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People-Park Interaction:
A Case of Bandhavgarh National Park, India

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ABSTRACT

The purpose of this study was to understand the complexities involved in wildlife conservation taking the example of a protected area (PA) in India. The country is one of the mega-biodiversity countries of the world and at the same time a developing country with a heavy reliance on natural resources for its growth, and a large rural and tribal population for which the very forests, which have now been declared into PAs form their survival base.

Bandhavgarh National Park (BNP) covers an area of 448.84 sq. km. In view of the importance of tiger conservation in India, Bandhavgarh, which has the highest number of tigers in the world, was given the status of a Tiger Reserve in 1993. However, the area faces competition from people living within the Park and on the periphery for subsistence use and income generation. There is a high resource use overlap due to people's various activities inside the Park. On the other hand, better protection has led to increased wildlife depredation in the form of crop damage, livestock and human losses. These human-wildlife conflicts pose major problems, which the Park officials have to contend with.

The study sought to understand the degree of dependence of the resident human population on the Park resources, pressures exerted on the Park as a result of this resource use, the changes that the inclusion in the Park entails for the people, and the interaction between the people and the Park authorities. A variety of methods were used to achieve this goal. The type and degree of people's dependence was studied mainly through focus group discussion and two-staged sampling of 155 households. Mapping of resource use and forest department surveys were applied to gain information about the Park officials' perception of resource use, benefits of the Park for the people and the wildlife and potential consequences of resource use by people. Secondary data was referred to with regard to conservation policies and legislations relevant for the Park and management practices.

The study revealed that people residing inside the Park are dependent to a very large extent on the Park resources for subsistence and income generation. The results showed that differences in tenure type did not have a significant impact on the restrictions faced and problems and costs incurred since inclusion in the Park. The pressure mapping of the Park revealed excessive overuse of Park resources by the people and a high degree of resource overlap with the wildlife. This is detrimental for the Park and contrary to the conservation objective of the Park.

The study revealed that presence of alternatives not only influences people's acceptance of the PA, which is crucial to ensure the future viability of the PA, but also reduces the dependence of the people on the PA. Therefore, provision of alternative sources of employment are necessary for the long-term survival of the Park.

The study concludes that although relocation of the villages from inside the Park is a policy stipulation, at present its implementation is highly unlikely and the chances of relocation at a future date also appear slim. The contrast between the policy stipulation and reality has led to ambiguous regulations and weak enforcement of existing rules. The uncertainty imposed by the threat of relocation provides an incentive to the local people to overexploit the resource base for short-term benefits, as the people do not know whether they will still be there in the long-term to suffer the costs.

BNP is the only NP in India where eco-development has been launched in villages inside the Park. This might be in acknowledgement of the problems involved in relocation. More research is, however, needed to assess the success of this initiative and how it compares to policy alternatives like the provision of alternative sources of income outside the Park. Involvement of the inside villagers in Park management and providing them with a share of the revenues from eco-tourism in the area would also be desirable. This would provide a means for understanding the substantive needs of the local people and give them a personal stake in the condition of the Park. It would also help to build trust between Park authorities and the people, a prerequisite for securing the Park's future.

KURZFASSUNG

Das Ziel der vorliegenden Studie war es, die Schwierigkeiten des Artenschutzes am Beispiel eines Naturschutzgebietes in Indien besser zu verstehen. Indien ist eines der Länder mit der größten Artenvielfalt und ist gleichzeitig ein Entwicklungsland, dessen Wachstum in hohem Maße von seinen natürlichen Ressourcen abhängt. Das Land besitzt außerdem eine große ländliche und einheimische Bevölkerung für die gerade die Wälder die Lebensgrundlage bilden, die als Schutzzonen ausgewiesen worden sind.

Der Bandhavgarh-Nationalpark (BNP) hat eine Größe von ca. 448,84 km². Vor dem Hintergrund der Bedeutung der Tigerschutzprogramme in Indien wurde der BNP, der die größte Anzahl Tiger der Welt aufweist, 1993 als Tigerreservat ausgewiesen. Das Gebiet unterliegt jedoch einem Nutzungskonflikt, da der Lebensunterhalt und das Einkommen der Menschen, die im Nationalpark und an dessen Peripherie leben, vom Park abhängen. Es gibt einerseits eine hohe Ressourcenüberschneidung aufgrund der verschiedenen menschlichen Aktivitäten innerhalb des Parks. Andererseits hat der verbesserte Schutz der Tiere dort zu höheren Schäden auf den landwirtschaftlich genutzten Flächen sowie zu Verlusten beim Vieh und Todesfällen bei der lokalen Bevölkerung geführt. Diese Naturschutzkonflikte führen zu großen Problemen, mit denen die Parkbeamten kämpfen müssen.

Die Studie hat folgende Fragestellungen untersucht: (1) Den Grad der Abhängigkeit der Bevölkerung von den Ressourcen im Park, (2) die darauf zurück zu führenden Belastungen des Parks, (3) die für die Parkbevölkerung durch die Einbeziehung in den Park entstandenen Veränderungen, und (4) die Interaktionen zwischen der Bevölkerung und den Parkbeamten. Mehrere Methoden wurden eingesetzt, um dieses Ziel zu erreichen. Die Art und der Grad der Abhängigkeit wurden hauptsächlich durch Diskussionen mit den Zielgruppen sowie 2-stufige Befragungen von 155 Haushalten ermittelt. Eine Kartierung der Ressourcennutzung sowie Befragungen bei der Waldbehörde wurden durchgeführt, um Informationen über die Wahrnehmung der Beamten bezüglich der Ressourcennutzung, bezüglich der Bedeutung des Nationalparks für die Menschen sowie der Tier- und Pflanzenwelt, und bezüglich der Auswirkungen der Ressourcennutzung durch die Menschen zu erhalten. Sekundärdaten wurden aus für den Park und die Managementpraxis relevanten Dokumenten zu Naturschutzpolitik und Gesetzgebung entnommen.

Die Ergebnisse der Studie zeigen, dass der Lebensunterhalt und das Einkommen der betroffenen Menschen in hohem Maße von den Ressourcen im Nationalpark abhängen. Sie zeigen ebenfalls, dass die unterschiedlichen Landbesitzverhältnisse keinen signifikanten Einfluss auf die Einschränkungen, mit denen die Menschen konfrontiert wurden, oder auf die seit der Einbeziehung in den Park entstandenen Probleme und Kosten hatten. Die Nutzungskartierung zeigt Übernutzung der Parkressourcen durch die Menschen und eine hohe Überschneidung mit der Nutzung durch die wildlebenden Tiere. Dies ist nachteilig für den Park und widerspricht dessen Schutzziel. Die Studie zeigt, dass das Vorhandensein von Alternativen für die Lebensgrundlage und das Einkommen nicht nur die Akzeptanz des Parks erhöht, was entscheidend für die zukünftige Lebensfähigkeit des Parks ist, sondern auch die Abhängigkeit der Menschen vom Park reduziert. Alternative

Einkommensquellen müssen daher bereitgestellt werden, wenn der Park auf Dauer existieren soll.

Die Studie kommt zu dem Schluss, dass eine Umsiedlung der Dörfer aus dem Park momentan und auch zukünftig höchst unwahrscheinlich erscheint, obwohl dies eine politische Forderung ist. Der Widerspruch zwischen der politischen Forderung und der Realität hat zu unklaren Vorschriften und einer schwachen Durchsetzung der vorhandenen Vorschriften geführt. Die Unsicherheit, die durch die angedrohte Umsiedlung entsteht, verführt die Menschen dazu, die Ressourcen für einen kurzfristigen Vorteil zu nutzen, da sie nicht wissen, ob sie in Zukunft da sein werden, um die entstehenden Auswirkungen zu tragen.

BNP ist der einzige Nationalpark in Indien, in dem eine umweltfreundliche Entwicklung in den Dörfern eingeführt wurde. Der Grund könnte sein, dass man die als Folge einer Umsiedlung zu erwartenden Probleme erkannt hat. Weitere Forschung ist jedoch erforderlich, um den Erfolg dieser Initiative zu untersuchen und die Maßnahmen mit Alternativen, wie die Schaffung von anderen Einkommensquellen außerhalb des Parks, zu vergleichen. Die Beteiligung der Dorfbewohner innerhalb des Parks am Parkmanagement und an einem Anteil des Parkeinkommens aus dem Ökotourismus wäre wünschenswert. Dadurch wären die existentiellen Bedürfnisse der lokalen Bevölkerung besser nachvollziehbar und sie könnten einen persönlichen Anteil am Park haben. Außerdem würde dies zu einem höheren Vertrauen zwischen den Parkbeamten und der Bevölkerung führen, was die Voraussetzung für die zukünftige Sicherung des Parks ist.

TABLE OF CONTENTS

1	INTRODUCTION	1
1.1	Background and problem statement	1
1.2	The Indian scenario	5
1.3	Hypothesis and objectives of study	7
1.4	Structure of dissertation.....	8
1.5	Relevance of study	8
2	METHODOLOGY	10
2.1	Introduction	10
2.2	Conceptual framework	10
2.3	Research design	13
2.3.1	Research site	13
2.3.2	Research methodology	14
2.4	Secondary data sources.....	19
2.5	Analysis	19
3	GLOBAL AND INDIAN CONSERVATION POLICIES AND THE HISTORY OF BANDHAVGARH NATIONAL PARK.....	20
3.1	Introduction	20
3.2	Protected area network	20
3.2.1	Protected Areas in the Global Context	20
3.2.2	Protected areas in India	21
3.3	Forest legislation	23
3.4	Other conservation initiatives.....	26
3.4.1	Policies and programs addressing the issue of people’s participation in forest management.....	27
3.5	Conservation in Madhya Pradesh.....	28
3.5.1	Protected Area network in Madhya Pradesh	29
3.6	History of Bandhavgarh National Park	30
3.6.1	Location	30
3.6.2	Legal status	31
3.6.3	Significance of Bandhavgarh National Park (BNP).....	31
3.6.4	History of the Park.....	32
3.6.5	Conservation in Bandhavgarh	33
3.6.6	Park management and objectives	33
3.7	Conclusion.....	40
4	RESOURCE UTILIZATION IN BANDHAVGARH NATIONAL PARK...	41
4.1	Demography and general characteristics of households.....	41
4.2	Pattern of land tenure.....	43
4.2.1	Status of land tenure	43

4.2.2	Location, size and type of landholdings	44
4.3	Agriculture.....	45
4.4	Minor forest produce	47
4.4.1	Type of minor forest produce harvested.....	48
4.4.2	Amount and use of minor forest produce harvested.....	49
4.4.3	Income generation from sale of minor forest produce (MFP).....	49
4.5	Fuel.....	51
4.5.1	Types of fuel.....	51
4.6	Livestock rearing	55
4.6.1	Livestock ownership.....	55
4.6.2	Purpose of livestock	56
4.6.3	Livestock feeding	56
4.6.4	Income generation from livestock rearing.....	58
4.7	Alternative sources of income	58
4.7.1	Work for the Forest Department.....	58
4.7.2	Other employment inside the Park	59
4.7.3	Work outside the Park	60
4.7.4	Income generated from alternative sources.....	61
4.8	Conclusion.....	61
5	PEOPLE AND PARK INTERACTION	63
5.1	Policy regulating Park formation.....	63
5.1.1	Imposed restrictions.....	64
5.1.2	Problems due to restrictions	69
5.1.3	Costs incurred due to the Park.....	73
5.2	Changes since inclusion in the Park	82
5.3	Benefits of the Park	83
5.4	People's perception regarding wildlife, the Park, and its management	85
5.4.1	Awareness of Park existence and need for wildlife preservation.....	85
5.4.2	Attitude of the people towards the Park	86
5.4.2	Park Management.....	88
5.5	Conclusion.....	88
6	IMPLICATIONS OF RESOURCE UTILIZATION FOR PARK MANAGEMENT.....	90
6.1	Main management problems	90
6.2	Assessment of the degree of damage and pressure on the Park	95
6.2.1	Extent of damage.....	99
6.2.2	Pressure ranking of the Park.....	103
6.3	Conclusion.....	106
7	POTENTIAL STRATEGIES FOR SOLVING THE CONFLICT	108
7.1	Relocation.....	108
7.2	Delineation of the villages from the Park.....	113
7.3	Potential alternative solutions.....	114

7.3.1	Need for alternatives.....	114
7.3.2	Alternative income generation.....	119
7.4	Conclusion.....	121
8	CONCLUSION AND RECOMMENDATIONS	122
9	REFERENCES	132
	APPENDICES.....	139
	MAPS	143
	ACKNOWLEDGEMENTS	

ABBREVIATIONS

ACF	Additional Conservator of Forest
BNP	Bandhavgarh National Park
CWW	Chief Wildlife Warden
EDC	Eco development Committee
FAO	Food and Agricultural Organization
GOI	Government of India
GOMP	Government of Madhya Pradesh
IBWL	Indian Board of Wildlife
IUCN	International Union for Nature and Nature Conservation
JFM	Joint Forest Management
JPAM	Joint Protect Area Management
MFP	Minor Forest Produce
MoEF	Ministry of Environment and Forest, Government of India
MP	Madhya Pradesh
MPFD	Madhya Pradesh Forest Department
NBSAP	National policy and action strategy on biological diversity
NFAP	National Forestry Action Program
NP	National Park
NWFP	National Wildlife Action Plan
PA(s)	Protected Area
PF	Protected Forest
POR	Preliminary Offence Report
PRA	Participatory Rural Appraisal
PWS	Panpatha Wildlife Sanctuary
RF	Reserved Forest
UNESCO	United Nation Education and Cultural Organisation
WLPA	Wildlife (Protection) Act , 1972
WS	Wildlife Sanctuary
WWF	World Wildlife Fund for Nature

1 INTRODUCTION

1.1 Background and problem statement

Biodiversity¹ brings many benefits to humans, including direct uses, e.g., in the provision of food, shelter and clothing. Many of these products are traded in the market, and have a recognized economic value. Others are subsistence products critical to the livelihood needs of people living in rural areas of developing countries, such as wild foods and bush meat, products that normally fall outside conventional economic analysis. There are also indirect ecological benefits and non-consumptive uses such as recreation (Stocking et al. 1995).

Industrialization, which paved the way for development and advancement, generally has been achieved by drawing heavily on forest resources. The indiscriminate exploitation of forest resources by developed countries and the continued exploitation by less advanced² countries has taken a heavy toll on the forest resources especially in the last century. The impact has been greatest in the less advanced countries, not only because there is heavier reliance on the forest resources for economic and subsistence use by the people but because forests in these countries represent the greatest biodiversity.

Growing environmental consciousness led to the realization of not only the ecological but also the commercial implications of continued destruction of forests, and the need for forest conservation. The most effective way to protect biodiversity is to protect natural habitats. Zoos and botanical gardens can hope to conserve only a small proportion of the earth's biodiversity, and they also suffer from the disadvantage of removing organisms from interactions with their natural environment thus preventing many ecological and evolutionary processes. Thus a great emphasis has been placed on the establishment of national parks (NPs) and nature reserves over the years (Stocking et al. 1995), which have since been recognized as playing a crucial role in conserving biological diversity (Wells and Brandon 1992).

¹ Biodiversity is defined as the variability among living organisms and ecological complexes of which they are part, including diversity within and between species and ecosystems (MoEF 2002).

² The term less advanced refers to both developing and less developed countries.

The International Union for Nature and Natural Resources (IUCN) introduced the concept of a Protected Area (PA) system as a mechanism of protecting and restoring forests and biodiversity around the world in the 1960s and defined PAs as:

“ ...An area of land and / or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means” (IUCN 2002).

The 10th General Assembly of IUCN defined the term national park or ‘NPs’ in 1969. It stated that areas with this title should have the following characteristics:

“.....A NP is a relatively large area (1) where one or several ecosystems are not materially altered by human exploitation and occupation, where plant and animal species, geomorphological sites and habitats are of special scientific, educative and recreative interest as which contains a natural landscape of great beauty and (2) where the highest competent authority of the country has taken steps to prevent or to eliminate, as soon as possible exploitation or occupation in the whole area and to enforce effectively the respect of ecological, geomorphological or aesthetic features, which have led to its establishment, and (3) where visitors are allowed to enter under special conditions for inspirational, educative, cultural and recreative purposes” (Indian Board of Wild Life (IBWL)1970 in Kothari et al. 1997).

Although all countries with PAs follow the IUCN categorization³, its implications are different for different countries. In developed countries, fewer people depend on forest resources for subsistence use, and as there are alternatives to timber, it

³ In 1978, IUCN's commission on NPs and PAs (CNPPA) published its report on ‘categories, objectives and criteria’s for PAs in which it proposed 10 categories, namely, I) Scientific Reserve/ Strict Nature Reserve, II) National Parks, III) Natural Monument/ Monument Landmark, IV) Nature conservation Reserve/ Managed Nature Reserves/ Wildlife Sanctuary, V) Protected Landscape, VI) Resource Reserve, VII) Natural Biotic Area/ Anthropological Reserve, VIII) Multiple Use Management Area/ Managed Resource Area, IX) Biosphere Reserve & X) World Heritage Site (Natural). In 1984 CNPPA reviewed and revised the categories and proposed the deletion of categories VI-X (IUCN 1994 in Kothari et al. 1997a). This proposal was further revised in 1992 and now there are six categories of PAs namely- Category I Ia Strict Nature Reserve, Ib Wilderness Area; Category II NP; Category III Natural Monument; Category IV Habitat/ Species Management Area; Category V Protected Landscape/ Seascape; Category VI Managed Resource PA (ibid. 1997).

is possible to set aside large tracts of forests for wildlife protection and confer with the IUCN categories, especially categories I (Strict nature reserves) and II, national parks (NP). Though categories III to VI are less strict than categories I and II, most less advanced countries have a large number of their PAs as category II (NPs). For less advanced countries, which have large numbers of forest-dependent communities⁴, heavy reliance on wood especially for fuel and timber products and as a major source of income for governments, it is more difficult to comply with the IUCN categorization. The situation is complex and riddled with difficulties for the governments and forest-dependent communities alike. PAs have, over the decades, been successful in protecting biodiversity to some extent, but have emerged as areas of conflict where the welfare of the wildlife is pitted against the welfare of forest-dependent communities.

Unfortunately the view of nature conservation that has tended to dominate international thinking over the past century sees humans as intruders into nature, valuing “pristine nature” as the ideal to be retained (McNeely et al. 1996). The instinctive reaction, therefore, when an area is declared a PA, especially a NP, is exclusion of humans from within its boundaries.

Almost invariably, the forests included in the PAs in less advanced countries also support local lifestyles and economies which are adversely impacted as a result of the mandatory acquisition of rights for creating a PA especially a NP. The legal process of creating a NP requires extinction of all, or most, private rights and privileges over notified lands. This, in essence, means wholesale relocation of human settlements falling within the bounds of such areas, or guarding the PA boundaries. This is commonly done by using force to curb access to resources within the reserves (Madhusudan 1998). This approach has come to be known as the “guns-and-guards” or the “fences and fines” approach (Wells et al. 1992, Guha 1998).

At the same time, the local communities are expected to bear the costs of losses to crops, livestock, or life (Madhusudan 1998). Forest- dependent communities are rarely compensated for these direct costs and loss of alternative sources. Over the decades, growing discontent with the way the PAs have been imposed with a total disregard for the people inhabiting these areas has led to increasing clashes and

⁴ Forest-dependent communities refer to people living in or within the immediate vicinity of forest tracts which constitute their main source of livelihood for subsistence as well as for income.

confrontations between people and Park managers. It has also led to acute human-wildlife conflicts especially in areas having large mammalian species of global importance (Saberwal et al. 1994). As a consequence, the PA approach is not as effective in protecting the wildlife over a long time as was previously envisaged. Possibly the single most important cause of failure to achieve an appropriate degree of nature conservation when establishing formal PAs is the absence of the involvement by local residents or users in the area in question (Caldecott 1992:v).

Mounting evidence of the adverse socio-economic impacts of conservation policies on local communities in less advanced countries has promoted criticism of existing conservation approaches and has led to a search for alternatives (West and Brechin 1991, Gadgil and Guha 1992, Caldecott 1992, Western et al 1994, Pimbert and Pretty 1995, Ghimire and Pimbert 1997). A shift has occurred from the dominant conservation paradigm of total exclusion and restriction on local human access and use of PA (Thapar 1999), favored by a majority of wildlife conservationists, to one that argues for the rights of and involvement of the resident people in PA management (Ghai 1994, Kothari 1996, McNeely 1996a, Blaikie and Jeanrenaud 1997, Guha 1998).

Although it is now widely recognized that the forests cannot be protected by antagonizing the people living in and around them, this fact is still often ignored in actual practice. The same officials who make this statement design and implement schemes that alienate the local people further (Dogra 1994). The emphasis frequently continues to be on the exclusion of people from PAs. Relocation is, however, an expensive process and one leading to a lot of resentment and discontentment (ibid. 1994). Local support is acknowledged to be a critical factor in successful management of PAs (Bashir 2000). The main underlying assumption is that local support or at least acceptance of conservation will be achieved if conservation is of net benefit, or at least involving low or no costs, to local communities (Runge 1992; Wells 1992). Strategies for generating local support include reducing or compensating conservation costs borne by local communities, and varying degrees of local participation in PA decision-making and management. In order to ensure people's participation, institutional agreements between the PA authorities and the people have to be instituted with built-in regulatory and monitoring mechanisms. Without some form of organization in which people accept a set of mutual responsibilities and monitor each other to be sure that these

responsibilities will be carried out, everyone will tend to wait for someone else to undertake the onerous task involved in maintaining the facility (in this case the PA) (Ostrom 1993:85). Unless people have a stake in the resource, they are not likely to participate in its conservation or judicious use. Current conservation trends tend to exclude local people from PA management. This leads to problems of exclusion and further exacerbate the difficulty of designing institutions that motivate individuals to make investments in maintenance activities (ibid. 1993). This would result in what Hardin (1968) refers to as the “tragedy of the commons”, leading to overgrazing, shrinking forests, and disappearing species (Oakerson 1992), thereby countering the very objectives for which the PA was formed in the first place.

1.2 The Indian scenario

To understand the complexities involved in biodiversity conservation, it was decided to undertake a study in a developing country where there are multiple demands on forest resources. India was chosen as the study area country as it is one of the mega-biodiversity countries of the world and at the same time a developing country with a heavy reliance on natural resources for its growth, with the majority of its population still living in rural areas and a large tribal population reliant on the very forests which have now been declared into PAs. It reflects the conflict between a country’s need to develop and at the same time the need to conserve the vitally important flora and fauna that ironically form the survival base for a large part of the rural population.

