*. Cambridge Scholars Publishing. Newcastle United Kingdom.
- Khot, A. (2001) *Management Plan of Chandoli Wildlife Sanctuary of Kohlapur Wildlife Division*. Official document from the forestry department of Maharashtra, India.
- LiveDiverse (2009a) *The LiveDiverse Project Concept: Sustainable Livelihoods and Biodiversity*. Retrieved on June 25, 2010 from http://www.livediverse.eu/?page_id=82.
- LiveDiverse (2009b) *Report from 1st Stakeholder fieldtrips: India 7th-15th December, 2009*.
- LiveDiverse (2009c) Work Package 6- Socioeconomic vulnerability. Internal Document.
- Mahal, A. & Veerabhraiah, N. (2005) User charges in India's health sector: An assessment. In P. Lal (Ed.) *Financing and Delivery of Health Care Services in India* (pp. 265-273) Cirrus Graphics Private Limited: New Delhi.
- Mahapatra, L.K. (1999) Testing the Risks and Reconstruction Model on India's Resettlement Experiences. In M. Cernea (Ed.) *The Economics of Involuntary Resettlement* (pp. 189-230) Washington: World Bank.
- Maharashtra State Project-Affected Persons' Rehabilitation Act, 1999 (Mah. Act No. XI of 2001) Retrieved on July 5, 2010 from <http://mdmu.maharashtra.gov.in/pages/projectrelatedrehab/MahaActXI.pdf>
- Millenium Ecosystem Assessment (MA) (2005) *Ecosystems and Human Well-being: Biodiversity Synthesis*. World Resources Institute, Washington D.C.
- Niphadkar, M. (2008) *Chandoli National Park- Some more details*. Retrieved on July 15, 2010 from <http://indiabiodiversity.org/IBP/node/89/popup>

Omvedt, G. (2001, January 11) New Victories for Dam Evictees. *The Hindu*. Retrieved on July 26, 2010 from <http://www.hinduonnet.com/2001/01/11/stories/05112523.htm>

Orlove, B & Brush, S. (1996) Anthropology and the Conservation of Biodiversity Source: *Annual Review of Anthropology*, Vol. 25, pp. 329-352.

Rao, M. (2009) Discussion with conservator of forests on December 10th with LiveDiverse team in Kohlapur. Cited in *Report from 1st Stakeholder fieldtrips: India 7th-15th December, 2009*.

Samant, J. (2010, May 5) Personal Interview.

Western Ghats Website (2010) *Biological-diversity*. Retrieved form <http://westernghatsindia.org/biological-diversity> on July 25, 2010.

Appendix 1

Household Survey questions used

1. Please list the household members with their age, sex, literacy and occupation (Please don't read all categories aloud, but ask the respondent about the different household members with their age, sex, literacy and occupation, and mark the answers below)

Household member No.	Age	Sex M=1 F=2	Literate Yes=1 no=0	Current occup.	Sector	Current occupation codes
Respondent						00= child below 6 years
02						01= child (>6) not going to school
03						02= school/education
04						03= self-employed
05						04= temporary labour
07						05= permanent
08						06= non-employed
09						07=household tasks
10						08= retired
11						09= other (specify)
12						Sector codes (link to occupation)
13						01=agriculture/livestock
						02=forestry/fishing/mining/ etc.
						03= tourism/craft making & selling
						04=commercial/construction/other
						05= government, public sector
						06= other (specify)

2. Has the household been in the village for the last 20 years, and if not where is it from?

01= yes 02= no, displaced (protected area) 03= no, displaced (dam) 04= no, in-migrant regional/national 05= no, in-migrant international

3. What products does the household collect directly from nature (ie the forest/wetland/bush)? (more choices possible) like for example meat, fish, medicinal plants, flowers, fruit, nuts, vegetables, timber, fuel, fodder, material for the house etc? (Please probe a bit and ask whether the household collects merely for its own use or broader and mark the answers below)

None	01
Meat for consumption	02
Meat for the market (selling)	03
(Shell) fish for consumption	04
(Shell)fish for the market (selling)	05
Fruits, berries, nuts etc. for consumption	06
Fruits, berries, nuts etc. for market (selling)	07
Mushrooms, vegetables etc for consumption	08
Mushrooms, vegetables etc for market (selling)	09
Medicinal plants, dye etc for own use	10
Medicinal plants, dye etc for market (selling)	11
Construction material, timber etc. own use	12
Construction material, timber etc. for market (selling)	13
Fuel, fodder etc. for own use	14
Fuel, fodder etc. for market (selling)	15
Flowers, plants for ceremonial purposes	16
Other (specify)	17
(Refused to answer)	99
(Don't know)	00

4. Are any of these products collected in Chandoli National Park?

Yes=1, no=0

5. How important is the collection of these products for the household's livelihood?

01=very important 02= important 03=not so important 04= not important 00= don't know

6. What is the household's average income per month? Please include the income received from wages, selling products, remittances (money sent home), pensions, grants etc. FROM ALL HOUSEHOLD MEMBERS, excluding taxes. (If the respondent mentions an exact amount, please note this done. Otherwise, ask the household whether they earn somewhere between (higher category) and (lower category) and mark below. Please probe a bit when the amount seems very low or high)

	Household
No income	01
Rs 1-500	02
Rs 501-1000	03
Rs 1001-1500	04
Rs 1501-2000	05
Rs 2001-2500	06
Rs 2501-3000	07
Rs 3001-3750	08
Rs 3750 and above	09
(Uncertain/Don't know)	00
Refuse to answer	99

7. Has the household been affected by the establishment of a protected area/park? (NAME)

Yes=1, no=0

8. Would you say that the effect has been mostly positive, or negative, or neither?

01=mostly positive 02= more positive than negative 03=neutral 04=more negative 05= mostly negative 00=don't know 99=no effect

9. Do you feel that the rules and regulations with regard to the use of the protected area (NAME) are effectively enforced?

01 =rules are well-enforced 02 =rules are somewhat enforced 03=rules are enforced 04 =not all 00= don't know 99=refuse to answer

10. Do you know of households that are breaking the rules in using natural resources in the protected area/park (NAME) (poaching, timber felling, fishing, grazing etc)

01=yes, many households 02= yes, few households 03=yes, but mostly outsiders 04= no 00= don't know 99= refuse to answer

11. Now, if some organization would try to improve park management and the protection of nature, would you be willing to cooperate and report households that are breaking the rules (poaching, timber felling, fishing, grazing etc)?

01=yes, always 02= yes, in some cases 03= no, except in case of outsiders 04= no 00= don't know 99= refuse to answer

12. Do you feel you can influence the use and management of the protected area/park (NAME) ?

01=yes, always 02= yes, in some cases 03= sometimes, depends on the issue 04= no 00= don't know 99= refuse to answer

Appendix 2

Qualitative Interviews

1. Do you have a different amount of income or food now than before the national park was established?
2. What kind of other changes have there been since the national park was established?
3. Was the use of natural resources from Chandoli national park important for you before it was prohibited? (Collecting, poaching, grazing etc)
4. Do you use fewer resources from Chandoli Park now?
5. Do you feel you need to make more effort or take more time to get the resources you need?
6. How has your social network changed since the park was established?
7. How has the displacement of other communities around you affected the way that you deal with difficult times? (If you do not have enough food for example?)
8. Has the status of village elder or leader changed after the establishment of the national park?
9. Is there a difference between men and women when it comes to collecting natural resources from the park?
10. Do you think women or men are more affected by the park establishment (In the sense of income from natural resources for example)?
11. What is your view in general of the National park and how it has affected your life?