India occupies less than three percent of the world’s land area but its contribution to the world’s biodiversity is approximately eight percent of the total number of species [Khoshoo 1996 in Government of India (GOI) 2001a]. It ranks tenth in the world and fourth in Asia in plant diversity, and is tenth in the number of endemic species of higher vertebrates in the world (ibid.). The total forest cover of India is 637,293 square kilometers, which is 19.39 % of the geographical area of the country (GOI 2001 a).

India has adopted the same categories of PAs as those laid down by the IUCN, not considering whether the category specifications make their adoption viable in the Indian context or not. At present there are 586 PAs in India. The three categories of PAs found in India are NPs, wildlife sanctuaries (WS) and closed areas. Almost all PAs in

India fall in the former two categories that correspond with IUCN categories II and IV. In 1999, India had 89 NPs covering 4.06 million ha and 497 wildlife sanctuaries covering 11.54 million ha respectively. Together they cover 15.6 million ha or 4.75 % of the geographical area of the country (GOI 2001a)⁵.

Most PAs in India also support various forms of land use, such as agriculture, livestock grazing, and collection of minor forest produce (MFP)⁶. In wildlife sanctuaries having human habitation, certain types of rights and activities might be permitted at the discretion of the chief wildlife warden⁷ (CWW) if he feels that these activities are not detrimental for the wildlife. The NPs, too, contain human populations dependent on the natural resources to meet their subsistence and economic requirements. According to the IUCN definition of a NP, however, no human habitation is possible inside a NP. This contradiction between the concept of a PA and the reality has led to many problems and conflicts. A survey carried out in the mid-1980s by the Indian Institute of Public Administration, New Delhi, revealed that in more than 20 % of the 222 surveyed PAs, physical confrontation and clashes had occurred between the people and the Park managers over resource use (Saberwal et al. 2001).

Relocation is a highly unpopular, costly, and consequently, politically inexpedient and slow process, and has not yet been completed in most NPs and WSs in the country (Pabla 1997). It also faces several problems, including lack of adequate relocation sites and of funding for appropriate compensation. Forced relocation would not only be unfair to the people, but also stands in violation of the International Labor Office's convention 107 of 1957 to which India is a signatory, which prohibits forceful relocation of indigenous people from within the PAs (Krishnan 1996). In view of these difficulties, there is a need to acknowledge the fact that for the time being the people inside the PAs especially NPs are there to stay, maybe forever. Though some changes are taking place in official policies and acts to involve people in management of forests in the form of eco-development and Joint Protected Area Management (JPAM), eco-development has failed to provide a solution and overlooks the need for genuine participation of people living inside the NPs. JPAM is the latest in a series of attempts made by the FD to involve people in wildlife protection management (Section 7.3.1).

⁵ The category of closed area has rarely, if ever, been used.

⁶ Also referred to as non timber forest produce (NTFP).

⁷ The chief wildlife warden is the head of the wildlife division of the state.

Although JPAM was suggested in the 1990s, no working examples of this are visible so far.

Both the design of relocation packages that are acceptable to the people as well as the more realistic policy option of providing alternatives to resource utilization require- as a precondition- a detailed assessment of the current resource use by the people living within the PA. Very few studies have attempted such quantification of resource use by forest dependent communities in India (Berkmuller 1987, Dhaundiyal 1997, Bashir 2000). The study by Berkmuller looked at the resource dependence of people living on the periphery of Rajaji NP on the Park, the study by Dhaundiyal concentrated on people living on the periphery of the forest corridor between Rajaji and Corbett NPs, and the one by Bashir analyzed land-use conflicts in Wayanad sanctuary, Kerala, where scope for resource use by the resident human population exists. It was therefore decided to undertake a study in a NP, which by the prevailing conservation laws and policies should be free from human habitation and use but in reality has human habitation, and where the Park resources constitute the main source of subsistence and income generation for the inhabitants. The question is one of finding a balance between the conflicting interests between the local people and the conservation objectives and to come up with alternatives in which the people are not made worse off than they are at present.

1.3 Hypothesis and objectives of study

The main aim of the study is to gauge whether there is a need for resident people's participation in conservation and better management of the PA.

Focusing on the case of Bandhavgarh National Park (BNP), the study sets out to test the following hypotheses:

- 1) Park objectives are in direct conflict with the interest of the local people.
- 2) The nature of these conflicts differs with the official rights of the people, particularly with their land tenure type.
- 3) Access to alternative sources of income reduces pressure on the PA.

The main objectives of the study are:

- 1) To determine the current utilization of Park resources by local people.
- 2) To analyze the effect of the establishment of the Park on local people.
- 3) To analyze the impact of people's activities on Park resources and related management problems.
- 4) To determine strategies for conflict resolution.

More specific objectives are elaborated in the specific chapters to examine different aspects of people-park interaction.

1.4 Structure of dissertation

The methodology adopted in analyzing the topic under consideration is elaborated in Chapter 2. Chapter 3 presents more detailed information on the institutional background. It highlights some of the complexities of biodiversity conservation and discusses the major policies regarding conservation at the global, national, and local level. The primary and secondary data collected in this study are analyzed and discussed in chapters 4 to 6. Chapter 4 describes the current resource utilization by the people living inside the Park and the role of Park resources in household subsistence and income generation. Chapter 5 discusses the changes that the inclusion in the Park has entailed for the people in the form of restrictions, problems, costs and benefits. The management problems resulting from the presence of people within the Park boundary and the impact on the Park of people's continued resource utilization are described and analyzed in Chapter 6. Chapter 7 discusses possible solutions to the problems being faced by the people and the Park. Chapter 8 summarizes the main findings, derives policy recommendations, and points out areas for further research.

1.5 Relevance of study

This study attempted what very few studies have attempted so far, a quantification of resource use by people residing inside a PA in India. No known attempts have been made to do this kind of quantification inside a NP in India. It was thus decided to carry out such a study to highlight the complexities involved in resource utilization in a PA, which technically should be free from human habitation. Such an analysis is also a

prerequisite for the definition of appropriate compensation packages or the design of other, more suitable policies. A quantification of resource dependence is also essential to gauge the extent of dependence and the resulting resource pressure on the PA. Such information can prove to be vital to formulate management options at the PA level. The study also assessed the impact of PA formation on people, especially of those living inside the PA and the resulting changes in the relationship between people, the wildlife and the forest department as a result of the PA formation. It is critical to understand this aspect if conservation of wildlife in the long run is to be achieved.

2 METHODOLOGY

2.1 Introduction

This chapter provides the conceptual framework of the study, criteria for study area selection, different methodologies adopted for data collection, and sources of data collection. The emphasis of the study was on primary data collection. As it was not possible to collect all the required information using only one technique, different techniques were adopted. These ranged from focus group discussions and Participatory Rural Appraisal (PRA) to structured household and Forest Department (FD) questionnaires.

2.2 Conceptual framework

The conceptual framework underlying this study is illustrated in Figure 1.1. The concept behind forming a PA is one of wildlife conservation in its natural state for its propagation. Most often these PAs coincide with areas of forest used by local people⁸ for subsistence and economic utilization; by the paper and pulp industries as a source of raw material; and by the government as a source of income in the form of timber exports. In less advanced countries it is often difficult and most often impossible to exclude all uses of the PA resources (especially by the local people). The monetary and social costs involved in keeping the PAs aside exclusively for wildlife are high, both for governments and local people. The situation is complicated further by political and other vested interests, which divide the opinion regarding the fate of the local people and the PA.

⁸ The term is used to refer to both the resident human population of the PA and those living outside and dependent on the PA resources unless otherwise specified.

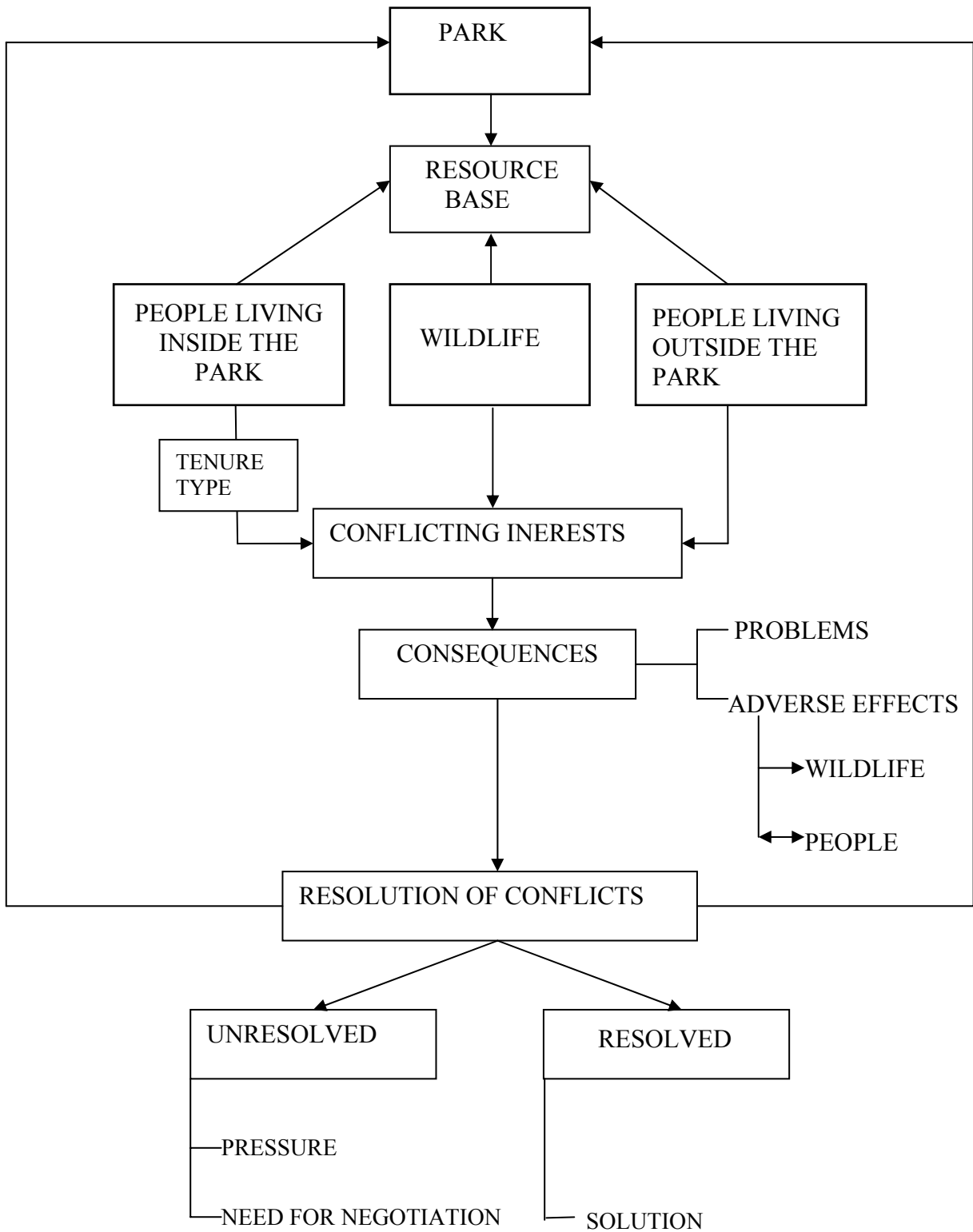


Figure 2.1: Framework of study

For the wildlife and the local people, the PA forms a resource base. For the wildlife the PA provides the only hope for their survival. The same applies to the people, too. People use the resources of the PA not only for subsistence but also for income generation. This resource use by the wildlife and people takes place in a confined space as the boundaries of the PA are fixed. As the resource base is fixed, there is overlapping resource use, whereby the resource use / activities of one have an impact on the other, more so in the case of the resource use by the people on the wildlife. As a result, conflicts on various fronts arise between wildlife and people, between people living inside the PA and those living on the periphery of the PA, and between people and the PA authorities, i.e., the FD.

The scale and intensity of the conflict between people and wildlife and with the Park authorities, of the internal villages, might differ depending on the tenure type, i.e., on people having different property rights in an area declared into a PA. Those who have no rights inside a declared or intended PA feel more insecure and their use of the PA resources is in direct violation of the PA rules. On the other hand, people having permanent assets inside the PA have rights over resource use but are also in conflict with PA authorities over resource use for income generation. Perceived differences in restrictions, problems and hence costs incurred due to the establishment of the PA can also vary according to the tenure type and hence affect people's reaction to the PA.

There is a direct conflict between people and wildlife over resource use but with the FD it is due to the curtailment of access to PA resources. There are differences in the degree to which the people with different tenure types react to the curtailment over resource use and also the degree to which they have been affected by the Park formation.

The consequences of conflicting interests manifest themselves in the form of problems and adverse effects for the wildlife and the people. For the wildlife this takes the form of competition with the livestock for forage, competition with the people for minor forest produce, disturbance through constant movement of people in the PA, danger of being poached, and other unintentional and intentional damages caused by the people as a result of their activities. For the people there are problems of crop damage, livestock lifting, possibility of human loss, restrictions on resource collection, effects on income levels, and relocation.

To vent their anger and frustrations against what they perceive to be an unjust attitude of the government, the people cause intentional damage to their own resource base. Antagonistic feelings towards the FD and the wildlife have arisen as a result of the formation of PAs. In some cases, the conflicts and resentment have reached a point where people are demanding de-notification of the PA. In the face of people's discontent, the purpose for which the PAs have been formed cannot be fulfilled. According to Ghimire and Pimbert (1997), the growing social conflicts with regard to the PA have meant that the PAs are unable to fulfill their conservation mandate. The PA authorities cannot ignore the people and their growing discontentment and resentment, hence giving rise to the need for conflict resolution.

In order to understand the complexity of wildlife conservation in the face of PA resource use, it was important to do an in-depth study in at least one PA. As these conflicts are more prominent in developing countries, it was decided to carry out the study in India (Section 1.2). The above-stated conceptual framework was applied to the case of Bandhavgarh National Park (BNP) to examine the kind of resource utilization of the PA by the people, the areas of conflicts, types of conflicts, resulting problems for the people and wildlife including the problems associated with the management of the PA, need for conflict resolution and possible solutions. Although different stakeholders are involved, including people living on the periphery of the Park, the study focuses on only two of the stakeholders, namely, the wildlife and the people inside the Park as they are more directly affected by the formation of the PA.

2.3 Research design

2.3.1 Research site

The following criteria were adopted for selecting the study area:

1) National Park (NP)

According to policy prescriptions, NPs or intended NPs should be areas devoid of human habitation, which in the case of India, most often they are not. It was felt that a NP would be most appropriate to bring out the complexity of the issues of resource utilization and resulting problems, both for the people and the management, as well as the problems and shortcomings of the policies and management of the PA system.

2) Resident human population

As the study looks at the impact of a PA on people living inside an existing or proposed PA, it was mandatory to select a site with people living inside.

3) Inclusion of both Revenue Villages (RVs) and Forest Villages (FVs).

A RV is a village in which people have full ownership rights over the land they live on and cultivate upon and a FV is a village in which people do not have rights over the land they live and cultivate upon except for user rights, i.e., people are issued a temporary lease by the forest department for cultivation but have no claim on the land they live on and cultivate.

This criterion was chosen based on the assumption that people with different ownership rights would differ with regard to the problems faced due to the inclusion in the NP, reaction towards restrictions faced, and attitude towards the Park.

BNP was chosen for the study as it was the only Park that fulfilled all the above outlined criteria. BNP was originally established in 1968 and its area extended further in 1982 (Section 3.6.2). It has a special significance as, together with Panpatha sanctuary, it forms part of the Bandhavgarh Tiger Reserve, which was declared in 1993 (Section 3.6.3) and currently has the highest number of tigers in the world.

2.3.2 Research methodology

On the basis of the preliminary visit, which was undertaken in September 2000, it was decided that a number of techniques were required for conducting the fieldwork. They include group discussions, Participatory Rural Appraisal (PRA) exercise and use of questionnaires. A fact sheet on the Park was also prepared to get a rapid overall impression about the Park and its management.

Participatory Rural Appraisal (PRA)

Focus group discussions

As the first step, focus group discussions were held in September 2000 with the villagers of two villages, one revenue and one forest village, both inside the Park. Along with this, a rough questionnaire was used in the revenue village, where specific

questions regarding the village, socio-economic status of people, park restriction and problems were asked.

Mapping

Two separate mapping exercises were carried out: one at the village level and one with the village based forest officials.

Mapping of villages with the help of the villagers was undertaken to have maximum village participation and also to explain the purpose of the study to a large number of villagers at one go. It also provided an opportunity to discuss the villagers' problems, possible solutions for their problems, demands from the forest department if any, type of resources extracted from the Park, approximate numbers of days spent in collection, changes in availability of resources over time, possible reasons for change, and changes since inclusion in the Park. Food habits of wild animals were also discussed to determine conflicts in resource use between wildlife and people. The type of information collected during the mapping exercises in the villages is listed in Appendix A1.

Mapping with the village-based forest officials was done to get a visual representation of damage caused by people and their activities. Information gathered pertained to: areas open for grazing, areas with illegal grazing, fire-prone areas, areas of wildlife richness, closed areas where maximum preliminary offence reports (POR)⁹ had been issued. The Park is divided into four parts (ranges) with no human habitation in the old Park area but villages in the other three ranges. For the mapping exercises, 15 officials from the rank of deputy forest ranger to beat guard¹⁰ in the three ranges were consulted when making compartment¹¹-wise range maps. Secondary information regarding type of offences, number of offences, name of area of offence, fines collected, courts cases registered, etc., were also collected for the last five years (1995 to 2000) from the Park headquarter and range offices.

⁹ If and when people are caught indulging in an illegal activity or if livestock is caught grazing in areas closed for grazing, the forest /beat guard who is the lowest official in the FD hierarchy issues a POR on the basis of which fines are collected or the case is registered in the court if fines are not paid.

¹⁰ The main positions in the hierarchy of the forest department in the Park from the highest to the lowest are: Conservator of forest, additional conservator of forest, range officer, deputy ranger, and forest/beat guard.

¹¹ Each range is divided into circles, which are further divided into beats. A beat comprises of several compartments.

Survey

A detailed survey of households and FD representatives was conducted to solicit more dis-aggregate information. For both households and FD surveys, questionnaires were used. The two surveys were meant to compliment each other and also to establish whether the FD can carry out the role of managing the PA on their own or whether people's participation is a must. Both the questionnaires highlight the problems and restrictions of the people and of the FD for determining the ground realities of PA management.

Household survey

The type of information collected through the use of the household questionnaire included:

- 1) Type and extent of different activities undertaken for subsistence and income generation by the household
- 2) Resource utilization in the Park
- 3) Changes since inclusion in Park
- 4) Perception about FD and its role in PA management
- 5) Attitude towards the Park

The questionnaire was refined in the course of a pilot study, which was carried out in Mehanwah village (revenue village) and covered the entire village (25 households). Interviews were carried out in Hindi in both the pilot study and the actual survey. Enumerators were trained by the author during the course of the pilot study. Each enumerator was accompanied by the author the first day and interviews were carried out by the enumerators thereafter.

General approach for household survey

The household was identified as the most suitable sampling unit as this was the most coherent unit of economic production and social organization in the study area. The notion of individual share existed even where joint land ownership and cultivation was

practiced by some families (Bashir 2000). For the purpose of the survey, a household was defined as a group of people sharing one kitchen.

Preliminary research work was undertaken from September-December 2000 in order to prepare the household questionnaires. This included general discussions with villagers and in-depth interviews with key informants to establish the farming practices, local terms of measurements, and harvesting time of different crops and MFPs. The latter was important as it indicated the most suitable time to conduct the survey (Bashir 2000).

Sampling method

Sampling was done based on caste distribution of the villages¹². As there were no obvious differences among the households on the basis of their socio-economic status, division of the Park population on the basis of caste was the best criteria for sample selection. Accordingly, mapping used for familiarization with the layout of the village was marked out on the basis of different castes. This was done because, before the survey was undertaken, caste-wise breakup of the population was not present. Thus the community composition of all households in the Park has also been established as a result of the survey.

Sample size

The total sample size is 155 households (31 %) of a total of 503 households in the Park (six villages and one illegal settlement). In each village, either 25 % of the village households or a minimum of 15 households, whichever was greater, were sampled.

Sampling technique

A two-stage strategy was adopted for conducting the household survey. In the initial phase, the village households were divided on the basis of caste (Table 2.1). For the

¹² The Park population comprises schedule tribes, schedule castes and other backward classes. Though the baigas and gonds belong to the schedule tribe, in the thesis they are treated separately as groups, i.e., castes, for the purpose of distinguishing them for the survey. The same is the case with people belonging to the schedule caste.

village as a whole, 25 % of the households were selected from different castes. In the second phase, 25 % from each caste was selected and randomly sampled¹³.

Table 2.1: Caste wise distribution of the Park and sample population¹⁴

Caste	Total no. of households	Percentage Park Population	Caste-wise distribution of the sample	Percentage total sample size
Baiga	220	434	59	38
Gond	108	21	36	23
Yadav	133	26	46	30
Chamar (Tanners)	3	1	4	3
Blacksmith	4	1	1	3
Other Castes	40	8	9	6
Total Households	503	100	155	100

For the survey, every alternate household was decided upon. If no one was present in the house, then the house next to it was surveyed and then the alternate household. The maps drawn during the mapping exercise were reduced to an A4 size and distributed to the enumerators with the houses to be surveyed and the ones already surveyed clearly marked daily¹⁵.

Post-survey discussions were conducted to check for response consistency. Questionnaires were rechecked at the end of the day. Doubts and queries arising from them were noted and clarified the next day. After the completion of all surveys in one village, a day was devoted to double-checking all queries and doubts.

The detailed household survey was undertaken from February to May 2001. February was decided upon because people tend to be relatively free in this month as there is a lull in agricultural activities from February until after the monsoons. All the information gathered concerning various income generating activities and crop productivity was collected for the year ending in December 2000.

¹³ However, castes having only one or two households were deliberately included in the sample. In most cases, these castes consisted of blacksmiths or potters, and as their dependence on the Park resources was perceived to be different from the others it was important to include them in the sample.

¹⁴ All the tables presented in the thesis are based on primary data collected during the filed survey conducted between September 2000-November 2001 unless otherwise stated.

¹⁵ Where there was more than one household in one house, only one was surveyed. This posed a difficulty as at times, all households in that house wanted to be surveyed. In some cases where it could not be avoided, the additional survey was conducted but not included in the final sample.

FD survey

The aim of the FD surveys was to get a detailed picture of the role of the FD in PA management, their responsibilities, success, problems and restrictions in managing the PA. Two different questionnaires were used for the FD survey: one for the higher-ranking officials [including, director, deputy director, additional conservator of forest (ACF) and rangers] and the other for the field (village) based staff (deputy rangers and beat guards). The main difference between the two surveys being the field-based staff survey had more specific village-related questions and was structured to cross-check and verify as much of the information given by the households as possible. Questionnaires for higher-ranking officials had questions related to research and monitoring including usefulness of past research on the Park and consultation in policy formulation. All the village-based staff (12 interviews) and 5 of the higher officials including the Director and Deputy director of the Park were interviewed¹⁶.

2.4 Secondary data sources

Besides the primary data collection, secondary data was also collected from the Park office, territorial forest division¹⁷ and Census of India. Extensive literature was collected from various institutes and organizations such as the Wildlife Institute of India, State Forest Research Institute and World Wildlife Fund for Nature-India.

Data was collected pertaining to previous research done on BNP, conservation policies and laws prevailing in the country, wildlife census, population census, livestock census, and documents related to declaration of the Park, area and extent of the Park.

2.5 Analysis

Analysis of the qualitative and quantitative data gathered in the field is discussed in chapter's 4-6. Sample data was primarily analyzed by village type. Various statistical methods were used for testing differences among village types, these are discussed where appropriate.

¹⁶ Three higher-ranking officials (two rangers and one ACF of the Park) could not be interviewed as repeated attempts at getting them to agree on a time and date failed.

¹⁷ The forest department in India is divided into two parts/ divisions, the territorial division which deals with commercial exploitation and revenue generation from all forests lying outside the PAs, and the wildlife division, which deals with and looks after the PAs in the country.

3 GLOBAL AND INDIAN CONSERVATION POLICIES AND THE HISTORY OF BANDHAVGARH NATIONAL PARK

3.1 Introduction

To safeguard the wildlife and ensure the long-term viability of the PAs, policies and legal acts have been issued in different countries according to national priorities and type of PAs present in the country. Most of them fail to take into account the resource utilization by people living in and around these PAs and lack mechanisms for coping with resource use by people and wildlife protection simultaneously. The chapter provides the global and Indian context of PAs; various forest legislations, their applicability and relevance for people's involvement in protected area management. It looks at the conservation history of Madhya Pradesh and sets the context for the case study dealt with in the thesis. The objectives of this chapter are the following:

- To describe the global and Indian context of PAs,
- To summarize various legislations pertaining to PAs in India,
- To examine the applicability and relevance of the legislations for people's involvement in protected area management,
- To look at the conservation history of Madhya Pradesh and set the context for the case study dealt with in the thesis.

3.2 Protected area network

3.2.1 Protected Areas in the Global Context

The concept of PAs emerged only about a century ago and since has spread widely around the world. The consciousness to conserve and protect wildlife and biological diversity through vigorous legal support emerged first at the international level among the developed countries at the beginning of the 20th century when these countries advocated the perusal of conservation of wildlife and biological diversity as a national priority. Various international bodies such as the IUCN were formed to operationalize this advocacy while a number of other existing bodies included conservation in their agenda (PRIA and RLEK 1993).

All countries having a network of PAs have adopted some or all categories of PAs as proposed by IUCN, and follow the same guidelines (Section 1.1). Since the 1970s, there has been a large increase in the number of PAs throughout the world. By 2000, there were more than 30,000 PAs covering 13,250,00 sq. km (IUCN 2002) or approximately 9 % of the world's land surface with 46 % of the PAs falling in the strictly protected categories (Green and Paine 1997 in Bashir 2000). While high-income countries have over twice as many PAs as developing countries, the latter contain nearly 58 % of the global PAs (Bashir 2000:2.12).

Some countries have taken advantage of the current definitions of PA by declaring PAs as falling in categories I (strict nature reserves) and II (national parks) (Section 1.1), using this as an excuse to evict local inhabitants from the PA or to stop people from using the PA resources (Chaudhury 1993) as in the case of Kanha NP in India where inside villages were forcefully evicted. Since most less-advanced countries such as India, have most PAs falling in category II and IV (NPs and wildlife sanctuaries), this has proved to be a point of contention between forest-dependent communities and governments.

The last two decades of the 20th century have seen a policy shift from one of strict preservation to 'sustainable use of biodiversity' largely as a means of developing greater support for conservation (McNeely 1989; UNEP 1995). The realization that natural systems are more dynamic than previously realized has also promoted policy shift in part. Major new insight into the relationship between humans and their natural environment has revealed that there are few, if any, genuine 'pristine' terrestrial areas and some of the areas valued by conservationists are at least partly the product of direct and indirect human manipulations (Homewood and Rodgers 1991; Gomez-Pompa and Kaus 1992 in Bashir 2000).

3.2.2 Protected areas in India

India is one of the 12 mega -biodiversity countries of the world, containing 81,000 animal species and 46,000 plant species in the 70 % of the area of the country surveyed till now [GOI 2001b; Ministry of Environment and Forest (MoEF) 2002].

In keeping with the changing attitudes towards forest protection in the world in the 1970s, India too launched its own program for protection of wildlife and forest.

Under the provision of the Wildlife Protection Act of 1972, two types of PAs can be established in the country, namely NPs and wildlife sanctuaries (Bhatt and Kothari 1997). National Parks are given the highest degree of protection, with virtually no human activity barring passage, management work and tourism being allowed by law. According to the Wildlife Protection Act (WLPA), 1972:

“...(i) No alteration of the boundaries of a NP shall be made except on a resolution passed by the legislation of the state, (ii) no persons shall destroy, exploit, or remove any wildlife from a NP, or destroy or damage the habitat of any wild animal, or deprive any wild animal of its habitat within such NP except under and in accordance with a permit granted by the Chief Government, being satisfied that such destruction, exploitation, or removal of wildlife from the NP is necessary for the improvement and better management of wildlife therein, authorizes the issue of such permit, (iii) no grazing of any livestock shall be permitted in a NP and no livestock shall be allowed to enter therein except where such livestock is used as a vehicle by a person authorized to enter such NP” (Kothari et al. 1997).

Wildlife sanctuaries have a somewhat lesser degree of legal protection than NPs. Points (i) and (ii) of the WLPA which are applicable to NPs are also applicable to sanctuaries, the difference being that certain activities might be permitted such as livestock grazing and collection of forest produce in sanctuaries (Kothari et al. 1997).

Enactment of the Wildlife Protection Act (WLPA) in 1972 accelerated the rate of PA formation in the country. The act gives control over PAs exclusively to the Chief Wildlife Warden (Section 33 and 35 (6)) and provides no scope for formal joint management with local communities (Kothari et al. 1996). Hence the legal definition is in accordance with the conventional image of PAs as pristine natural habitats, despite the fact that the reality in India is quite different. To adhere to this image, villagers have been evicted from a number of PAs in the last century especially from high profile areas such as tiger reserves and NPs, and in others, use by local communities has been prohibited or severely curtailed (Chaudhury 1993). According to a survey of 222 PAs in India carried out in the mid 1980s, however, majority of the PAs had human settlements and resource use activities inside them (Kothari et al. 1989). Of the PAs surveyed, 69 %

had larger than three million people living inside them and 64 % had community rights and leases or concessions inside them (ibid. 989). In a majority of the PAs, physical displacement of people had *not* taken place. These PAs have become places of conflict now, as contrary to legal requirements, no resource extraction should take place inside the PAs.

3.3 Forest legislation¹⁸

The Indian Forest Act of 1927, the Wildlife (Protection) Act (WLPA) of 1972 and the Forest Conservation Act of 1980 are the three most important forest- and wildlife-related legislations in India.

The Indian Forest Act of 1927 (currently under revision) provides for the management of forest resources and legislates uniformity of forest law in the country. Supplementary forest legislation has been enacted by some states (FAO 2002). Under this act, forests were categorized into reserve forest (RF) and protected forests (PF). In the RF, no rights are allowed and in the PF everything is allowed unless specifically forbidden.

The entire thrust of forestry in the country during the first four decades after independence (1947) was towards the production of a uniform industrial cropping system, created after clear-felling and cutting back of all growth, except of the species chosen for dominance. Far more emphasis was placed on plantation rather than on management of existing trees. Both the legislation and policy continued to reinforce the primacy of timber for commercial purposes (Saxena 1999). The policy makers looked upon the people as a liability, which led to increased rural poverty and unemployment on the one hand, and social unrest and conflict on the other.

The WLPA of 1972 laid the legal framework for the establishment and management of PAs in India. The act, which has since been adopted by all states and union territories [except for the states of Jammu and Kashmir, which has a special status under the Indian constitution (Bashir 2000)], provides the necessary uniform legislation for the establishment of PAs in the country. Provisions of the act include constitution of state wildlife advisory boards and the notification of PAs (FAO 2002). Before the

¹⁸ The main forest legislations of the country are summarized in Appendix A2.

enactment of the WLPA, some states had their own wildlife legislation (Kothari et al. 1997).

In 1983, the Government of India decided that rational planning and implementation of a comprehensive network of PAs would be the keystone of the National Wildlife Action Plan (NWAP) (Rodgers 2000). Drawing on the World Conservation Strategy launched by IUCN in March 1980, the Bali Action Plan arising from the 3rd World Parks Congress in October 1982, and the World Charter for Nature proclaimed by the United Nations General Assembly in October 1982, the NWAP was adopted by the government of India in October 1983 on the recommendation of the Indian Board of Wildlife (IBWL). Objectives of the NWAP included the establishment of a representative network of PAs and development of appropriate management systems (together with the restoration of degraded habitats), and the adoption of a National Conservation Strategy, which is now being formulated (FAO 2002).

The Forest Policy (1988), which superseded the 1952 Forest Policy, had more people-oriented statements and had tried to remove many anti-people views of earlier policy statements. While the 1952 policy stressed the need of industry and defense as the paramount concern of the country, the 1988 policy was a complete reversal. Commercial interests were no longer a major concern and the focus shifted from earning revenue from forests, to ensuring environmental stability and maintenance of ecological balance (Saxena 1997). However, exclusive State ownership of forests was retained. The policy also created a contradiction between national and people's needs by emphasizing subordination of both to environmental stability.

The National Forestry Action Program (NFAP), a strategic long-term plan for the next twenty years to address the issues underlying the major problems of the forestry sector was undertaken in line with the National Forest Policy, 1988. The objective of the NFAP is to bring one third of the areas of the country under forest and arrest deforestation in order to achieve the development of forests (MoEF 2002).

The Wildlife Protection Act (WLPA), 1972, was amended in 1991 with the aim of further strengthening wildlife conservation; however it was silent on the aspect of joint management of PAs. Up to 1991, no PA could be established before existing rights of the people had been identified, acquired and extinguished by the government and compensation provided. Since 1991, rights in sanctuaries may be admitted or

rejected at the discretion of the District collector and the CWW (Bashir 2000). The WLPA also contained elaborate procedures for dealing with legal rights in proposed PAs (Section 19-26) but did not mention anything about leases or concessions that people had within these PAs. The act was also silent on the issue of rights and concessions of people in proposed NPs. The WLPA further increased the hardship of the local communities by including a new clause (Section 29), which rendered all activities not beneficial to wildlife as prohibited in a PA. This compounds the problem further and makes the task of people's participation in PA management even more difficult if not impossible. Since the underlying assumption continues to be that human use of PAs must necessarily be destructive. Since then there has been a move by the state governments to ban the collection of minor forest produce (MFP) from PAs. In Madhya Pradesh (MP), a ban on MFP collection in all PAs was imposed in 1994, but the resulting uproar caused the chief minister of the state to revoke the ban (Kothari et al. 1996).

There are no laws and policies that deal exclusively with PAs in the country, although a draft Biological Diversity Bill is currently in process (Bashir 2000:3.2). The main aim of the legislation is to regulate access to biological resources and to ensure equitable sharing of benefits arising from their use (MoEF 2002).

Like the biodiversity bill, a new Forest Bill to replace the Forest Act 1927, is also proposed. However, serious reservations regarding the bill have been raised as the voice of the common people and the local communities have been ignored. The law deviates from the policy statement of 1988 on forests, which recognizes the central role of people in the conservation, restoration and management of forests and which seeks to reinstate the symbiotic relationship between people and forests (Jena 1995). If the proposed Forest bill is accepted then whatever little progress has been made to involve local people in forest management would be negated.

The National Wildlife Action Plan (NWAP) of 1983 has been revised for the period 2002-2016. The plan outlines the strategies, action points and the priority projects for conservation of the wild fauna and flora in the country (MoEF 2002).

3.4 Other conservation initiatives

Besides the two categories of PAs in India, other conservation efforts have been made in the country for the conservation of wildlife, including Project Tiger, biosphere reserves, and Eco-development projects.

Project Tiger

Project Tiger was launched in India in 1973. It is a "one-of-a-kind" project as it attempts to save an individual species- the tiger. The philosophy behind the project is that:

“The Tiger cannot be preserved in isolation. It is the apex of a large and complex biotype. Its habitat, threatened by human intrusion, commercial forestry and cattle grazing, must be made inviolate” (Kothari et al. 1997).

Areas designated as tiger reserves are designed on the basis of zones. The ‘core zone’ is free of almost all human activities, and a ‘buffer zone’ where restricted human land use is allowed. The reserves in themselves are not a legal entity, but they all contain NPs or sanctuaries as their core and in some cases their buffer zones (ibid.).

At present, there are 27 tiger reserves in the country, spread over 24 states, covering an area of 37761 sq. km. The government is planning on declaring an additional six tiger reserves in the near future (MoEF 2002).

Biosphere reserves

In accordance with the Man and Biosphere program of UNESCO, 13 biosphere reserves have been created in India with a total area of 50950.89 sq. km (MoEF 2002). The first to be formed was the Nilgiri Biosphere reserve in 1986. Of the 13 biosphere reserves only three have so far been included in the world network of biosphere reserves (MoEF 2002). As in the case of the tiger reserves, biosphere reserves also do not have a legal identity.

Special areas for eco-development

The task force set up in 1983 on the recommendation of the Indian Board of Wildlife (IBWL) to look at practical strategies for eliciting public support for wildlife

conservation recommended the adoption of a core-buffer-multiple-use-area zonation for each PA (IBWL 1983 in Kothari et al. 1997). However, the concept has never been officially or legally implemented (Kothari et al. 1997).

National Policy and Action Strategy on Biological Diversity (NBSAP)

India became party to the International Convention on Biological Diversity in May 1994. The main objectives of the convention are i) conservation of biological diversity, ii) sustainable use of components of biological diversity, and iii) fair and equitable sharing of benefits arising out of the utilization of genetic resources. The scheme was initiated in 1991-92 to ensure co-ordination among various agencies dealing with issues relating to conservation of biodiversity and to review, monitor and evolve adequate policy instruments for the same. The policy on biodiversity conservation is in the form of a macro-level statement of strategies, gaps and further actions needed for conservation, and is known as the NBSAP (MoEF 2002).

3.4.1 Policies and programs addressing the issue of people's participation in forest management

The growing realization of the dependence of people on the forest resources and of the difficulties and unfairness of relocating people from PAs has led to policy change, especially during the late 1980s which has seen a move towards involving people in PA management.

Eco-development

Eco-development was launched as a centrally sponsored scheme in the 1990s. The idea behind it was to reduce the dependence of communities living in areas surrounding PAs on the PA. The scheme was initiated through site-specific village-level planning to achieve sustainable development of village resources, alternatives to fuel, fodder and timber and schemes to provide job alternatives to individuals and families in order to eradicate forest-dependent livelihood patterns and ensure people's active participation in protection of PA resources (MPFD 2002).

Joint Protected Area Management (JPAM)

JPAM is defined as:

“JPAM is the management of PAs and their surrounds with the objective of conserving natural ecosystems and their wildlife, as well as the livelihood security of local traditional communities, through legal and institutional mechanisms, which ensure an equal partnership between these communities and government agencies” (Kothari et al. 1996).

JPAM has greater chances of success when undertaken along with eco-development programs. Broadly speaking, JPAM is a people-government, joint-resources management system in NPs, WS, community/ *panchayat*'s¹⁹ resources, revenue land and private resources (ibid.).

3.5 Conservation in Madhya Pradesh

The state of Madhya Pradesh (MP) came into existence in 1956 as an amalgamation of different, mostly princely states that had their own forestry rules and practices in the past. In the year 2000, the state was divided into two states, namely, MP and Chattisgarh, which lies to the east and south east of MP. Of the 61 districts, 45 are in MP and the remaining 16 districts have gone to the state of Chattisgarh. MP now covers an area of 308,000 sq. km [Government of Madhya Pradesh (GOMP) 2002] with a forest cover of 95000 sq. km (World Bank 2001), i.e., 31 % of the present state area. It is amongst the most forested states in the country and accounts for 21 % of India's forest cover (WWF 2002). Approximately 23 % of the country's tribal population live in MP, which constitutes 20 % of the total population of the state. According to GOMP, 13.8 million tribals live in or within 5 km. of forests in MP (GOMP 2002). Thus MP has one of the largest tribal populations dependent on the forest resources for meeting their subsistence and economic requirements in the country (World Bank 2001).

¹⁹ Panchayat is the lowest body of governance in the country at the village level.

3.5.1 Protected Area network in Madhya Pradesh

For the conservation of wildlife, MP has set up a network of PAs under the provisions of the WLPA, 1972. The state government framed the Wildlife (Protection) Rules in 1974. MP at present has nine NPs and 25 WSs spread over an area of 10,855.55 sq. km. They constitute 11 % of the total forest area and 4 % of the geographical area of the state. The state government is making efforts to increase the PA network to cover 15 % of the forest or 5 % of the geographical area of the state as suggested by the State Wildlife Board [Madhya Pradesh Forest Department (MPFD) 2002]. MP has two advisory bodies for the management and conservation of wildlife and biodiversity in the state: (i) State Wildlife Advisory Board, headed by the forest minister of the state. Its main role is to advise the state government on wildlife conservation matters, and (ii) Madhya Pradesh Biodiversity Board, constituted in 2000 to advise the state government on future strategy for conservation and sustainable utilization of biodiversity. The Board is headed by the chief minister and members of various committees (MPFD 2002).

Conservation of biodiversity in forests outside the PA network in the state

Besides NPs and WSs, MP also has some other categories of conservation areas, namely, tiger reserves and biosphere reserves.

Madhya Pradesh is known as the tiger state of the country as it harbors 19 % of India's and 17 % of the world's tiger population (MPFD 2002). Under “Project Tiger”, MP has five tiger reserves: Kanha, Panna, Bandhavgarh, Pench and Satpura. Kanha NP was one of the first nine PAs selected under Project Tiger in the country in the 1970s.

Pachmarhi was constituted as a Biosphere Reserve in 1999 by the Government of India on the basis of a project document prepared by Environmental Planning and Coordination Organization (EPCO), an autonomous body under the Department of Housing and Environment, GOMP.

External aid for wildlife conservation

MP has some externally aided projects for involving people in forest protection, similar to that at the national level.

Madhya Pradesh forestry project

Under the biodiversity conservation component of a World Bank aided project (1995-2000), 24 priority PAs in the state were selected for improving their management through scientific management plans, habitat improvement, staff training, provision of enhanced protection infrastructure, and research and monitoring. In villages in and around PAs, 502 eco-development committees were constituted under this Project (MPFD 2002).

India Eco-development Project

Pench Tiger Reserve was selected under the India Eco-development project, funded by the Global Environmental facility in 1996 (MPFD 2002). About six other PAs have started eco-development under this project.

A separate World Bank sponsored eco-development project was initiated in the 1990s around a few other PAs in the country. As per government order of GOMP of February 2000, eco-development zones were to be constituted in a 5 km radius from the periphery of the PA along with some more villages, which are more than 5 km from the periphery but still dependent on the PA (Pushkar 2001) in the state. Information pertaining to the extent to which this has been achieved is not known.

3.6 History of Bandhavgarh National Park

3.6.1 Location

Bandhavgarh National Park (BNP) lies between 23° 30' 12" and 23° 45' 45" N latitude and 80° 47' 15" and 81° 11' 45" E longitude, covering an area of 448.84 sq. km (Map 1²⁰). Prior to 2000, BNP lay in the Shahdol and Jabalpur districts, but after the reorganization of the districts in 2000, following the division of MP state in two parts, it now lies in the districts of Umaria and Katni (Gopal *pers. comm.*). It is surrounded on all sides by the Umaria forest division, but for a short stretch in the east along the Johila river it forms the boundary of the new North Shahdol forest division (Pushkar 2001).

²⁰ All maps are attached at the end of the thesis.

3.6.2 Legal status

BNP (105 sq.km) was declared in 1965 and notified as a Park on 23 March 1968 under the MP National Park Act 1955 (No. VII of 1955) through MPFD Notification No. 2977/X/68. The extension area (343.84 sq. km) was included under Section 35(i) of the Wild Life (Protection) Act 1972 (53 to 1972) vide MPFD Notification No. 14/2/82/X/2 Bhopal dated 11 May 1982 (Sonakia 1993) (Map 2). Final notification of the Park has not yet been released. BNP along with the adjoining Panpatha sanctuary acquired the status of a tiger reserve in 1993. The tiger reserve along with the 5 km buffer zone covers an area of 1161.471 sq. km (Map 3) (Pushkar 2001).

3.6.3 Significance of Bandhavgarh National Park (BNP)

Floristically BNP forms part of the Indo-Malayan Realm, and zoo-geographically is a member of the Oriental Region. According to biogeographic classification it lies in Zone 6E-Deccan Peninsula, Central Highlands, having moist deciduous forests mainly of Sal (*Shorea robusta*). According to Champion and Seth's classification of forest type in India (1968), the Park is in the forest Group 3 (tropical moist deciduous forests), sub-group 3C (North Indian moist deciduous forests- 3C (C2a- moist peninsular low level Sal, 3C/C3a- West Gangetic moist mixed deciduous forests). It supports 37 species of mammals, 72 species of butterflies, more than 250 species of avifauna, a wide range of invertebrates and reptiles and a rich flora including medicinal plants (Pushkar 2001). The white tiger now found in different parts of the world originated from BNP.

The Park is also of geological and geomorphological importance as it forms the catchment of several perennial rivers. Because of the porous nature of the feldspathic sandstone, on which the Park developed, the rainwater is absorbed and then released through springs throughout the year feeding numerous rivers. Five of these originate in the Park. River Son, which flows adjacent to the northern boundary of the Park, also benefits from its catchment capability (Pushkar 2001).

3.6.4 History of the Park

BNP takes its name from the Bandhavgarh Fort, which lies inside the Park (FDD #1²¹ undated). The area has been mentioned in recorded history from about 300 A.D onward. Passing into the hands of different dynasties, it was finally part of the Rewa state until Indian independence in 1947 (ibid.).

The area enjoyed considerable protection during the Baghel dynasty (Sonakia 1993). The Park and the proposed extended area formed part of the “Shikargarh” (hunting ground) of the ex ruler of Rewa (Pushkar 2001). It was kept as an exclusive “Shikargarh” for the royal family and was free from hunting and disturbance by others. Shooting was practiced only for the sake of game and sports. Tiger shooting was done only by the members of the royal family. Shooting of wild animals by persons other than the rulers was limited to “*Ilakedars*”²² and a few other persons. Those possessing crop protection guns did not do any shooting inside the forests. Blank cartridges and crackers, however, could be used for crop protection in the field, which were within the Shikargarh (Sonakia 1993).

The old Park was declared reserved forest under the “Kaunan Jungle, Riyasat Rewa Act,” 1927, and restrictions on felling of certain species were imposed. Palas²³ cutting rules (1926) were enforced in the interest of lac cultivation. Hunting, shooting, poisoning water, setting traps and snares was regulated in reserved forests and “*Aam*”²⁴ Jungle” under “Kaunan Jungle, Riyasat Rewa”. *Shikar*²⁵ rules were framed under “the *nistar*”²⁶, grazing and other rules relating to reserved forests and *Aam* Jungles” in 1930. Consequently, the shooting or killing of tiger, leopard and gaur (bison) was prohibited throughout the Rewa State in 1930. In other reserved forests, shooting and hunting was permitted only with the authority of the Divisional Forest Officer. For crop protection, the wild animals could be shot except during April to June every year. In “*Aam* Jungle”, Rewa residents were allowed to hunt and shoot without any official permission (Sonakia 1993).

²¹ All documents collected from the BNP authorities are referred to as Forest department documents (FDD #1-10) where # refers to the number of the document.

²² Person in charge of the area.

²³ Palas is a bush or tree from which lac, a gum used in industrial processes is extracted.

²⁴ Forests other than reserved forest.

²⁵ Hunting.

²⁶ Requirements of villagers of forest produce is referred to as *nistar* (ref. Government of Madhya Pradesh 1998). The word extraction is henceforth used to denote *nistar* in the thesis unless otherwise stated.

In 1947, Rewa State was merged with Vindhya Pradesh and new regulations were enforced from October 1950. The Madhya Pradesh Game Rules of 1962 and the MP Forest Rules of 1962²⁷ were subsequently enforced.

3.6.5 Conservation in Bandhavgarh

Being the private hunting reserve of the former ruler of Rewa, the Park was well protected against people. The settlements inside the Park remained while it was still a hunting reserve, but there were strict rules regarding hunting. With the declaration of the Park in 1968, the settlements were relocated and the Park closed to any human activity from the surrounding villages.

Because of the protection of the area, the fauna there increased to the extent that it became necessary to increase the size of the Park in 1982. The 'extension' area is tribal with a heavy dependence of people on the Park resources for subsistence and economic use. Before inclusion of the extension area in the Park, plantation felling took place, which provided a large number of people with employment. Once the intention was declared to include the area in the Park boundary, plantation felling was stopped, thus depriving people of employment opportunities.

Besides curtailment of regular employment opportunities, extension of the Park area has led to other forms of hardship for the people. Under the Park rules, people can only collect minor forest produce (MFP) for self-consumption. Cutting of trees, green bamboo, collection of fallen logs for house repair and construction, sale of MFP and fuelwood have all been rendered illegal.

3.6.6 Park management and objectives

Management prior to 1968

Even prior to its declaration as a National Park in 1968, the old Park area (Tala range) being the private hunting reserve was well protected (Sec. 3.3.4). The extension areas of the Park were managed under separate forest divisions, Jabalpur and Shadol. Forests in the two southern ranges (Magdi and Kallwah, 220.38 sq. km) were worked according to the ten-year working plans of the FD. While it is not clear from the old working plans whether forest workings took place in the northern extension area (Khitauli range,

²⁷ The MP forest rules of 1962 laid out rules regarding hunting, shooting, fishing, poisoning water and setting traps and snares in reserved and protected forests.

118.72 sq. km), it may be assumed that it was governed by the same rules and regulations as the southern extension area, because all areas formed part of the erstwhile Rewa state. After reorganization of the state in 1956, the forests of the division continued to be felled to meet the commercial demands. Felling of the forest was under the control of the local forest officers, resulting in over felling in the area (Naidu 1967). The first working plan of the division was prepared in 1960 (Dixit 1972). Bamboo working took place in the southern extension of the Park from 1956-57 to 1967-68 by the M/s Orient paper mills, Amlai, and regular forest workings of other commercially important species such as sal (*Shorea robusta*) and teak (*Tectona grandis*) continued till 1982 (Sec. 3.3.4). Emphasis continued to be on commercial exploitation of forests for maximum revenue generation. Scientific management of the forests was only introduced in 1967.

Management since 1968

After the declaration of the old Park area as a NP in 1968, the first management plan for this area for a period of 10 years (1972-73 to 1981-82) was written in 1972. The management objectives stated therein (Dixit 1972) were:

- 1) to conserve and improve wild animals,
- 2) to preserve the scenic effect, natural and historical monuments of national significance,
- 3) to provide recreation facilities to visitors, and
- 4) to carry out studies on wildlife and various factors related to its scientific management.

In order to fulfill the objectives, the plan prescribed the management of the Park in six working circles:

- i) **Vegetation:** Conservation and maintenance of Park vegetation to provide food and shelter for the wildlife and also to preserve vegetation for scientific, regenerational, scenic and aesthetic purposes;

- ii) Wild animals: Proper management of habitat by improving the availability of food and water supply for the wild animals, study the predator-prey relationship, conduct census operations, keep a check on grazing by domestic animals, multiply and introduce wild animals;
- iii) Recreation: Provision of accommodation facilities, construction of roads and paths in the Park area, provision of vehicles, elephants, hideouts, watchtowers, etc.;
- iv) Construction and maintenance of infrastructure facilities;
- v) Administrative: Putting the Park under a separate management and provision of suitably trained staff; and
- vi) Miscellaneous: Protection of wild animals, vegetation and other assets of the Park, relocation of the village, possible future extension of the Park, and publicity and information. It also recommended formation of a buffer zone around the Park to keep the Park free from biotic pressure.

It is not clear whether the objectives in the 1972 plan have ever been achieved, as no documentation was available. The overall objectives of the plan appear to be geared more towards tourism than wildlife protection. No scientific studies (objective 4) were carried out during the plan period. Zoning was not formally introduced until 1993. In addition, although the plan spelled out the strategies for achieving the Park objectives it did not specify the activities needed for carrying them out nor were any measurable indicators of progress indicated.

With the intention to include the forests in the extension area of the Park, all forestry operations were stopped in 1982. The extension area is now under the managing authority of the Park director but still falls under two different forest divisions. The second management plan of the Park was not written until 1992. Therefore, between 1983 (the end of the first management plan period) and 1992, the Park was managed according to the annual plan of operations (APO). The APOs prepared every year by the Park authorities give a detailed account of activities to be carried out in the Park for the current year. The second management plan for the Park emphasizes the gradual reduction and elimination of factors detrimental to nature conservation (but does not specify the factors explicitly) and on accelerating development based on sound ecological principles (does not specify development of

what and for whom). The plan specifies the following main objectives of the Park (Sonakia 1993):

- 1) to maintain essential ecological processes and life support systems in and around the BNP area,
- 2) to scientifically manage this important and significant bio-geographic subdivision,
- 3) to preserve the genetic diversity present in BNP,
- 4) to develop an appropriate management system specific to the area's needs,
- 5) to study the gaur (bison) ecology and take appropriate measures to protect it from extinction,
- 6) to evolve a system of sustainable utilization of the ecosystem in the buffer zone or multiple use area so as to maintain the ecological balance,
- 7) to develop research and monitoring facilities which would provide a scientific understanding of wildlife population and habitats essential to their proper management and appropriate utilization of the ecosystem, and
- 8) to promote and support wildlife interpretation commensurate with controlled tourism primarily aimed at wider public appreciation of the importance of wildlife for the enrichment of human life.

The main strategies for achieving the objectives include:

- 1) Protection of wildlife,
- 2) Better fire control,
- 3) Habitat management for maintenance and prorogation of wildlife,
- 4) Soil and water conservation,
- 5) Eco-development to reduce pressure of resource utilization by peripheral villages, and
- 6) Eco-tourism to promote awareness regarding the importance of wildlife.

Thus, the second management plan is more focused on wildlife preservation and the strategies outlined in the plan for meeting the Park objectives are more comprehensive. However, some of the measures suggested contain ambiguities:

essential ecological processes mentioned in objective 1 have not been clearly spelt out and are prone to different interpretations, as is objective 2. Lack of sufficient funds for carrying out the required activities compounds the problem. No meaningful research to aid in better Park management has been conducted to date. Since 1995, the bison has no longer been sighted in BNP. No studies have been conducted to explain its disappearance. A big drawback of both the management plans to date is the lack of scope for people's involvement in Park management.

Most important, both plans have been written with the underlying assumption of the relocation of the inside villages. Sustainable utilization of ecosystems in the buffer zone has not been well defined. There is a continued dependence of the inside as well as the peripheral villagers on Park resources for their livelihood (Chapter 4). While the 1993 plan emphasizes eco-development²⁸, the emphasis continues to be on the peripheral villages. Though eco-development committees (EDCs) have been formed since the early 1990s in some of the peripheral villages it is difficult to gauge their effectiveness. Nevertheless, it is interesting that EDCs have recently also been formed in the inside villages, which indicates an implicit acknowledgement of the needs of the inside villages and stands in contrast to the assumption of a relocation of those villages (Chapter 7). Though the 1972 plans mentions relocation briefly, and the latest plan elaborates on the procedure, there is no certainty regarding relocation. The 1993 plans lays down five reasons for the relocation of the villages from the extension area: i) the fact that, according to the WLPA, all the rights within the NP should vest with the government; ii) the fact that India is a signatory to the IUCN convention of 1968, which states that ecosystems in a NP should not be materially altered by human exploitation and occupation; iii) chances of crop damage, livestock lifting and human loss with a gradual increase of wildlife in the NP; iv) fear of spread of epidemic diseases in wild animals originating from cattle; and v) gradual increase in human and cattle population causing stress on the forest (Sonakia 1993). However, reasons ii) to v) are not unique to the villages inside the Park, but also apply to the peripheral villages. Though both plans state that the process has been initiated for all three forest villages inside the Park, until

²⁸ The main aim of eco-development is to minimize people's dependence on the PA. At the time of the survey, eco-development committees have been formed in 46 out of the 77 villages surrounding Bandhavgarh Tiger Reserve, to ensure people's participation in the protection of forest and wildlife.

now a relocation plan has been submitted for central government approval for only one village [Kallwah (forest village), Magdi range].

Finally, in 1993 the Government of India, Ministry of Environment and Forest declared an area of 1161.471 sq. km as Bandhavgarh Tiger Reserve (BTR), which includes the BNP, Panpatha wildlife sanctuary (PWS) and 65 villages around the protected area. PWS came under the jurisdiction of BNP in 1996 (Gopal *pers. comm.*). In tune with the guidelines and objectives of Project Tiger, BTR is constituted on the basis of a “Core-Buffer” strategy. The entire area of the National Park and 90 % of PWS (245.84 sq. km) is visualized as a “Core Zone” free from biotic disturbances of any sort. A buffer zone of 536.719 sq. km (which is not under control of Bandhavgarh Tiger Reserve) surrounding the core is treated as a multiple use area. This zone is characterized by an interspersion of revenue and forestlands and many villages. The immediate surrounds of the core area up to 5 km with an area of 367.99 sq. km of the Umaria division, 251.99 sq. km of the Katni division and 72.79 sq. km of village area falls under the buffer zone of BTR (Pushkar 2001).

The management objectives of the Reserve are (FDD #9 undated):

- 1) Amelioration of the population of prey and predator within the perimeter of the intrinsic carrying capacities,
- 2) Development of forest and wildlife as a whole,
- 3) Economic development of local people, who are directly dependent on the Reserve, and
- 4) Development of tourism to motivate people for nature conservation.

Thus, the objectives outlined for the BTR are similar to those outlined for BNP but with a greater emphasis on the economic development of local people dependent directly on the reserve’s resources through eco-development works (Appendix 6.1). No management plan for the BTR has been drawn up so far²⁹ and the reserve is being managed under the second management plan of the Park, i.e. 1993.

²⁹ As part of a training diploma course for forest officials at the Wildlife Institute of India, Dehradun, four mock management plans of Bandhavgarh Tiger Reserve have been prepared. One for the period from 2002-2007, and the other three for the period of 2002-2012.

Rights and concessions of people living inside the extension area

Extraction, thoroughfare and grazing concessions exercised in the old Park area by the villagers became extinct under the MP National Park Act 1955. For the people living in the extension area of the Park, the procedure is still incomplete although the process for settlement of rights was initiated in February 1985. According to a letter issued in January 1997 by the district collector of Jabalpur district, no claims were filed by the villagers in Bagdari village³⁰. As for the revenue villages, even the Park authorities do not have any information regarding the progress of the resettlement process in the revenue villages³¹. In 1997, the Supreme Court of India directed all the states having PAs to settle the rights of the people prior to August 1998, but in most cases this procedure has still not been completed. In case of BNP, the situation is complicated further as people from 10 revenue villages lying outside the Park boundary have their fields inside the Park covering an area of 2191.94 acres. The process of acquiring this land by the Park authorities is underway. Once the rights are settled, final notification of the Park will be issued under the WLPA (Sonakia 1993). After preliminary declaration of the area as a NP, all collection of MFP was stopped, but in 1990 the MP government allowed collection of *tendu* leaves for sale and MFP for self-consumption from the proposed extension area for the inside villages until final notification (Pushkar 2001).

The fact that the settlement procedure has not yet been completed might be due to the differences in the rights that the two village types have in the Park. Forest villages fall under the direct jurisdiction of the FD. As people in the forest villages were brought from outside by the FD as labor, and over time have acquired the status of a village, only temporary leases have been granted by the FD, which can be taken back at any time. Since some of these villages have been inside the Park for more than 80 years, compensation will now have to be paid by the government for their relocation. For the revenue villages, people have permanent rights to the land they live on and cultivate and are under the jurisdiction of the revenue department. Though the rights in both village types have to be settled by the district collector, there is lack of coordination between the forest and revenue departments.

³⁰ Bagdari is the only village in the extension area of the Park in the Jabalpur (now Katni) district. The remaining villages lie in the Umaria district, formally in the Shahdol district.

³¹ During the course of collecting secondary information from the Park headquarters, I was informed that repeated attempts by the Park authorities to get information regarding the progress of resettlement process in the revenue villages from the office of the district collector had been unsuccessful.

3.7 Conclusion

Countries were practicing conservation in some form or the other even before it became an international agenda in the 1970s, which saw the appearance of PA networks worldwide. From its inception, the concept of PA has been giving rise to ambiguities from how one decides which areas to protect, how much area to protect, and which species are to be protected, to the controversy regarding the notion of PAs as undisturbed areas of wilderness. The latter is rarely the case especially in the tropics and sub-tropics where they tend to coincide with areas of human habitation.

India is no exception; here the bias of conservationists has been reflected in the set of wildlife policies, legislation and programs heavily influenced by western models of conservation that have emerged in the country in the early 1970s. Though changes have taken place especially following the Forest Policy of 1988, the stress continues to be on reducing or altogether eliminating the human sources of biotic pressure.

4 RESOURCE UTILIZATION IN BANDHAVGARH NATIONAL PARK

For the people living inside the Park, most of their activities take place within its boundary. It is not only a home for them but also the main source of food, fuel, fodder and income. This chapter looks at the resource utilization by the people living in the Park and analyzes the kind and degree of people's dependence on the Park. The objectives of this chapter are to: i) determine the characteristics of the people living inside the Park, ii) analyze people's use of Park resources and, iii) analyze the income derived by people from different activities inside and outside the Park.

4.1 Demography and general characteristics of households

Basic statistics on the demographic characteristics of sampled households are given in Tables, 4.1, 4.2 and 4.3. There are a total of six villages and one illegal settlement³² inside the Park. According to the 1991 census, the total population inside the Park was 2309³³. The 155 sampled households comprised 915 individuals, of whom 55 % were male and 45 % were female. The average size of the sampled households was 5.9 members with a minimum of 2 members and a maximum of 17 members. There were no statistically significant differences³⁴ among the village types with regards to total number of family members [The difference between forest and revenue villages was .77, -1.10 between revenue villages and illegal settlement and -.33 between forest villages and illegal settlement]. The dependency ratio for the sampled households was 0.8623 with 46 % of the sampled household population in the economically inactive age groups. Of these, 42 % were below the age of 14 years and 4 % above 65 years. For average age per household too, there were no statistically significant differences among the village types (-2.27 between forest villages and revenue villages, -1.14 between revenue villages and illegal settlement and -3.69 between forest villages and illegal settlement).

³² The illegal settlement is treated by the FD as a part of Kallwah village but for this study is treated as a separate entity.

³³ These figures do not include the population of the illegal settlement.

³⁴ All the tests for statistical significance in the thesis are supported by the Levene's test for the Equality of Variances.

The population of the Park can be divided into 10 castes. Broadly speaking, 4 castes belonged to the schedule tribe (ST)³⁵ and the rest to schedule caste (SC)³⁶ and other backward classes (OBC). The ST made up 62 % of the sample, the SCs 8 % and the OBC 30 % of the Park population. In general, people belonging to these groups in the region are poor and underprivileged with low levels of literacy and a heavy reliance on the forest for subsistence and income generation. According to the 1991 census, there were 15.4 million tribals in the state of MP. Almost all the tribals live within the forest or at the fringes of the forest and 80 % of the tribal population of the State is found in districts with fairly substantial forests. Of the 9.63 million SCs in the state, large populations also resided in and near forestlands. Together the STs and the SCs account for 23% of the state population (EPCO 1996).

Table 4.1: Total number of household members in the sample

	Minimum	Maximum	Mean	Std. deviation
Total number of household members	2	17	5.90	2.73
Forest village	2	17	6.27	2.93
Revenue village	2	14	5.50	2.45
Illegal settlement	2	11	6.60	3.16

Table 4.2: Age composition of sample households

	Minimum	Maximum	Mean	Std. deviation
Age of household members	.01	80	23	18.48
Forest village	.01	75	21	17.52
Revenue village	.01	75	23	18.90
Illegal settlement	.1	80	25	20.56

Table 4.3: Sex composition of sample households

Sex	Number	Percentage
Male	507	55.4
Female	408	44.6
Total	915	100

³⁵ STs are communities which have special privileges in the Indian constitution for education and employment purposes, and have special laws pertaining to the lands on which they have traditionally lived. They are also referred to as tribal in India. These communities are socio- economically and politically backward. The extent of backwardness differs widely across the categories, i.e. tribals are more backward than OBCs and SCs.

³⁶ Like the STs the SCs and OBCs also have special provisions under the Indian constitution.

With regard to the people living outside the Park, there are around 60 villages in the close proximity of the Park area with a population of around 20,298 (1991 census). Here, cattle rearing was the main occupation, with agriculture being a subsidiary occupation. As far as these villages are concerned, the Park and the adjoining forest blocks were the only areas for grazing the cattle and collection of MFP. Bamboo is another forest produce important for villagers from these and other further off villages (Sonakia 1993).

4.2 Pattern of land tenure

4.2.1 Status of land tenure

Only people living in the revenue villages had legal title to land, while the rest of the Park area in BNP was legally owned by the government. Villages within the Park can be classified into three basic tenure types based on differences in their property rights: i) the right to transfer land rights to others, ii) user rights, iii) right to keep the returns from the resource and iv) the right to change the form or substance of the resource (Demsetz 1967, Li and Nugent 1995). There are three revenue villages - Gadpuri, Mehanwah and Milli –in the Park where people have all the above stated property rights, i.e., the right to transfer land to others, use the land as they want, keep the returns from the resource as well as to change the form or substance of the resource. However, as was revealed by the study, the people in the revenue villages can no longer sell their land, as in practice there is no longer a demand for their land. They also face the same restrictions as have been imposed on the people in the forest villages and are therefore no longer free to do as they want with their land. Secondly, the Park has three forest villages - Bagdari, Magdi and Kallwah -where people have been given the right to cultivate but no right to the land, i.e., so- called, forest leases. Thirdly, there is one illegal settlement (Kumarwah) where people have no tenure rights whatsoever. Occupation of land in Kumarwah is completely illegal. The people there originally came from different villages surrounding the Park to graze their cattle, but because of surplus fodder availability eventually settled in the Park about 60 years ago. The people still maintain links with their original villages. Although Kumarwah is not officially recognized by the FD and does not exist on official records, the *panchayat* of Mehanwah lies in

Kumarwah. This was confirmed by the villagers in Mehanwah. However, the Park authorities were silent on the matter.

Of the total sampled households only 64 % had a land lease. For the revenue villages, 57 households (71 %) of the 80 households surveyed held leases, in the case of 60 households in the forest villages, 42 households (70 %) had a forest lease (Table 4.4). The rest of the households had illegal land holdings (29 %).

4.2.2 Location, size and type of landholdings

The Park is divided into four ranges³⁷ namely, Khitauli, Magdi, Kallwah and Tala . Tala was uninhabited as it is the old Park area. An earlier settlement inside the Tala range, Bathan village, was relocated in 1972. The other three ranges had two villages each: Bagdari and Gadpuri in the Khitauli range; Magdi and Milli in the Magdi range; and Kallwah and Mehanwah in the Kallwah range. Kumarwah, the illegal settlement, is also located in the Kallwah range (Map 4). The total area occupied by the 6 villages is 2308 acres and an with additional 23 acres by in the illegal settlement. The proportion of land occupied by the forest villages and the revenue villages is similar, i.e., 1187 acres and 1193 acres, respectively. Statistically too, there were no significant differences in per capita land between forest and revenue villages (.509) although there were significant differences between the forest village and illegal settlement (.7326) and revenue village and illegal settlement (.6256). Gadpuri is the largest village in the Park occupying 1025 acres and Mehanwah the smallest with 92 acres.

The land use in the villages can be broadly classified as land under houses, *bari* (kitchen garden) and fields (Table 4.4). The average size of the landholding for the sampled households was 3.52 acres, though great disparities occurred in the actual landholding sizes, which ranged from 0.03 acres to 19 acres.

³⁷ For the purpose of management, the park is divided into smaller divisions. There are four ranges in the Park which are further subdivided into eight sub ranges/circles comprising of 45 beats, which are further subdivided into 186 compartments which are the smallest unit of management.

Table 4.4: Land occupation in acres under different land use by the sampled households (n=155)

Land use	Legal occupation	Illegal occupation	Total
House	6 (4%)	12 (4%)	21 (4 %)
Kitchen garden	58 (21%)	60 (21 %)	119 (21 %)
Fields	206 (75 %)	216 (75 %)	422 (75 %)
Total	274 (100 %)	288 (100 %)	562 (100 %)

4.3 Agriculture

Agriculture forms the basis of livelihood of the people living in rural areas. This was equally true for the people living in BNP, who cultivated mostly for subsistence and barter but also for sale, though the number of people selling crops was very small.

The main crops grown were wheat (*Triticum aecstivum L.*), rice (*Oryza sativa L.*), and maize (*Zea mays L.*). Other crops grown include mustard (*Brassica juncea L.*), kodo (*Paspalum scrobiculatum L.*), kutki (*Picrorhiza lindleyana*), til (*Sesamum indicum L.*), jawar (sorghum) and arhar [*Cajanus cajan (L.)*]. The numerous streams in the Park formed the main source of both seasonal and perennial irrigation. In Gadpuri some of the fields were irrigated from a village reservoir. The percentage area occupied by different crops in the fields and the kitchen gardens together with the total crop production are given in Tables 4.5. While the proportion of total production used for self consumption, barter and sale are given in Table 4.6.

Table 4.5: Total land occupation under different crops (acres) and total production in 2000

Name of Crop	Total land occupied by different crops	Total production
Rice (<i>Oryza sativa L.</i>)	253 (47%)	33504
Wheat (<i>Triticum aecstivum L.</i>)	144 (27%)	23606
Maize (<i>Zea mays L.</i>)	106 (20%)	24162
Mustard (<i>Brassica juncea L.</i>)	78 (15%)	5553
Kodo [<i>Paspalum scrobiculatum (L.)</i>]	48 (9%)	2931
Arhar [<i>Cajanus cajan (L.)</i>]	10 (2%)	100
Til [<i>Sesamum indicum (L.)</i>]	5 (0.86 %)	32
Kutki (<i>Picrorhiza lindleyana</i>)	4 (0.68%)	33
Channa [<i>Ccicer arietinum (L.)</i>]	2 (0.42%)	703
Urud [<i>Vigna mungo (L.)</i>]	1 (0.22%)	345
Barbati (bean)	.10 (0.01%)	8
Jawar (<i>sorghum</i>)	.05 (.009%)	100

Table 4.6: Total crops used for self-use and sale in 2000 (in kilograms)

Name of crop	Percentage total amount used for self-use and barter	Percent total amount used for sale
Wheat (<i>Triticum aecstivum</i> L.)	99	2
Rice [<i>Oryza sativa</i> (L.)]	100	-
Maize [<i>Zea mays</i> (L.)]	83	17
Mustard (<i>Brassica juncea</i> L.)	87	13
Kodo [<i>Paspalum scrobiculatum</i> (L.)]	100	-
Til [<i>Sesamum indicum</i> (L.)]	92	0.27
Urud [<i>Vigna mungo</i> (L.)]	100	-
Kutki (<i>Picrorhiza lindleyana</i>)	100	-
Arhar [<i>Cajanus cajan</i> (L.)]	100	-
Channa (<i>Ccicer arietinum</i> L.)	100	-
Barbati (bean)	100	-
Jawar (<i>Sorghum</i>)	100	-

Of the total crop production of 91473 kg, wheat constituted 37 % and rice 26 %. The total production of maize was 24162 kg. (26 %). For the remaining crops, production was less than 10 %.

Total crops used for self-consumption, barter and sale

Almost all (98 %) the produce was consumed by the households or used for barter (see Table 4.6). Barter was done in exchange for other crops or products or given as wages. Of the sampled households, one household reported bartering 400 kg of wheat in Kumarwah in 2000, which constituted a little over 1 % of the total wheat production in 2000. It was common practice to pay wages for agricultural labor in whole or in part in grains instead of as money.

Households were largely dependent on the Park for agricultural production. For most people crop production was not even enough for self- use let alone for sale. Of the surveyed households, 87 % bought food grains in 2000 from outside the Park to meet their food requirements. On an average, the households spend US\$ 55³⁸ in 2000 on buying food grains from outside. If they had to meet all their food requirements from outside they would have to spend a minimum of US\$ 88 per annum on food grains. Even with self-production, some people reported not being able to buy food grains from outside because of lack of money and their inability to borrow from the moneylender.

³⁸ The exchange rate as of 01.06.2001 was 1US\$ = 47.05 Indian Rupees (www.oanda.com)

Agricultural production not only sustained people but, for those few who had a surplus, also provided a source of income. For those who did not grow crops or had only small plots for production, wages in the form of food grains constituted their only hope. Thus for both the agricultural laborer and the employer, exchange in food grains was crucial.

Of the total households, only 12 households, i.e., 8 % sold their crops. Vegetables were grown by 43 % of the sampled households but mostly for self- use. Only 4 households (6 %) derived an income from sale of vegetables. The average income from selling crops in 2000 was US\$ 29 and from selling vegetables US\$ 70. Although sale of agricultural produce ranked only sixth amongst all the income generating activities³⁹ (Table 4.7), if people sold all that they had produced, this would be the second most important income source for the people.

Table 4.7: Average contribution from different sources of income to average household income in the Park in 2000 (US\$)

Name of Activity	Income contribution excluding self use (USD\$)	Percentage and rank	Income contribution including self-use ⁴⁰	Percentage and rank
Sale of agricultural produce	1.94	1.14 (6)* ⁴¹	87.52	19.71 (2)
Sale of MFP	42.54	25.02 (2)	54.22	12.21 (3)
Sale of fuelwood	1.57	0.92 (7)	7	1.5 (7)
Livestock rearing	35.18	20.71 (3)	206.57	46.53 (1)
Work for the FD	44.11	25.97 (1)	-	9.93 (4)
Work outside the Park	12.96	7.63 (5)	-	2.91 (6)
Other alternative sources of income	31.51	18.55 (4)	-	7.09 (5)
Total income	169.81		443.81	

4.4 Minor forest produce

Barring timber, all other products available in the Park, including fruits, nuts, berries, honey, seed, grasses, gums, medicinal plants, and flowers, are collectively referred to as minor forest produce (MFP). Fuelwood is often also considered as part of MFP, but is

³⁹ For the sampled households, seven major income sources were identified. These are sale of agricultural produce, MFP, fuelwood, livestock rearing, work for the Forest Department, work outside the Park and other alternative sources of income.

⁴⁰ The value of self- use is computed at market prices.

⁴¹ Rank of different activities in income contribution of households.

dealt with separately in this study. The term MFP is a misnomer as the products play a vital role in the life of the people in the Park. MFP is an important food source for the people and their livestock and also contributes substantially to household income. A majority of the sampled households (97 %) collected MFP. The government of Madhya Pradesh prohibited MFP collection from the extension area of the Park in 1982, but it was restarted in 1990 in view of the importance of MFP for people living in and near the Park (Sonakia 1993). Currently, MFP collection is banned from the Tala range (old Park area), and except for *tendu patta*, allowed only for self- use in the rest of the Park. However, the survey showed that households also collected MFP for sale. All the sampled households collecting MFP also sold part of it.

4.4.1 Type of minor forest produce harvested

The different MFPs collected on a regular basis by the households were *amla* (*Emblca officinalis*), *char* (*Buchanania Lanzan*), *ber* (*Zizyphus mauratiana*), *tendu patta* and fruit (*Diospyros melanoxylon*), *mahua* (*Madhuca indica*), mango (*Mangifera indica L.*), *jamun* (*Syzygium cumini*), *sal* seed (*Shorea robusta*), *dori* (*Mahua* seed), honey and medicinal plants. Mushrooms were also collected by people after the rainy season and constituted an important food supplement. Details of MFP collection and use by the households are presented in Tables 4.8 and 4.9.

Table 4.8: Number of households collecting different MFPs (n=151⁴²)

Name of MFP Collected	Total no. of households collecting
<i>Tendu patta (Diospyros melanoxylon)</i>	142 (94%)
<i>Mahua (Madhuca indica)</i>	131 (87%)
<i>Amla (Emblca officinalis)</i>	88 (58%)
<i>Char (Buchanania Lanzan)</i>	59 (39%)
<i>Tendu fruit (fruit of Diospyros melanoxylon)</i>	28 (19%)
<i>Jamun (Syzygium cumini)</i>	9 (6%)
Mango [<i>Mangifera indica (L.)</i>]	6 (4%)
<i>Ber (Zizyphus mauratiana)</i>	4 (3%)
<i>Dori (seed of Madhuca indica)</i>	2 (1%)
Honey	2 (1%)
<i>Sal seeds (seed of Shorea robusta)</i>	1 (0.66%)
Medicinal Plants	1 (0.66%)

⁴² Four households did not collect MFP in 2000.

The period of MFP collection depends on the availability of the MFP. In 2000, *amla* and *mahua* were collected for 14 days, *char* 11 days, *sal* seeds 10 days, and *tendu patta* for 7 days. The collection times do not include the time taken for processing the MFP for sale.

4.4.2 Amount and use of minor forest produce harvested

Most MFP, like *tendu* fruit, mango, *jamun* and, *dori* could not be quantified as these items are collected for self-use and people do not recall the respective quantities. Quantification of marketable MFP was, however, possible. For analysis purpose, the MFP were categorized in five categories: i) MFP used exclusively for self-use, ii) MFP used for self-use and sale, iii) MFP used exclusively for sale, iv) MFP used for barter, and v) MFP used for barter and sale (Table 4.9).

Table 4.9: Average amount of minor forest produce collected in 2000 (in kg)

Minor forest produce	Total amount collected	Amount used for self -use	Amount used for self -use and sale	Amount used for sale	Amount used for barter	Amount used for barter and sale
<i>Tendu patta</i> (bundles)	2215	-	-	2215	-	-
<i>Mahua</i>	15,333	4941	7540	2853	-	-
<i>Amla</i>	8146	256	455	7435	-	-
<i>Char</i>	223	81	10	11	115	6
<i>Sal</i> seed	120	-	120	-	-	-

4.4.3 Income generation from sale of minor forest produce (MFP)

Sale of all MFPs in the market was done directly by the people with the exception of *tendu patta*, which is nationalized, i.e., bought directly by the government. Although the villages fall under the jurisdiction of the Park authorities, *tendu patta* collection takes place under the supervision of the territorial division (*Gopal pers. comm.*). Collection centers are present in the villages inside the Park. All households received a fixed price for the *tendu patta*. After the sale of the *tendu patta* by the government, 50% of the profits are distributed by the government in the following year as a bonus to the *tendu patta* collectors. Initially, people also sold other MFP like *amla* and *sal* seeds through co-operatives, but their sale has been stopped since the inclusion of the extension area in 1982. Sale of *amla* and *sal* seed through the co-operative societies continues in the

villages lying outside the Park. The government is contemplating nationalizing *amla* collection also from within the Park starting in 2002.

The average income generated from the sale of MFP is given in Table 4.10. Sale of MFP contributed 25 % of the total income of the sampled households. On average each household made US\$ 43 from the sale of MFP. It was presumed that people from the forest villages collected more MFP for sale than people in the revenue villages and the illegal settlement, as people there were perceived to rely more strongly on livestock rearing. However, this was not the case. The independent sample t-test revealed that per capita income from sale of MFP was greatest for people in the illegal settlement and the least in forest villages⁴³. Even in terms of per capita total value of MFP (self-consumption plus sale), there were significant differences amongst tenure type, being highest for people in the illegal settlement and the lowest in the forest villages⁴⁴.

Table 4.10: Total average income generated from sale of MFP in 2000 (in US\$)

Minor forest produce	Total households	Mean	Std. deviation
<i>Amla</i>	82	31	31.35
<i>Char</i>	5	11	4.17
<i>Sal seeds</i>	1	9	-
<i>Tendu patta</i> (no. of bundles)	66	12	9.85
<i>Mahua</i>	1	94	-
Mango	1	1	-
<i>Dori</i>	1	11	-

1 US\$ = 47.05 Rs.

Though income from MFP sale is important, its use by the households for self-use, barter and as feed for livestock is equally important. Of the MFP collected, a minimum of 38 % was used by the people for purposes other than sale. Although not quantifiable, if other MFPs collected by people exclusively for self-consumption like fruits, nuts, berries, honey, medicinal plants and grasses are included, then the

⁴³ The difference between the forest and the revenue villages for income derived from sale of MFP was .023, for revenue villages and illegal settlement was .025 and for forest villages and illegal settlement it was .000.

⁴⁴ People in the illegal settlement got more per capita value from MFP collection than the other village types (.001, .000). While people in the revenue villages got significantly more per capita value from MFP collection than people in the forest villages (.016).

percentage of MFP used for self-use would be much higher. In real terms, MFP contributed 12 % of the household income from all sources (see Table 4.7).

If people were to be denied the collection of MFP, not only would an important income source disappear, but an important food source for the people would also be affected. In times of scarcity, the people use MFP as a food supplement and as an important alternative feed for their livestock.

4.5 Fuel

Besides providing people with different MFP, the Park also constituted the most important source of fuel for the households. The wood from the Park was used not only as fuelwood for cooking but also for heating purposes as well as for crop protection (small bonfires in the field to keep the wild animals away). For some it is also a source of income, although fuelwood sale is illegal. A majority of the FD officials surveyed stated fuelwood collection for sale as being an illegal activity.

Dung, which is available as most households had livestock, is the second most important fuel source (56 %). Some people also used crop residue and grass (3% each) as fuel. The kerosene stove for cooking was used by only three of the sampled households (2%).

4.5.1 Types of fuel

Though people had access to different sources of fuel, 97 % of the sampled households preferred wood to all other kinds of fuel, especially for cooking. Crop residue and grass were rarely used and only used as a last resort. Less than 2 % of the sampled households preferred dung and less than 1% preferred a kerosene stove to other sources of fuel.

Wood

All households used wood for cooking, and 98 % also used it for heating in form of open fires, mostly in winters. Wood is also used for heating purposes during the summer and monsoon period by 3% and 26 % of the sampled households, respectively.

Nearly all the households (99%) collected fuelwood from the Park. The remaining bought fuelwood that had been collected from the Park by others. Only two households collected fuelwood from their own land. Households tended to collect

fuelwood when required, generally on a daily basis. Most people however, stockpiled wood for the monsoons as it is difficult to collect wood during the rains, and wet wood makes cooking difficult.

Estimated seasonal fuelwood consumption at the village level is shown in Table 4.11. The figures presented in the table should be treated as rough estimates, as their reliability depends on the person's ability to approximate daily fuelwood consumption and number of bundles collected per day and the exact weight per bundle (Bashir 2000). The total fuelwood consumption for the sampled households was 12,283 tons (Figure 4.1)⁴⁵, which corresponded to an average of 7925 kg per household per year. This amounted to a total value of U.S\$ 5522, i.e., US\$34 per household per year⁴⁶.

Table 4.11: Average per capita fuelwood consumption of sampled households in 2000 (in kg)

	No. of households	Minimum	Maximum	Mean	Std. deviation
Total sample	155	51	47250	1507	4427
Forest village	60	51	3750	828	710
Revenue village	80	127	47250	2049	6073
Illegal settlement	15	131	4200	1329	1261

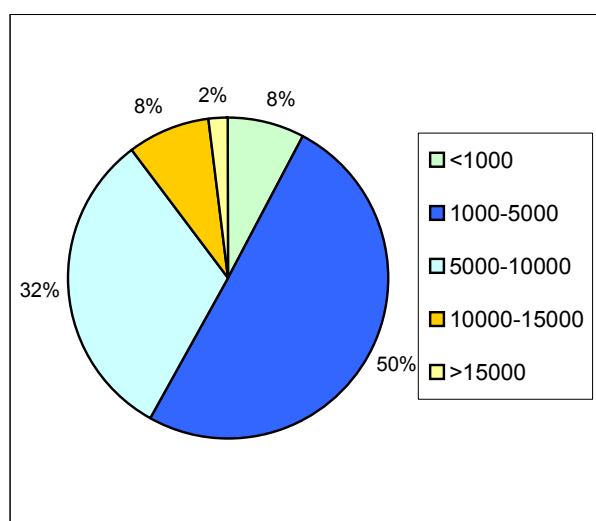


Figure 4.1: Estimated fuelwood consumption per household in 2000 (in kg) and percentage (households)

⁴⁵ The total fuelwood consumption was calculated by multiplying the number of fuelwood bundles used per household per season with the average weight per bundle of 25 kg.

⁴⁶ The total value of fuelwood consumption per annum in monetary terms was calculated @ US \$ 0.21 per bundle, which is the rate at which a bundle of fuelwood (approximately 25 kg.) was sold by some villagers.

There is a significant difference between fuelwood used in forest and revenue villages (Table 4.11). Households in the revenue villages had the highest level of fuelwood consumption, followed by the illegal settlement. The forest villages had the minimum average annual fuelwood consumption. Average annual consumption of fuelwood in the forest villages was 828 kg, which is far below the average fuelwood consumption for the sample households in revenue villages of 2049 kg as well as the illegal settlement. For the illegal settlement average household fuelwood consumption amounted to 1329 kg per annum.

As people are not allowed to cut standing trees, and dead and fallen twigs and branches are not always easily available near the village, people tended to lop branches and let them dry before collecting them. However, it is difficult to estimate how much lopping takes place. When asked, people were not willing to admit to it as there is a ban on lopping. However, 65 % of the people reported lopping in response to the question on type of damage caused by people to the Park. Besides lopping for use as fuelwood, lopping for feeding livestock was also done. Given the presence of people, the high dispersal of settlement and easy access to the Park resources by the people despite Park restrictions, it is difficult for the FD staff to enforce lopping restrictions effectively (Bashir 2000).

Fuelwood sale

Contrary to expectations, sale of fuelwood did not appear to constitute a major source of income for the households. Sale of fuelwood ranks last amongst the different sources of income and constitutes less than 2 % of the total income of the households (see Table 4.7). It is possible that the actual number of people selling fuelwood was grossly understated due to people's reluctance to admit to this illegal activity. It is also possible that people do not actually sell firewood as, apart from Bagdari and Gadpuri, most villages are located deep inside the Park and are too far away from the market. Only in the case of Gadpuri, two households admitted to deriving regular income from sale of fuelwood, while two other households stated selling fuelwood occasionally. This might be due to the proximity of Gadpuri to the main road and thus to transportation facilities, and to Tala, where the tourist lodges and hotels are located. According to a study by Goswami (1999), the average annual fuelwood requirement of the tourist lodges and

hotels in Tala was 23,500 kg. This is said to be a gross underestimation. Both the households in Gadpuri sell fuelwood in Tala. For these two households, sale of fuelwood constitutes the most important source of income generation with the average income from sale of fuelwood being US\$ 122 per year. Besides for the people living inside the Park, the Park is also the main fuelwood source for the villages lying on the periphery of the Park. Fuelwood is also sold by some of the outside villagers in Tala and other places.

Other uses of wood

The most frequent use for wood apart from use as fuelwood is for crop protection. However a quantification was not possible as most sampled households expressed an inability to give an estimation of the amounts of wood used. Wood was also used for making yokes and ploughs. Of the 95 households (61%) who made other use of wood in 2000, all made ploughs and yokes, 12 households (13%) used it for house construction, and four (4 %) for making furniture or churners. The average amount of wood used for other purposes was 729 kg in 2000.

People also derived an income through other use of wood. Two of the households derived their income from the sale of furniture, made of wood from the forest. One household later denied selling furniture but further enquiries among the villagers revealed that he sold furniture. The income derived from the sale of furniture is, however, not known. Some households also sold yokes or bought them from other households in their respective villages. These activities are most likely illegal, because suitable logs are not easily found in the Park and permission is required from the Park authorities for the collection of fallen logs. According to official FD policy, households collecting logs without permission are liable to be fined and the logs confiscated. If the FD were to enforce this policy more strictly, these households would be fined heavily and would lose a source of income. People would also be unable to construct and repair their houses and fences or make ploughs.

Dung

Besides wood, dung is also used as fuel, mostly for boiling milk. Use of dung is highest during the monsoon season when dry wood is not available in the forest. For those three

months, 98 % of the households used dung as a source of fuel. Dung is also used by 83 % of the households in summer and by 93 % in winter. The aggregate dung use for the sampled households in 2000 was 148 tons. More dung is used in the revenue villages and illegal settlement due to the larger livestock holding there. Dung is also used for income generation. According to the FD, the people in Kumarwah sold dung as a fertilizer, but the surveyed households denied it when asked for income generated from the sale of dung.

4.6 Livestock rearing

Most of the sampled households possessed livestock, including cattle and buffaloes. Few households also had goats and poultry. Livestock ownership is not only a status symbol, but also means security as the livestock can be sold in times of hardship.

4.6.1 Livestock ownership

Of the total households sampled, 90% owned livestock (the term livestock includes cattle, buffaloes and goats) (Table 4.12). Almost all the households owned cattle and 50% owned buffaloes, while 17 % owned goats. On average, a household had 7 cows and bulls, 7 buffaloes, and 3 goats.

Table 4.12: Village- wise ownership of livestock

	Average number of livestock per household		
	Forest village	Revenue village	Illegal settlement
Cattle	7	7	12
Buffaloes	6	4	16
Goats	4	3	8

In terms of total number of livestock, the revenue villages had 33 % more livestock than the forest villages. There were however no statistically significant differences amongst the forest and revenue villages in terms of number of total livestock owned. The Yadav's, who live in the revenue villages and illegal settlement, represent the livestock caste in the region. Kulluwaha tola, which is a cluster of a few settlements and forms a part of Gadpuri village, was established by one person who used to bring livestock from other places to graze in the Park area and eventually settled there. At present, the total number of households in Kulluwaha tola is 14. Amongst the revenue

villages, Gadpuri had the maximum number of livestock (50 %). The illegal settlement, had the highest mean number of cattle per household this was confirmed by the t-test which revealed the illegal settlement having the highest number of cattle and buffaloes (Appendix A3).

4.6.2 Purpose of livestock

Most of the households (90 %) kept livestock for milk (Table 4.13). The total milk production for the sampled households in 2000 was 128,900 liters, i.e., an average of 921 liters per household. About 59 % of the households used milk for making other products. Ghee (hydrogenated fat used for cooking purposes) was made by 44 % of the sampled households, and 16 % made Khoya (milk dough). All the 14 % of the households owning bulls used them as draught animals. Chicken and goats were either consumed or sold by 7% of the households. About 21% of households reported selling livestock.

Table 4.13: Purpose of keeping livestock

Purpose	Households (Percentage)
Milk	126 (90%)
Ghee	61 (44%)
Khoya	22 (16%)
Sale of livestock	29 (21%)
Fertilizer	26 (19%)
Draught animal	19 (14%)
Meat	10 (7%)
Sale of poultry	3 (2%)
Sale of eggs	1 (1%)

Of 155 sampled households, 15 did not own livestock.

Though only 19 % of the households explicitly stated keeping livestock for dung for fertilizing, all the households used dung in the fields, as most could not afford to buy inorganic fertilizer.

4.6.3 Livestock feeding

There is nearly complete reliance on Park resources for grazing livestock. Almost all the sample households (96%) grazed their livestock in the Park. Only 2 households (1 %) reported feeding their livestock exclusively from their own land, which is doubtful.

About 13 % of the households also stall-fed their livestock. Both, the people who stall-fed and those who fed livestock from their own land came from the revenue villages. The forest villages completely rely on the Park for grazing their livestock, as people did not have access to alternative grazing areas.

Since official notification of the Park has not been finalized, grazing was being allowed in the extension area of the Park. A total of 44 compartments covering an area of 101 sq. km are open for grazing. Besides the internal villages, grazing is legally allowed for livestock from 34 villages lying outside the Park. However, it is difficult to regulate the number of cattle grazing inside the Park as it is nearly impossible for the FD officials to distinguish cattle that is legally allowed to graze in these compartments from cattle belonging to villages which are not permitted to use the Park for grazing. The total cattle population of the inside villages was 3430 (1990 census) and of the villages lying outside 23,134 including those in the 5 km buffer zone around Bandhavgarh Tiger Reserve (Pushkar 2000).

Besides grazing livestock in the Park, 94 % of the households also provided alternative feed to the livestock (Table 4.14). Collection of grass and fodder has been banned since the inclusion in the Park but people still collected it as neither could they afford to buy fodder nor had they sufficient fodder on their land to feed the livestock.

The majority of the people did not practice stall-feeding as it is very labor intensive and involves collection of grass and fodder from the Park to feed the livestock, which is illegal.

Table 4.14: Alternatives to livestock grazing (alternative feed) (n=140)

Name of alternative feed	No. of households giving alternative feed	Percentage
Crop residue	109	78
Crop residue and grass	22	6
Grass and other feed	1	1
Crop residue, grass and other feed	8	6
Green fodder	1	1
Grass	4	3
Leaves	1	1
None	9	6

4.6.4 Income generation from livestock rearing

Livestock rearing contributed 21 % of the total income of the sampled households and was the third most important income generating activity of the households (see Table 4.7). The households sold dairy products such as milk, ghee and khoya. Butter and buttermilk were used for self-use only. Out of the sampled households, 23 % sold milk; ghee and khoya were sold by 37 % and 9 % of the households, respectively. People also sold livestock, including cows, buffaloes and goats; they also sold poultry to people from villages surrounding the Park who occasionally came to buy the livestock from villages inside the Park. Only two of the sampled households sold meat.

Income generated from livestock rearing constituted a more important source of income for households in the revenue villages and the illegal settlement than the forest villages by virtue of them having larger numbers of livestock. In terms of reliance on livestock rearing for self-use and sale, livestock rearing is the most important activity for the households (see Table 4.7). This being the case, the Park as grazing area for the people's livestock is of crucial importance. For the people living in the surrounding villages, the Park is the most important grazing ground, too.

4.7 Alternative sources of income

Besides agriculture, MFP and fuelwood collection and livestock rearing, for which people are primarily dependent on the Park, people also derived an income from alternative sources. These included work for the FD, work outside the Park and other alternative sources of income inside the Park.

4.7.1 Work for the Forest Department

The FD hired people for different purposes, mostly for manual work on daily wages. A few were also employed on a permanent basis (people working for the FD for 6 months or more). About 41 % of the sampled households had family members working for the FD, of which 6 % worked on a permanent basis and the remaining 94 % worked as daily wage employees. Table 4.15 shows the type of activities undertaken by the households for the FD. Most commonly, people were hired for work in road

construction, for clearing fire lines⁴⁷, as fire watchers⁴⁸ or for construction of stop dams or other infrastructure. On average, households were employed by the FD for the duration of a little over a month per year. For the sampled households, work for the FD was the most important source of income and constituted 26 % of the total household income (see Table 4.7).

Table 4.15: Kind of work undertaken for the Forest Department by the sampled households (n= 64)

Work description	Total response	Percentage households employed
Worked in road construction	17	27
Clearing of fire lines	14	22
Construction of dams etc	10	14
Fire watcher	11	17
Watchman	4	6
Worked in patrolling camp	4	6
Handled wireless set	4	6
Patrolling	3	5
Tourist guide	1	2
In charge of <i>tendu patta</i> collection	1	2
Marked compartments	1	2
Worked as barrier guard	1	2

Although 41% of the households had been employed by the FD and this work comprised the most important source of income, employment was lower than before inclusion of the extension area in the Park. According to the Park director, the FD employed more people in plantation felling before the inclusion at the time of the survey. Other forest officials also acknowledged people being better off in terms of employment opportunities and income generation before their inclusion in the Park.

4.7.2 Other employment inside the Park

More than half of the households (52%) had other alternative sources of income inside the Park. These ranged from working as agricultural and manual laborers to tertiary

⁴⁷ Every year before the summer season, the FD hires people to burn grass and fallen leaves as a precautionary measure to minimise forest fires. The total length of fire lines in BNP is 571.5 km.

⁴⁸ During the fire season, some villagers are hired temporarily by the FD to help put out the forest fires, although all the villagers living inside the Park are obliged to help put the fires out.

sector occupations like teaching. Table 4.16 lists the alternative income sources inside the Park. These incomes contributed 19 % of the total household income.

Table 4.16: Type of alternative source of income inside the Park (n=80)

Type of activity	Total households	Percentage
Worked as agricultural labor	42	53
Worked as manual labor	14	18
Tended to other people's livestock	8	10
Lent diesel set	7	9
Owned a shop	4	5
Sewed	4	5
Sold vegetables	4	5
Carpenter	4	5
Teacher	3	4
Lend thresher	1	1
Collected milk & and sold it outside the Park	1	1
Potter	1	1
Blacksmith	1	1

4.7.3 Work outside the Park

Members from 21% of the sampled households went outside the Park for employment. On an average, a household spent 70 days working outside the Park. Some worked as agricultural laborers, mainly harvesting crops. Some migrated on a seasonal basis for three or four months a year to other places or to other states like Uttar Pradesh in the north and to Maharashtra and Gujarat in the western part of India, where they worked as manual laborer.

Of the 34 households working outside the Park, only 26 (76 %) specified the number of years they had been going outside the Park for employment. All stated going outside only since the last 15 years, i.e., since the inclusion of the extension area in the Park. The different reasons given by the people for going outside the Park for work included unavailability of work inside the Park (55 %), very little work inside the Park (18 %), and lack of food and money (15 %).

More people from forest villages went outside the Park to work than from revenue villages. Of the 34 households 59 % belonged to the forest villages and 18 % to the revenue villages. There were also statistically significant differences amongst tenure type with regards to members of households going outside the Park for employment

purposes. The t-test confirmed that people from forest villages tended to go out most often followed by people from the revenue villages (.097, .098, .009) for employment purposes.

4.7.4 Income generated from alternative sources

Average income generated from working for the FD was US\$ 106 with a minimum of US\$ 1 and a maximum income of US\$ 910. For people working for others inside the Park, average income generated was US\$ 61. Average income generated from working outside the Park was US\$ 62 with a minimum of US\$ 3 and a maximum income of US\$ 304. For the alternative sources of income as a whole, the average income was US\$ 76 per household. Together, the alternative sources of income contributed nearly as much income as the sale of agricultural produce, MFP, fuelwood, and livestock rearing taken together (see Table 4.7).

4.8 Conclusion

The survey results showed that households are strongly dependent on Park resources for subsistence and income generation. Despite an explicit ban on resource extraction for income generation, all households sold various forest produce, including MFP and fuelwood. Sale of MFP constituted the second most important source of income for the households after work for the FD, mostly as daily wage employees. There was exclusive reliance on the Park for grazing of livestock by the Park villages as well as a few peripheral villages, which are legally allowed to graze their cattle in the extension area of the Park. The villagers were completely reliant on the Park for fuel. Currently, the Park rules allow harvesting of deadwood for domestic use, but for a few households sale of fuelwood continues to be the most important source of income.

One fifth of the households had members going outside the Park for employment purposes. Without exception, all had started going outside since their inclusion in the Park, mostly due to lack of adequate employment opportunities inside the Park.

Inclusion in the Park has entailed changes for the people in terms of stricter rules and regulations with regards to free movement and resource extraction within the extension area. Better protection of the Park has given rise to an increase in costs borne

by people especially in terms of greater crop and livestock losses which has led to tensions and conflicts with the Park authorities over resource use. These issues are examined further in Chapter 5.

5 PEOPLE AND PARK INTERACTION

Better management of the Park has benefited both, people, by providing them with a better supply of forest products, and animals, by better protection leading to an increase in wildlife populations. Nevertheless, it has also led to problems for the people, the wildlife and the FD. In a confined place with limited resources, there is bound to be resource overlap and hence competition and conflict over resource use. This chapter focuses on the effects on the resident human population of inclusion of the extension area in the Park and the subsequent regulations. The effects of the people on the Park and wildlife and the FD's management problems are dealt with separately in Chapter 6. The chapter aims to: i) determine whether inclusion in the Park has led to any changes in the accessibility of resources to people, ii) determine whether problems have resulted from the imposed restrictions for the people, iii) analyze local people's perception on the conservation of the Park, and iv) analyze people's perceptions of FD and its role in PA management

5.1 Policy regulating Park formation

The Wildlife (Protection) Act (WLPA) (1972), which laid the foundation of PAs in India, discourages human habitation inside the wildlife sanctuaries and national parks (Section 3.2.2). Under the WLPA, states can create a PA for the protection, propagation or development of wildlife but first have to declare the intention to do so⁴⁹. Moreover, if there are any people living within the proposed PA, their rights must be settled. In the case of BNP, the government of Madhya Pradesh (GOMP) had declared its intention to expand the PA 20 years ago, but hardly any efforts have been made to settle the rights of the people.

Under the settlement of rights procedure, the district collector⁵⁰ issues a notification stating the government's intention to declare a specified area as a PA. Within two months of issuance of the notification by the collector, people are required to file claims over any land falling within the boundaries of the intended PA (Section 21

⁴⁹ Preliminary notification has to be done under sections 18 and 35 of the WLPA. Generally, PAs should not be declared in areas of reserve forest or territorial water. Prior concurrence of the central government is required if the intended PA includes any of the two above-mentioned areas.

⁵⁰ Administrative head of the district.

of WLPA). The notification is supposed to be widely publicized in the local language through local newspapers and other media. For the purpose of looking into the claims filed by the people the collector appoints a settlement officer. On the basis of claims made, the settlement officer either rejects the claims or accepts the claims in whole or in part and compensates the people in money or by giving alternative land or both. Once the rights have been settled, the people can make no claims at a future date.

5.1.1 Imposed restrictions

As explained in Chapter 3, the legal status of people's activities in the Park is complex. On the one hand, once the intention of expanding the PA has been made, the management of the 'intended' area today must be in accordance with laws governing NPs, i.e., managed under the assumption that all villages will ultimately be relocated. Therefore, all human activities are illegal, including those for income generation and some subsistence activities such as the cutting of trees for use as fuelwood and building material. On the other hand, the claims of the villagers have not yet been settled. Table 5.1 shows people's perspective on the restrictions imposed since their inclusion in the Park while Table 5.2 shows the perception of FD officials of illegal activities conducted in the Park. In their opinion, the collection of MFP, fuelwood and bamboo are all illegal activities. People continue to indulge in poaching according to the forest officials though there is an explicit ban on hunting. Table 5.3 shows the restrictions imposed on people since their inclusion in the Park. The purpose of this Section is to analyze the *de facto* restrictions on people's behavior in more details.

Though not specifically stated for the people of BNP, Krishnan's (1996) statements are a reflection on the situation of the people in BNP today:

"...NPs established on inhabited lands have turned the tribals and other forest dwellers overnight into 'trespassers' in their own homeland. Tending to their livestock has become 'cattle trespassing'; they are not allowed to clear the land for their subsistence; hunting of animals for their survival has become illegal; collecting small timber amounts to thefts; contravention of any rules attracts criminal prosecution. Punishment can extend for months with heavy fines that they cannot afford and are enormous for them (Krishnan 1996:75)".

Table 5.1: Kind of restrictions imposed after Park formation (percentage of households listing restrictions) (n=155)

Restrictions on people's activities	Overall	Forest villages	Revenue villages	Illegal settlement
Grazing	68	67	65	87
Fuel wood collection	37	45	33	27
Free movement in the forest	17	17	18	20
Carrying axe into the forest	13	10	16	7
Collection of construction material	12	3	19	7
Taking cart into the forest	11	8	15	0
Hunting	8	12	8	0
House construction	8	7	8	20
Cultivation	6	3	4	33
Bamboo extraction	6	8	5	0
MFP collection	5	7	4	7
Cutting trees and bushes	4	3	5	0
Mud collection for house repair/ construction	2	2	3	0
Ban on entry of vehicles	2	5	0	0
Fodder	1	0	2	7
<i>Nistar</i>	1	0	0	7
Use of crackers for crop protection	1	5	0	0
Setting fire around <i>mahua</i> trees for easier collection	1	5	0	0
Fencing	1	0	1	0
Leaves collection	1	0	1	0
No restrictions	9	10	10	0

Table 5.2: FD's opinion about status of resource extraction from the Park (n=17)

Illegally extracted resource by people	Number of responses	Percentage
Fuelwood	7	44
Tubers	3	43
Bamboo	5	42
Nuts	0	0
Honey	4	67
<i>Amla</i>	7	44
<i>Char</i>	7	47
<i>Sal</i> seeds	2	29
<i>Tendu</i> fruit	1	14
<i>Ber</i>	1	20
<i>Mahua</i>	9	60
Medicinal plants	4	44
Poach	3	43
Grass	3	43
Other MFP	1	11

An overwhelming majority of households (91%) reported restrictions since inclusion in the Park. The 9% saying no restrictions had been imposed comprised those people who continued with their activities in defiance of the rules of the Park. There were no differences in this regard between the revenue and forest villages, with 90% of the households in both reporting restrictions due to the Park. For Kumarwah (illegal settlement), 100% of the households stated restrictions. Kumarwah never had the status of a village even before inclusion in the Park but now it has officially been deemed an illegal settlement, therefore, the impact of restrictions is greatest on the people there as use of the Park even for subsistence activities is illegal.

Inclusion in the Park has led to curtailment of people's movement and limited access to the Park resources. Apart from a few compartments near the villages which have been kept open for extraction from which the people are supposed to meet their fuel, MFP and grazing requirements, all other areas have been closed for use by the people. Prior to inclusion in the Park, people were allowed to move freely for the above activities except in the old Park area. Seventeen percent of the households stated restrictions on free movement since inclusion in the Park.

The greatest restriction people face concerns grazing (68 %). This might be due to the fact that this restriction is the most strongly enforced by the FD. Apart from the old Park area, people used to be allowed to graze their cattle freely in the extension

area. Now grazing in areas other than the stipulated compartments has become a punishable offence. People are liable to pay fines if cattle stray in the unopened compartment, and if people are unable to pay the fine the livestock is impounded and taken to the cattle pound. People frequently complained about the shortage of grazing areas. Restrictions on grazing were stated most by households in the illegal settlement (87%) followed by 67% in the forest villages and 65% in the revenue villages. Considering people in the revenue villages have more livestock, it is surprising that the lowest number of households stated restriction on grazing as compared to the forest villages. This might be because people continue to graze their livestock and overlook the restriction, as there is lack of alternative grazing ground and thus are liable to have more friction with the FD.

All households inside the Park depended exclusively on the Park for fuelwood collection (Section 4.5.2). Prior to 1982, besides collecting deadwood, people chopped wood when required. Some even collected fuelwood for a few days or weeks, as they could bring back cartloads of wood. Since 1982, there have been restrictions on fuelwood collection (reported by 37% of the households). People are also no longer allowed to carry an axe into the Park and only allowed to carry head loads of deadwood.

Restriction on collection of construction material from the Park was stated by 12 % of the sampled households and on construction of new houses by 8 %. People are no longer allowed to chop down trees or bamboo for use as construction material. Even for the collection of fallen logs in the Park permission of the FD has to be sought (Section 4.5.4).

Two percent stated restrictions regarding entry of vehicles into the Park. The FD has to be informed before a vehicle can be brought inside, which, in an emergency, proved to be very inconvenient. Though the Park authorities in principle provide a vehicle in emergencies this is not always possible as the FD only has a few vehicles and they have to come from the range headquarters located at a distance from the villages.

Most people living in the extension area used to practice hunting partly as rituals and partly for livelihood (Sawhney 1998). Since 1982, hunting has been banned, a restriction listed by only 9% of the surveyed households. About 5 % stated restrictions on MFP collection. New areas can no longer be brought under cultivation, which was

stated as a restriction by 6 % of the sampled households⁵¹. Other restrictions such as use of crackers for crop protection, setting fire around *mahua* trees for easier collection, fencing and leaves collection as fodder were stated by less than 1% of the households.

The FD acknowledged restrictions being imposed on the people since inclusion of the extension area in the Park. Of the FD officials interviewed, 76% stated restrictions on cutting trees/ bamboo and lack of permanent assets, 65% stated restrictions on grazing, 53% were of the opinion that there were restrictions on MFP and fuelwood collection and on hunting. 47% felt the movement of people was restricted. Restriction on collection of construction wood was stated by 41 % of the FD officials, while 24% reported restrictions on carrying an axe into the forest (24 %), cultivation (18 %), and other restrictions (6 %) (Table 5.3).

Table 5.3: Forest officials’ opinion regarding restrictions imposed on people after inclusion in the Park (n=17)

Restrictions	Total response	Percentage
Inability to cut green trees/ bamboo	13	76
No permanent assets	13	76
Grazing	11	65
MFP collection	9	53
Fuelwood collection	9	53
Hunting	9	53
Free movement	8	47
Collection of construction wood	7	41
Carrying axe into the forest	4	24
Lack of electricity	4	24
Cultivation	3	18
Other restrictions	1	6

There were not many differences in the perceived restrictions by different tenure type with 90 % of the households in both the revenue and forest villages claiming restrictions and 100 % in the illegal settlement. Both the revenue and forest villages stated an equal number of restrictions (16), whereas households in the illegal settlement stated fewer restrictions (10). Ban on entry of vehicles, use of crackers for crop protection and setting fire around the *mahua* tree for easier collection were stated as

⁵¹ Only three cases of encroachment, which have since been removed, were recorded since the inclusion of the extension area in the Park. According to all forest officials interviewed during the field study, none stated encroachment of land by people living inside the extension area as a problem.

restrictions exclusively by the forest villages; restriction on fodder collection by the revenue villages and extraction facilities exclusively by the illegal settlement.

Though not stated by the households and possibly not perceived as a restriction or noted by the forest officials, people are no longer allowed to use guns for protecting their crops from wild animals, as there is a ban on keeping guns within a 5- five km. radius of the PA boundary. Households possessing guns at the time of the inclusion in the Park have had to surrender them. Only one household amongst the sampled households had a licensed gun. The reason why this household had a gun could not be clarified.

Interestingly, there was no restriction stated by all the households and, therefore, the total response to the various restrictions was less than 100 %. This might be because, most households did not perceive the restrictions as such and carried on with their activities as before. Other factors contributing to this are discussed in greater details in chapter 6. This also applies to the forest officials, as none of the restrictions were stated by 100 % officials nor were as many restrictions stated as by to the people. The reasons for this are explored further in Section 6.1. Also, the vast difference in opinions regarding restrictions imposed between the households and the FD, especially regarding free movement of people in the Park, MFP collection, fuelwood, hunting, and collection of construction wood, point to the fact that although these restrictions are in place, they are not adhered to nor are they strictly imposed. Only with regard to restrictions on grazing do the opinions of the people and the FD coincide. On the one hand, the forest officials realize that people cannot be stopped from entering the forest for fulfilling their needs in the face of lack of alternatives and substitutes for meeting their requirements. On the other, it is difficult for the village- based staff to keep a check on the activities of all the villagers at all times, as there is a shortage of staff at the field level (Section 6.1).

5.1.2 Problems due to restrictions

More than 92 % of the sampled households stated facing problems due to restrictions imposed since inclusion in the Park (Table 5.4). A similar number of households in the forest villages and revenue villages reported facing problems, i.e., 92 % and 93 %

households, respectively, while only 33 % of the households in the illegal settlement stated problems due to the restrictions.

Table 5.4: Problems due to Park (percentage of households listing problems per village type) (n=155)

Problem	Overall	Forest village	Revenue village	Illegal settlement
Crop damage	43	43	50	-
Inability to cut green trees/ bamboo	21	18	23	27
Lack of electricity	21	20	25	-
Lack of irrigation facilities	21	23	20	13
Lack of employment	17	28	11	7
Drinking water for people and livestock	14	10	13	33
Lack of other facilities	10	20	3	8
Threat of relocation	6	7	8	-
Grazing	6	8	-	33
Harassment by forest officials	6	7	6	8
Lack of school	6	8	1	20
Lack of health facilities	5	3	5	7
Distance from market	5	3	3	13
Lack of sufficient food	3	-	3	13
Road/ transportation	3	7	1	-
Restriction on vehicle entry	2	-	-	-
Problems in cultivation	1	-	1	7
Problems in house construction	1	3	3	-
Other problems ⁵²	10	7	10	-
None	8	8	8	7

Crop damage was perceived by the households as the biggest problem (43 %), as the increase in wildlife numbers due to better protection was a natural consequence. Although the FD also stated it as a problem faced by the resident human population, only 29 % were of the opinion that it posed a grave problem. Inability to cut green trees or bamboo for use as fuelwood, construction material and fencing was stated as a problem by 21 % of the sampled households.

⁵² Other problems include: Fuelwood collection; underpaid; no repair work; crop protection; disease in livestock; restricted to open compartment only; lack of fodder; problems of fuelwood; problems in practising better agriculture; decrease in income level; vet; social worker; lack of teachers; have to 'steal' for meeting daily needs; shortage of land for cultivation; difficult to make a living; and too many restrictions.

Despite the fact that there are restrictions on fuelwood collection, only one household stated this restriction as a problem. This might be because people continue to lop trees for use as fuelwood as they do not have alternatives. This also indicates the inability of the FD in imposing the restriction, maybe in recognition of the importance of fuelwood for the people and also that people can ill afford to buy fuelwood from distant extraction depots.

Seventeen percent of the households stated lack of employment opportunities inside the Park since their inclusion. Before that a large number of households were employed by the FD for felling trees and in charcoal making, which took place in the village itself. All forestry operations came to a halt in 1982, thus depriving those households of a permanent and steady source of income.

Access to limited grazing areas was stated as a problem by 6 % of the households. This poses a problem because the livestock tends to stray in the closed compartments, where it runs the risk of predation and being impounded. Initially, people used to graze their livestock all over the extension area but now only certain compartments are open for grazing. These open compartments tend to be overgrazed as neither is rotational grazing practiced nor is livestock stall-fed due to various reasons (Section 4.7.3). The grazing of livestock belonging to villages outside the Park further compounds the problem. Although livestock of only 34 villages outside the Park boundary are allowed to graze legally inside the Park, for the remaining 26 peripheral villages, the Park also continues to be an important grazing ground. Surprisingly, grazing was not reported as a problem by households in the revenue villages. Several factors could contribute to this. People might be continuing to graze in the Park area at the risk of being fined or cattle being impounded as they do not have alternative feeding ground; they might feed larger amounts of crop residue to their livestock; they might lop more trees for fodder, hence causing more damage and destruction to trees (Section 6.2) or bribe the forest officials (Section 6.1).

Although a policy stipulation (Section 3.2.2), relocation was perceived as a problem by only 7 % of the households. Till now, the relocation plan for only one village (Kallwah village) has been drawn up and sent for approval to the central government. The Park authorities are hoping that once this village has been successfully relocated, the other villages will follow suite. As forced relocation is not allowed even

in a NP (Section 7.1), the Park authorities stated the willingness of people in Kallwah village to relocate. However this was contrary to the statements made by the villager's themselves. Of the households surveyed in Kallwah, 72 % were against relocation. Only 56 % stated moving if forced to move and even then only after additional demands, besides the compensation package currently being offered by the government, are met. In Mehanwah, Milli and Kumarwah, people were aware of the relocation issue, but it had been mentioned only vaguely to them. The issue of relocation had come up in Gadpuri a few years ago when the Collector had visited the village and asked for the people's consent. The people had demanded more money for their land than is currently provided in the relocation package, and the issue subsequently died down. People in Gadpuri were now of the opinion that they would not be relocated. The people in Bagdari were not willing to move at all. This might be the reason why households did not perceive relocation as a major problem.

Nearly all households favored different developments in the villages such as roads, electricity, market and hospital, which are contrary to the conservation objective of the Park. Hence none of these facilities can be made available to the villages in the extension area. The two other major problems stated by the households, i.e., electricity and lack of irrigation facilities, are development-related problems. Electricity cannot be provided for fear of poaching by electrocution. Lack of irrigation facilities essentially due to lack of electricity was stated as a problem by 20% of the households. However, access to better irrigation facilities to some extent might be able to mitigate the losses in crops due to crop damage (Section 5.1.3).

The FD officials also felt that problems were being faced by people due to the imposed restrictions. Thirty five percent were of the opinion that people faced problems in fuelwood and MFP collection, and in grazing. Twenty nine percent stated crop damage as a problem. Twenty five percent stated inability to hunt, whereas 13 % stated other problems including lack of development in the villages, feeling of 'freeness', and inability of the villagers to carry out their activities in the open (Table 5.5).

Table 5.5: Problems faced by people due to restrictions (forest officials perception)
(n=17)

Problem	Total response	Percentage
Fuelwood collection	6	35
Grazing	6	35
MFP collection	6	35
Crop damage	5	29
Inability to hunt	2	25
Lack of development	1	13
Lack of electricity, inability to sell land, lack of health facilities	1	13
Can't do anything in the open	1	13
Lack of freeness	1	13
Restriction on movement	1	13
Lack of transportation facilities, inability to expand agricultural land, inability to cut trees	1	13

5.1.3 Costs incurred due to the Park

Due to the restrictions imposed, people not only faced problems but also bore different costs. Problems related directly to the restrictions, whereas costs related to the consequences of the restrictions and problems. More than 92 % of the households stated incurring costs due to the Park (Table 5.6). Response to costs incurred was similar across the different village types. The highest cost seemed to be of crop damage, as nearly 88 % of the households reported having crop damage; livestock losses were reported by 41 % of the households; inability to extract MFP, which constituted one of the largest income sources for the households (Section 4.5.3), was reported by 25 % of the households. Other major costs incurred included inability to hunt (16 %), human loss because of wildlife (9 %) and lack of employment opportunities (5 %).

Table 5.6: Costs incurred due to the Park (Percentage of households listing costs)
(n=155)

Type of Damage	Overall	Forest village	Revenue village	Illegal settlement
Crop damage	88	90	88	80
Livestock loss	41	30	44	73
Inability to freely extract forest produce	25	20	24	47
Inability to hunt	16	13	18	20
Human loss	9	3	11	20
Grazing	5	2	4	27
Lack of employment	5	10	1	-
Fuelwood	1	2	1	-
Shortage of water for livestock	1	2	-	7
No development	1	2	-	-
Unavailability of timber and rocks for well repair	1	-	1	-
Inability to cut trees	1	2	-	-
Lack of fodder	1	2	-	-
Inability to sell forest products	1	2	-	-
Lack of facilities	1	2	-	-
Harassment by forest officials	1	-	1	-
Restrictions	1	-	1	-
Fines for grazing	1	-	-	7
Lack of roads	1	2	-	-
Lack of electricity	1	2	-	-
Lack of ration food shop	1	2	-	-
Inability to get credit	1	2	-	-
No costs incurred	8	7	9	7

There were differences amongst tenure types with regard to the major costs incurred. For crop damage the response was similar, with 90 % of the forest villages, 88 % of the revenue villages and 80 % of households in the illegal settlement stating it as a cost. Livestock losses as a cost due to predation was the highest for the illegal settlement (73 %), followed by the revenue villages (44 %) and forest villages (30 %). This is in line with the fact that people in the illegal settlement had the highest number of livestock and the forest villages the lowest (Section 4.6.1). Inability to extract forest produce freely was stated by the highest number of households in the illegal settlement (47 %), compared to only 24 % in the revenue villages and 23 % in the forest villages. Inability to hunt was also stated most frequently by households in the illegal settlement (20 %), 18 % in the revenue villages and 13% in the forest villages. As for human loss,

20 % in the illegal settlement stated it as a cost, followed by revenue villages (11 %) and 3 % in the forest villages.

Crop damage and lack of employment were stated most by the forest villages; grazing livestock losses, inability to freely extract forest produce, inability to hunt, human losses and shortage of water for livestock were stated by most households in the illegal settlement. Forest and revenue villages stated lack of accessibility to fuelwood as a cost. Lack of development, inability to cut trees, lack of fodder, inability to sell forest produce, lack of facilities and other development activities were stated as costs exclusively by the forest villages. Unavailability of timber and rocks for well repair, harassment by forest officials and restrictions *per se* were reported as a cost only by the revenue villages whereas fines for grazing were reported exclusively as a cost by the illegal settlement. Overall, maximum costs were stated by the forest villages (18), followed by revenue villages (11) and the illegal settlement (8).

Costs incurred by the people since their inclusion in the Park as stated by the forest officials are stated in Table 5.7.

Table 5.7: Costs to people due to the Park (forest officials' perception) (n=17)

Cost	Total response	Percentage
Increased crop damage	16	94
Changes in crops grown	4	24
Reduction in crop sown area	3	18
Inability to protect crops grown	5	29
Livestock lifting	7	41
Insufficient area for livestock grazing	8	47
Human loss	4	24
Lack of employment opportunities	9	53
Decrease in income levels	4	24
Limited access to Park resources	7	41
Lack of development	5	29
Inability to freely extract forest products	8	47
Inability to sell land	4	24
Inability to get loans against land	3	18
Inability to set up land as security against bail	3	18
Poor fuelwood and fodder availability	1	20
Lack of transportation and health facilities	1	20
Inability to do what people want	1	20
No felling	1	20
Inability to graze livestock freely	1	20

A few other costs not explicitly stated by the households but by the FD, especially regarding people living in the revenue villages were: the inability of the people to sell their property as outsiders do not want to shift in and be subjected to the rules and regulations of the Park, inability to set up their land as security for bail or get loans against their land.

Crop damage, livestock lifting and threat to human life were assumed to be the major costs for the people due to increase in wildlife populations. These three issues are therefore discussed in more details below.

Crop damage

Because of better protection, there has been a steady increase in the number of wild animals in the Park over the years, especially of crop raiding species like wild boar (*Sus scrofa*), spotted deer (*Axis axis*), sambar deer (*Cervus unicolor*), and blue bull (*Boselaphus tragocamelus*) (Appendix A4). There is no denying the fact that there was crop damage⁵³ before the inclusion of the extension area in the Park, but there has been an increase in the incidence of crop damage over the years especially since 1982. Of the sampled households growing crops, 95% reported crop damage in 2000. This points to a direct relationship between increase in wildlife population and increased crop damage. Increased damage to people's crops due to the increase in the wild animal population since inclusion of the extension area in the Park was also stated as a cost by 94 % of the forest officials (Table 5.7).

Total amount of crop damage due to wildlife

The sampled households lost a total of 48 % of their total production in 2000 due to crop damage by wild animals (Table 5.8). The percentage crop damage for the forest villages (52 %) and the revenue villages (51 %) was similar. Only households reporting crop damage in 2000 were asked to quantify the damage (95 % of the households).

⁵³ Crop damage / damage henceforth refers to crop damage due to wildlife. Other factors responsible for crop damage include climatic factors, such as, lack of or untimely rains, disease and pest and soil infertility.

Table 5.8: Crop wise damage by wild animals in 2000

Crop	Actual damage (total loss in kg)	Percentage damage (loss of crop)	Loss in monetary terms (US \$)
Wheat (<i>Triticum aestivum L.</i>)	24226	42	2575
Rice [<i>Oryza sativa (L.)</i>]	28832	55	3983
Maize [<i>Zea mays (L.)</i>]	16979	42	-
Mustard (<i>Brassica juncea L.</i>)	2934	36	-
Kodo [<i>Paspalum scrobiculatum (L.)</i>]	7849	76	-
Kutki (<i>Picrorhiza lindleyana</i>)	487	94	-
Arhar [<i>Cajanus cajan (L.)</i>]	1346	66	343
Til [<i>Sesamum indicum (L.)</i>]	145	64	123
Urud [<i>Vigna mungo (L.)</i>]	106	90	715
Channa [<i>Cicer arietinum (L.)</i>]	95	40	-
Jawar (sorghum)	75	43	-

As no direct measurement of crop damage was performed, the figures might be exaggerated and should be treated as only a rough indication of the extent of the damage. Nevertheless, it appears that damage due to increased wildlife numbers *does* pose a serious problem for the people living inside the Park. Of the villages, Magdi (forest village) recorded the highest crop damage (64 %) and Gadpuri (revenue village) the lowest (36 %). There was maximum damage to *kutki (Picrorhiza lindleyana)* (94 %), *urud [Vigna mungo (L.)]* (90 %), and *kodo [Paspalum scrobiculatum (L.)]* (76 %). It is not possible to state the total crop damage in monetary terms, as no market exists for some of the crops. For the staple crops the total damage was approximately US\$ 6500.

Households were also asked to identify the wild animals causing the damage to different crops. The wild boar was stated by 72 % of the households as causing the most damage. Spotted deer (15 %), *sambar* deer (3%), common *langur (Presbytis entellus)* and others including jackal and birds (5%) were also reported as causing crop damage.

Changes in crops grown

In response to crop damage, households have made changes with regard to the crops they grow, i.e., they have reduced the area under a specific crop or stopped growing a crop. A total of 50 households (34 %) reported a change in crops grown. Of these, 64 %

had made changes because of damage caused by wild animals, 18 % due to disease and pest, 8 % due to climatic factors and 14% for other reasons, including unavailability of seeds. Of the households that had made a change in crops grown, 27 (54 %) were in the revenue villages and 23 (46 %) in the forest villages. No one in the illegal settlement had made a change in crops grown. This might be because people in Kumarwah do not have fields and only cultivate kitchen gardens, which are smaller in size and hence can be better protected.

Of the 50 households reporting a change in crops grown, 36 % had reduced the crop area and 70 % had stopped growing a crop altogether. Only three households had made changes before inclusion in the Park. The rest of the households had made the changes after 1982. The main crops changed include *arhar* [*Cajanus cajan* (L.)], *til* [*Sesamum indicum* (L.)], *kodo* [*Paspalum scrobiculatum* (L.)], *urud* [*Vigna mungo* (L.)] and rice (Table 5.9).

Table 5.9: Number of households reporting changes in crops grown (by crop type) (n=50)

Crop	Reason	
	Due to crop damage	Due to other reasons
Wheat [<i>Triticum aestivum</i> L.]	4	1
Rice [<i>Oryza sativa</i> (L.)]	7	0
Maize [<i>Zea mays</i> (L.)]	4	1
Kodo [<i>Paspalum scrobiculatum</i> (L.)]	12	2
Kutki (<i>Picrorhiza lindleyana</i>)	6	3
Arhar [<i>Cajanus cajan</i> (L.)]	14	0
Til [<i>Sesamum indicum</i> (L.)]	12	0
Urud [<i>Vigna mungo</i> (L.)]	11	9
Masur [<i>Lens culinaris</i> (M.)]	1	0
Channa [<i>Cicer arietinum</i> (L.)]	1	0
Wild rice	0	1
Wild mustard	0	1

The reduction in crops grown in response to crop damage implies an additional cost for the affected households in terms of reduced sales or higher costs for buying food. Of 7 households that sold crops before, 5 no longer do so. Indeed they now have to resort to buying from outside. The same is true for the remaining 43 households. Thus, not only has crop damage led to a change in crops grown, it has also affected the income levels of people.

Crop protection measures

Since the inclusion in the Park, people are neither allowed to keep guns (Section 5.1.2) nor are they allowed to use crackers to scare away the animals. General observations suggest that the two staples, rice and wheat, are the two most closely guarded crops (Bashir 2000). All households kept a constant watch in their fields, 94 % scared the animals away by making a noise. Only 30 % of the households fenced their fields for crop protection as they claimed fences to be ineffective especially in the case of wild boar, which is capable of digging under the fence to get into the fields. The people also used various other methods of crop protection (Table 5.10). Some traditional methods like the use of scarecrows were observed, however, the degree of effectiveness of this is not known.

Table 5.10: Crop protection measures (n=149⁵⁴)

Protection measure	Total responses	Percentage
Keep a constant watch	149	100
Trap the animal	1	0.67
Scare by making noise	140	94
Fencing	45	30
Use a dog	5	3
Hit with stones	7	5
Stun with torchlight	2	1
Psychological fencing	3	2
Fire	1	1
Chase the animals away	6	4

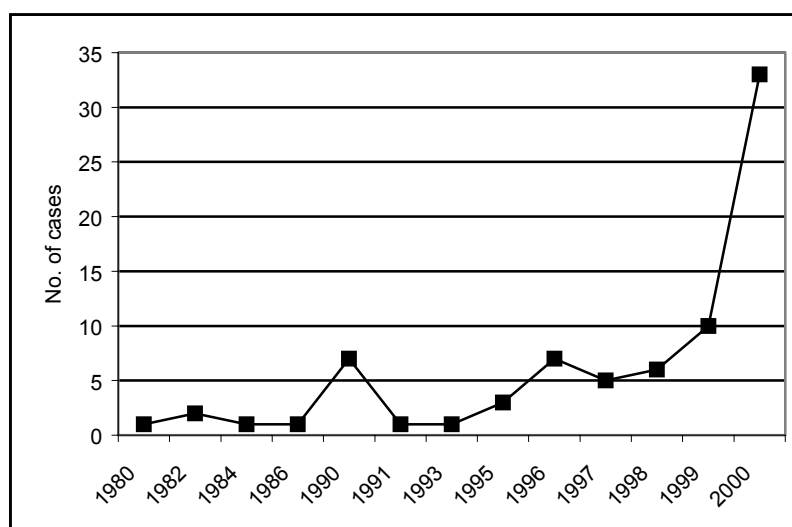
No crop compensation is given to people, as the state of MP does not have a crop compensation or crop insurance policy. This being the case and due to the huge losses suffered by people on account of crop damage, there has been a great deal of resentment toward the wild animals and also toward the Park as people now feel helpless with regard to protecting their crops. It used to be easier for the people to keep a check on the number of wild animals, especially of crop raiding species, when they had crop protection guns.

⁵⁴ Six of the households did not cultivate and thus this question did not apply to them.

Livestock lifting

The Wildlife (Protection) Act, 1972, is quite clear on the issue of grazing which is explicitly prohibited in a NP (Kothari 1997). However, as people have no alternative grazing ground (Section 4.7.3), livestock tended to graze in the Park and stray into the closed area and hence was prone to predation by wildlife.

Seventy nine of the sampled households reported livestock losses due to predation. As in the case of crop damage, the increase in the number of wild animals has led to an increase in livestock losses. There has been a steady increase in the number of predation cases since inclusion in the Park, which have risen from two cases in 1982 to 33 in the year 2000 (Figure 5.1). Of the 79 cases reported, 36 (46 %) took place in the unopened compartments, 35 (44 %) in the open compartment and the remaining 8 (10 %) in the village or household compound. Thus, contrary to the assumption stated by FD of increased livestock lifting due to increased illegal grazing, i.e., livestock straying in the closed compartment, 54 % of the cases had taken place in the open area.



Source: Field Survey, September 2000- November 2001

Figure 5.1: Cases of livestock lifting

Compensation for livestock lifting

The FD provided compensation for livestock lifting if the livestock was lifted in the open compartment, and if the case was registered within 48 hours of the incidence. All villages that are legally allowed to graze their livestock inside the Park are entitled to livestock compensation. For the villages inside as well as outside the Park, predation of

livestock in the village is also subject to compensation. The households were asked if they had applied for or received compensation for predation, their reasons for not applying for compensation, why compensation was not received, and their views on compensation if received (Bashir 2000).

Of the households suffering from livestock losses, only 43 % had claimed compensation, of these only half were actually compensated (Table 5.11). Of the people not receiving compensation, 35% didn't know why their application had been unsuccessful, 29 % explicitly stated not having bribed the forest officials and therefore not receiving the compensation, and 23 % stated being ineligible for compensation (Table 5.12). Most successful applicants were, however, dissatisfied with the compensation they had received: 83 % households reported inadequacy of compensation received, and only 12 % said the compensation was adequate.

Table 5.11: Compensation claimed for livestock lifting (n= 79)

Compensation claimed	Number of households	Percentage	Compensation received	Percentage
Yes	34	43	17	50
No	44	56	-	-
No answer	1	0.12	-	-

Table 5.12: Reason why compensation was not received (n=17)

Cause	Total responses	Percentage
Don't know	6	35
Livestock in unopened compartment	4	24
Didn't bribe	5	29
Livestock dragged by tiger in unopened compartment	1	6
No answer	1	6

Of the households not claiming compensation, 61 % stated that the livestock had been in the unopened compartment and they were, therefore not entitled to getting compensation; 14 % stated it was not worth the time and the money, as the process of applying for and getting compensation was a tedious one involving a lot of paperwork, 9 % gave religious reasons, and 5 % were not around to make the claim (Figure 5.2).

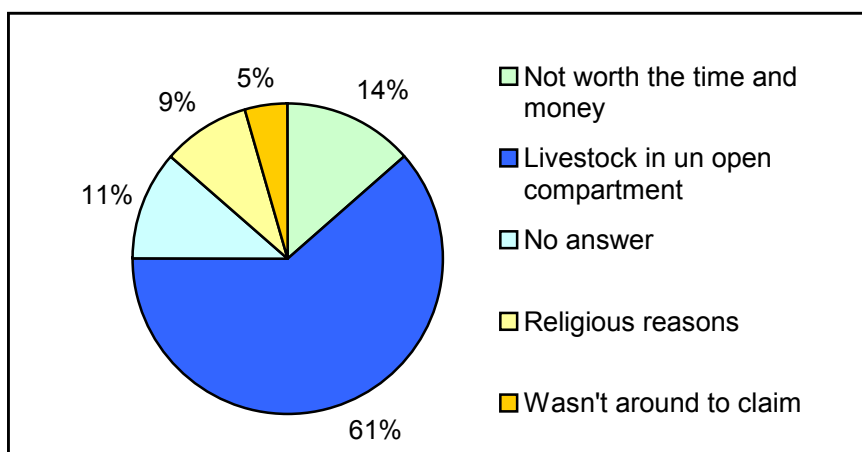


Figure 5.2: Reason for not claiming compensation for livestock lifting

Human injury and death

In case of human death due to wildlife predation, a compensation of Rs.20, 000 (US\$ 425) is provided. In case of human injury, the medical bill is borne by the BNP authorities up to a maximum of Rs.7500 (US\$ 159), which seems to be adequate, as none of the households who had members incurring injuries, complained about it. Since inclusion in the Park, 5 % of the households reported the death of a household member from wildlife attacks; a further 4 % reported injuries. All except for one household received compensation. Both the forest villages and the revenue villages reported an equal number of human losses since inclusion in the Park.

5.2 Changes since inclusion in the Park

Households were asked to state the changes that had taken place since the inclusion in the Park. These included changes with regards to availability of forest produce, i.e., MFP and fuelwood, as these two are directly derived from the Park and used for subsistence and income generation. Decreased availability of MFP since inclusion in Park was stated by 45 % of the households⁵⁵. Of these more than 53 % specified *mahua* as the main MFP changed, followed by *char* (45 %) and *tendu* fruit (43 %) (Table 5.13). While *tendu* fruit was used exclusively for self- use by the households, *mahua* and *char* were also sold and bartered (Section 4.5.2). Most people attributed the change in availability of MFP to an increase in wildlife population and 6% due to damage by

⁵⁵ Decreased availability was invariably confused with decreased accessibility of MFP by the households and not due to a decline in the MFP levels since inclusion in the Park *per se*.

wildlife. Changes were attributed to an increase in human population and damage through people by 29 % of the households.

Table 5.13: Change in forest produce (n=69)

Forest Produce	Total no. of households	Percentage
<i>Mahua (Madhuca indica)</i>	37	54
<i>Char (Buchanania Lanzan)</i>	31	45
<i>Tendu fruit (fruit of Diospyros melanoxylon)</i>	30	43
<i>Dori (seed of Madhuca indica)</i>	13	19
<i>Amla (Emblica officinalis)</i>	23	33
<i>Tubers</i>	1	1
<i>Bel</i>	2	3
<i>Bringi Fruit</i>	1	1
<i>Sal seeds (seeds of Shorea robusta)</i>	1	1

To measure changes in the availability of fuelwood, households were asked about changes in the distance traveled for the collection of fuelwood in the last five years, the reasons for changes, and about changes in the availability of tree species for fuelwood use. Amongst the sampled households, 44 % stated a change in the distance traveled for fuelwood collection. Of these, 43 % reported traveling greater distances for collecting fuelwood. An increase in the distance traveled due to decreased availability of fuelwood was reported by 38 % of the households, 55 % stated no change in the availability of fuelwood. Surprisingly, 6 % reported increased availability of fuelwood but having to travel greater distances because of better protection by the forest officials. On the other hand, 26 % of the households perceived better protection with decreased availability of fuelwood for household use. Only 24 % of the households reported a change in fuelwood species of which 86 % stated a decrease in available fuelwood species.

5.3 Benefits of the Park

Despite the restrictions and the consequent problems and costs incurred, there is no denying the fact that people also derived benefits from the Park (Table 5.14). Eighty-

eight percent of the households reported deriving benefits from the Park⁵⁶. These ranged from availability of fuelwood (92 %) to availability of fodder for livestock (13 %). The Park also provided an important source of water. It has a number of perennial and seasonal streams flowing through it with five major rivers originating in the Park. In the drought of 1998, there was no perceptible drop in the water levels in the wells inside the Park, while water scarcity was observed in the villages surrounding the Park. Water from the wells was used not only for drinking purposes by people and livestock, but also provided water for irrigation and was stated as a Park benefit by 55 % of the households.

Households in the forest villages stated the highest number of Park benefits (11). Ease of accessibility to forest products was reported only by the illegal settlement. People in the forest villages also equated benefits to the larger environmental context.

Table 5.14: Park benefits (Percentage of households listing benefits) (n=155)

Benefits	Overall	Forest village	Revenue village	Illegal settlement
Fuelwood	83	77	21	67
MFP	75	67	85	60
Water	48	32	59	60
Fruits/nuts/ honey, etc.	41	33	46	46
Construction material	25	13	29	53
Medicine	9	3	13	13
Fodder	8	3	6	33
Employment	5	-	9	-
Tubers	4	2	5	7
Leaves for goats and livestock	2	2	3	-
Easy accessibility to resources	1	-	-	2
Pure air	1	2	-	-
Bamboo	1	2	-	-
No benefits	9	17	1	20

⁵⁶ Benefits of the Park were equated with benefits of the forest by some households. The point to be noted is that if there were no protection, the forests inside the Park area might be as degraded as the ones surrounding the Park. Therefore, availability of things utilized by the people would have been less in some cases.

5.4 People's perception regarding wildlife, the Park, and its management

Because of the changes entailed through inclusion of the extension area in the Park, the resulting restrictions, associated problems and costs arising from it for the people, it was assumed that people's attitude towards the Park would be affected in proportion with the kind and degrees of the problems faced.

To gauge people's perception about the Park, households were asked questions related to awareness about the existence of the Park, reason for Park formation, need for the Park, need for conserving wildlife (Bashir 2000), and effectiveness of the FD in managing the Park.

5.4.1 Awareness of Park existence and need for wildlife preservation

Almost all households (98 %) were aware of the existence of the Park. Of the two people unaware, one was aware of the rules and regulations of the Park while one was not. For questions pertaining to the reason for the formation of the Park, a surprisingly large number of households (46 %) did not know why the Park had been established, 27 % stated protection of wild animals and forests as the reason, 12 % stated protection of the forest, 5 % gave other reasons (e.g., protection of forest resources for the people, provision of fresh air and clean environment, to stop the abuse of the forest by the people, and protection for the good of man and animals), less than 2 % stated revenue from tourism for the government as a reason (Figure 5.3).

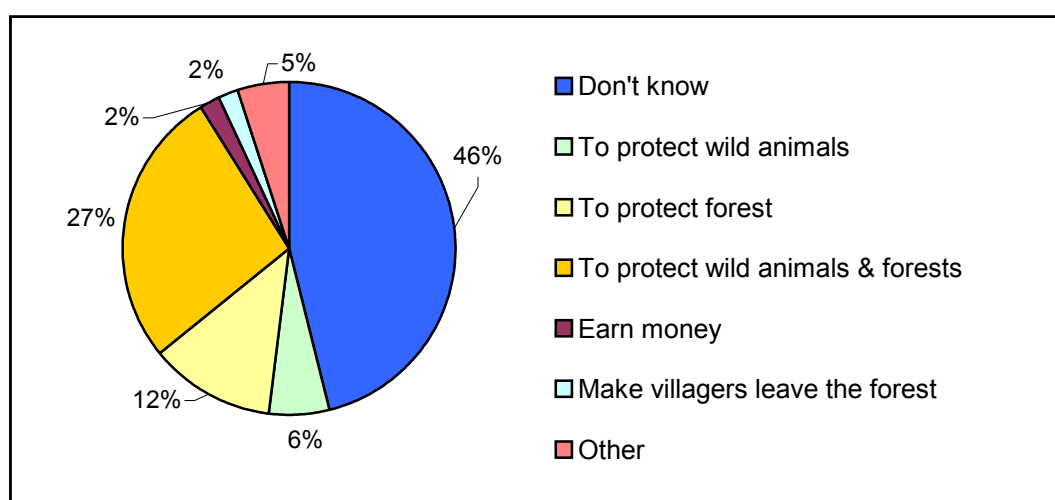


Figure 5.3: Reason for Park establishment

There were major differences among tenure types regarding reasons for the establishment of the Park. More than half the households in the forest villages (52 %) did not know the reason for Park formation compared to 48 % households in the revenue villages, and 20 % in the illegal settlement.

Although more than half the households were against the Park, 61 % were in favor of protecting wildlife and consider it important to protect wildlife. This excluded those households who only considered wildlife protection important if it did not lead to crop damage. Of the households in favor, 67 % gave reasons for it. 5 % stated that wildlife should be protected because it was there, 42 % stated the necessity for its protection because it was living, 2% stated wild animals had as much right to live as human beings, and 50% stated other reasons including aesthetic sense and addition to the value of the forest.

5.4.2 Attitude of the people towards the Park

Many factors affect the perceptions and attitudes of the households towards the Park (Bashir 2000). Some of the possible factors include- 1) employment opportunities with the forest department or households having other alternative sources of employment (i.e., work outside the Park or have other alternative sources of income within the Park such as agricultural labor, manual labor or tending to other people's livestock), 2) size of people's landholding, 3) Households experiencing crop damage or people having livestock losses, 4) Households who perceived a change in availability of MFP, 5) tenure type, depending on the kind of restrictions, problems and costs faced by people, households in different tenure types might vary in their attitude towards the Park.

Simple correlation tests were done to determine which of these factors affect the households attitudes positively/ neutrally or negatively towards the Park (Table 5.15).

Table 5.15: Results of correlation tests

	Correlation coefficients with attitude (positive=2, neutral=1 and negative=0)
Perceived changes in MFP availability (changed=1)	.289***
Livestock loss (lost=1)	-.180**
Tenure type (revenue village=1)	-.145*
Employed by forest department (yes=1)	-.005
Ratio of income from working outside park to total income (%)	.041
Ratio of income from other sources of income to total income (%)	.074
Crop damage by wildlife (yes=1)	-.042
Per capita size of land	.125

* Significant at 10%, ** at 5%, *** at 1% (two-tailed Pearson correlation test)

Perceptions of changes in availability of forest produce is significant and negatively correlated with the households attitude, meaning that households which perceived a change in the availability of MFP tend to be more against the Park. Similarly people who experienced livestock losses are more likely to be against the Park. The same holds for people who experienced crop damage, but the correlation is not significant. Tenure type (revenue village) as expected was negatively correlated and significant at the 10% level. Households in the revenue villages tended to be against the Park due to the reasons discussed in Section 5.1.3. Surprisingly employment by forest department, even permanent employment, was insignificant and is negatively correlated. This might be because most households are employed as temporary wage employers with an average total number of 38 employment days in a year. Also, fewer households are now employed by the FD than before (Section 5.1.2). Presence of other alternative source of income, with regards to ratio of total income generated from working outside the Park to total income and ratio of total income from other alternative sources of income to total income was not significant but positively correlated indicating that people with other alternative sources of income might at least be neutral towards the Park. The size of the land holding contrary to expectations, does not appear to affect people's attitude though it is positively correlated.

Some of the correlation results are consistent with a study conducted by Dhaundiya (1997) on factors affecting people's attitude towards the forests in the forest

corridor between Rajaji-Corbett NPs. The study concluded that households who had had some recent loss, e.g. livestock losses or human life due to wildlife were likely to have a more negative attitude. However, further and more detailed analysis, preferably using econometrics is required to confirm and establish factors affecting people's attitude towards the Park especially factors resulting in a positive attitude towards the Park⁵⁷.

5.4.2 Park Management

Forest Department and its role in Park management

More than half (58 %) of the households believed the FD was effective in the management of the Park, while 30 % thought they were ineffective and unable to do their job properly, and 11 % were not sure. From the impression received in the field, the large number of households stating effectiveness of the FD in management should be treated with caution as people might have been suspicious of the question despite repeated assurances that the interviewers would not reveal the name of the respondent answering this question.

5.5 Conclusion

All the activities of the people inside the Park are by law now 'illegal' but are tolerated by the Park authorities, as the rights of the people have not yet been settled. There are restrictions on all activities even on those concerning subsistence, while income-generating activities are an outright violation of the law. These restrictions have led to many problems, as people are heavily dependent on Park resources and have no viable alternatives.

The restrictions, problems and costs borne by the households were differentiated according to tenure type, as people in revenue villages had land security as compared to the forest villages and the illegal settlement, and therefore were expected to react differently to the restrictions and problems resulting from inclusion in the Park. However, there were no major differences in the restriction faced and costs borne across the sampled households.

⁵⁷ Such an econometric analysis is beyond the scope of this study. However, in a separate article with Dr. Stefanie Engel and Professor Ramón López this issue is being explored in more detail.

Although the people derive some benefits, such as availability of fuelwood and of fodder for livestock, these were equated with benefits from the forest and not of the Park *per se*. In addition, the costs the people had to bear in the wake of their inclusion in the Park seem to outweigh the benefits they derive. Better wildlife protection had led to a steady increase in the number of wild animals with a corresponding increase in crop damage and livestock losses. As people were not allowed to keep crop protection guns under the laws governing PAs and no crop compensation was being given, people suffered great losses with nearly half the crops being lost due to crop damage by wild animals every year. Though people were compensated for livestock losses, compensation was often inadequate and the process of getting compensation was tedious and sometimes not worth the effort.

Contrary to expectations, there had been fewer cases of human loss since inclusion of the extension area in the Park, but this does not lessen the possibilities of encounters with wild animals, as 10 % households stated loss of human life or injury as a cost of the Park. People did not appear to have any difficulties in obtaining compensation for human injury or death.

Although no attempts were made to determine the change in income levels since their inclusion in the Park, the survey results indicate that the income of the people has decreased. A far greater number of people were employed in plantation felling before inclusion in the Park than those now employed by the FD⁵⁸. Due to crop damages and preventive adjustments by households in the area cultivated, many households had to convert from selling surplus crops to buying crop produces from others. Of all the households, with members going outside the Park for employment, 79% had sought employment outside only after the inclusion of the extension area in the Park, mainly due to the lack of employment opportunities inside the Park and lack of food.

Though a large proportion of the people were in favor of wildlife preservation and recognized the need to protect wildlife, but because of all the problems and costs borne, a large proportion of the people were not in favor of the Park.

⁵⁸ The Park director confirmed this information.

6 IMPLICATIONS OF RESOURCE UTILIZATION FOR PARK MANAGEMENT

The main aim of PAs is conservation of wildlife. Therefore, the presence of humans within its boundary and the use of Park resources by people are contradictory to the Park's objectives according to the current conservation policies of the country, and thus problems in the Park's management. Chapter 5 assessed the changes that the inclusion of the extension area in the Park has meant for the people living within the Park boundary. This chapter analyses the problems posed by humans for the management of the Park and assesses possible implications of people's activities for the Park. It also aims to determine the main management problems and assesses the extent of damage caused to the Park due to resource utilization by the people.

6.1 Main management problems

In order to obtain an insight into the management problems faced by Park authorities, interviews and informal discussions were held with forest officials, including 5 higher officials from the ranks of Park director to range officer, and 12 village-based staff from the rank of deputy range officer to forest guards. All higher-ranking officials and village-based staff were interviewed on various aspects of general Park management. The higher-ranking officials were asked additional questions on research activities and potential knowledge gaps, while the village-based staff was asked additional village-specific questions. Overall, village-based staff identified more problems in Park management than the higher-level officials. According to the Park director, the biggest problem facing the Park as a whole is the presence of the large local population living in the surrounding villages and their use of Park resources, which is higher than the resource use of the people living within the Park boundary. Problems stated by the field-based staff are more related to the day-to-day problems faced in the course of dispensing their duty, whereas the higher-ranking officials placed more emphasis on problems related to efficiency in Park management.

Problems identified by the higher ranking officials:

- Lack of sufficient staff was reported as the main hurdle in effective management of the Park. There is fewer staff at present in the Park than the sanctioned posts due to the ceiling imposed on recruitment of new staff by GOMP in 1994 because of shortage of funds. As a consequence, no new staff can currently be recruited despite an urgent need for additional staff, especially at the beat guard level. Insufficient staff at the field level makes it very difficult to keep a check on the movement and activities of people (Sections 4.5.2 and 4.6.3). It is, therefore, reasonable to assume that the number of registered cases is but a fraction of the total incidences of illicit activities taking place inside the Park.
- Lack of sufficient funds especially for protection and maintenance purposes was stated as the second most important hurdle. The higher-level officials felt that most funds are required for the above-mentioned purposes but that only a minimum amount of money was allocated to them by the government.
- Lack of vehicles for patrolling: Essentially due to lack of funds, new vehicles for efficient patrolling cannot be purchased.
- Undue restrictions on transfer of staff: Transfer of staff is centrally controlled and the field director lacks discretionary powers to transfer incompetent staff.
- Higher-ranking officials also reported a lack of dedicated and educated field-based staff as a hurdle. There is a feeling that posting in the PAs is done as a punishment, while all the good staff is retained by the territorial division. Due to the present ceiling on recruitment, the field staff is aged and has been posted in the Park for a number of years, which makes them more prone to influence by poachers and timber thieves⁵⁹ (FDD #5 undated).
- Lack of awareness regarding the importance of wildlife amongst the local people was stated as another major hurdle in effective management⁶⁰.
- Problems are encountered in effectively dispensing and carrying out activities, such as relocation of inside villages, due to strong political pressure. There is a lot of vested political interest of the local politicians and MLA (member of legislative

⁵⁹ As this statement has been made in an official document of the Park, poaching and timber pilfering is obviously prevalent in the Park.

⁶⁰ This reflects the gap in communication between the Park authorities and the people, as the survey results revealed that 61 % of the people realise the importance of conserving wildlife (Section 5.4.1).

assembly), who do not want the people living inside the Park to move, as these villagers represent an assured vote bank for them.

- Although Bandhavgarh Tiger Reserve was declared in 1993, the buffer zone is still not under the administrative control of the Park director. Even now, normal forestry operations are carried out as per guidelines of working plans of respective forest divisions in the buffer zone (FDD #8 2000), i.e., emphasis continues to be on commercial exploitation of forests. This poses a management problem, as the objectives of the Park are very different from those of the regular forest division under whose jurisdiction the buffer zone lies. This also poses a problem when carrying out eco-development activities in the peripheral villages, as the responsibility lies with the Park authorities but the actual say in the matter of the villages in the buffer lies with the regular forest division. Thus, difficulties are encountered in co-ordinating activities between the two divisions.

Problems identified by the village-based staff:

- Lack of arms and equipment: Every beat guard has a few hundred acres under his jurisdiction which he has to patrol on foot with no weapons or wireless-set to contact headquarters in case of an emergency or to report and get backup if someone is caught indulging in an illicit activity.
- Lack of protection while patrolling: Usually the field staff patrols alone or with one helper. In case they chance upon people indulging in illicit activities, the forest staff is easily outnumbered and overpowered. As a result they are unable to stop people or register a case against them.
- Negligence by higher officials to carry out inspection and investigation of offences on time.
- Lack of co-operation by the higher officials: In case a person caught indulging in an illicit act does not pay fines, the case is registered with the court. If the case was registered against an influential person, the village-based staff does not have the support or the backing of higher officials to back their statements in the court.
- If the case for an illicit activity is registered in the court, the field staff has to pay money from out of their own pockets to appear in court to testify.

- Lack of provision of facilities by the forest department: The field-based staff complained about the inadequacy and inefficiency of the department in providing them with basic amenities.
- Self-centeredness of the villagers: The field-based staff frequently complained about people only being interested in fulfilling their immediate needs without paying heed to the long term consequences of resource overuse.
- Many also stated the unrealistic nature of training given to them and felt it did not equip them to deal with people, especially with women if caught indulging in an illegal activity.
- Like the higher-ranking officials, the field-based staff also identified political pressure as a problem in dispensing their duties efficiently.

Higher ranking officials also identified areas in which knowledge was lacking and hence management suffers. These include identification of i) economically viable cottage industries that can be set up to enhance the economic status of the people living in and around the Park, ii) the level of resource dependence of the inside villages on the Park for developing appropriate programs to reduce this dependence or provide alternatives⁶¹, iii) a socio-economic inventory of the dependence of the peripheral villages on the Park⁶², iv) an inventory of plants and animals in the Park, v) the protection status of the buffer zone, vi) the protection status of the forest corridor linking BNP with other PAs⁶³, and vii) ecology of lesser important animals for proper management inputs.

People *per se* pose as a management problem especially for the field-based staff. In the course of fulfilling their duty of stopping people from indulging in illicit activities, the field-based staff faces a lot of opposition and problems. Despite restrictions on the use of Park resources (Section 5.1.1), continued reliance of people on the Park (Chapter 4) leads to day-to-day friction between the forest staff and the villagers. The situation is equally applicable to the villages on the periphery of the Park, as their use of the Park resources is even ‘more illegal’ because villages inside the Park

⁶¹ The present study has attempted the same.

⁶² Socio-economic inventory was attempted by Tiwari (1995) and Tyagi (1997).

⁶³ The study conducted by Nath (2000) assessed the topic of corridors between Kanha, Bandhavgarh and Achanakmar tiger reserves in some detail.

are at least allowed to extract resources for their subsistence use. Problems and frictions with the people over resource use were reported by 81 % of the forest officials. The main causes of friction with the people stated by the Park authorities are outlined in Table 6.1. These frictions are usually in the form of arguments but 18 % of the forest officials also reported physical confrontations between the Park authorities and the villagers. Most often, efforts are made to settle the issue amicably as hostilities between the authorities and the villagers are seen as detrimental for the Park. Most often the conflicts and clashes take place on account of grazing. People try to enter the closed compartments because of better forage availability for their livestock and are invariably stopped by the forest guards. Minor conflict over crop damage and MFP collection also take place at times.

Table 6.1: Peoples activities leading to friction with the Park authorities (forest official's opinion) (n=17)

Problem	Percentage of response
Grazing	41
Intentional fire setting	18
Wood collection	6
Grass collection	6
Crop damage	6
Inattentiveness of people, people's unwillingness to pay fines	6
MFP collection	6
Lack of employment opportunities	6
No answer	35

Free movement of outsiders visiting their relatives in the inside villages poses a big problem. As the extension area has not been finally notified, the Park officials do not have the authority to stop people's relatives from visiting them. This movement of people will continue as long as the villages continue to be present inside the Park. As a consequence, the possibility of an illegal act being conducted is constant and cannot be ruled out. The field-level staff was of the opinion that until this free movement of people is stopped, the Park cannot be fully protected. There is also a constant fear of poaching by the villagers or aiding others in poaching as inside villagers have a better knowledge about areas of the Park with wild life abundance and know all routes to and from the Park.

6.2 Assessment of the degree of damage and pressure on the Park

The most important damaging uses of the Park identified by the forest officials in order of importance are livestock grazing, intentional fire setting, illicit felling, poaching and encroachment (Table 6.2). Poisoning of animals, lopping, illegal MFP collection and damage to trees for the collection of MFP are other problems noted by the interviewees. The two sets of forest officials did not differ much in their responses. The three most important types of damage identified by the higher officials were grazing, fire and poaching, and grazing, fire and illicit felling by the village-based staff.

Table 6.2: Damages caused due to resource utilization (n=17)

Problem	Percentage of forest officials listing problem as most important ⁶⁴
Grazing	59
Fire	24
Illicit felling	12
Poaching	6
Encroachment	6

For fulfilling their livelihood requirements, people move throughout the Park on a regular basis. These activities affect the extension area more than the old Park area not only because the villages are located in the former, but also because of better protection in the latter. The specific areas visited for resource harvesting and the frequency of visits varies according to the resources harvested by the people (Bashir 2000).

Although MFP collection is only allowed from the open compartments, cases of collection especially of *tendu patta* have been reported in the closed compartments and even from the old Park area where any form of MFP collection is prohibited. Collection of MFP is only allowed for the bonafide extraction of the villages in the extension area and is banned for the peripheral villages, but MFP collection by peripheral villages also takes place from within the Park (FDD #5 undated). People from Tala village also continue to collect fuelwood, bamboo, *mahua*, *amla*, *chironji* and *tendu patta* from the old Park area (Nath 2000). Especially during the time of *tendu patta* collection, hundreds of villagers enter the Park for the collection of the leaves and felling of entire trees is not uncommon for one-time collection (ibid 2000).

⁶⁴ The total percentage adds up to more than 100 % since the forest officials could state more than one problem for this question.

MFP constitutes the second most important source of income for the people living inside the Park boundary (Section 4.4.3), which means that people's reliance on the Park for MFP collection is extensive. Movement of the people through the Park for the collection of the various MFPs causes disturbance to the wildlife and also gives rise to the danger of poaching, as it is impossible to distinguish people who enter the Park for MFP collection from people who enter the Park for poaching under the guise of MFP collection. Moreover, the consumption of MFP by the people is in direct competition with the consumption of MFP by wild animals. Competition between people inside the Park and those in the peripheral villages has increasingly led to unsustainable practices and overexploitation of MFP, which in the long run causes harm to both wildlife and people. *Amla* collection is a case in point. Previously only ripe *amla* fruits were collected. Now people do not wait for the fruit to ripen and cut the tree down for faster collection. This not only leads to wastage but also to restricted availability of the fruit the following year and over time might lead to the extinction of *amla* trees in the Park. Because of this unsustainable practice, the *amla* tree has nearly disappeared from the areas surrounding the Park. Since now people from the peripheral villages have now turned to collection from inside the Park, it might eventually lead to the disappearance of the tree from the Park too.

Although not personally observed during the course of the fieldwork, setting of fire by people for collection of various forest produce, especially *mahua*, has been stated by the FD officials Nath (2000) and some of the sampled households (Section 5.1.1). The potential consequences of large-scale forest fires are destruction of habitat, loss of animal life and forage shortage for the ungulates (Nath 2000). When asked, people categorically stated that all fires caused are intentional in nature. Very rarely, if ever, fires are due to natural factors. This being the case, fire incidences in the Park are of grave concern. According to Pabla (1998), from 1984-1994, 77 % of the Park area had been subjected to fire, 49% more than twice and as much as eight times. Between 1996 and 2000, 142 incidences of fire were observed in the Park. Intentional fire setting as a revenge against the FD cannot be ruled out. This has been reported to happen when someone gets fined or is stopped by the field staff from indulging in an illicit act.

The heavy reliance of people on the Park for fuelwood (Section 4.5.1) also has consequences for the natural resource base. Availability of deadwood at present levels

of consumption appears to be insufficient to fulfill people's requirements, with cases of illicit felling being frequently reported (Section 6.2.1) and acknowledged in official Park documents. The zone of impact of fuelwood collection is likely to be especially large and of a high intensity, as households from all the villages gather fuelwood regularly from the Park (Bashir 2000). The FD officials estimate the entire Park area being susceptible to illicit felling (Section 6.2.1).

Grazing by livestock in the Park is in direct competition with the ungulates for forage. As of now, 20 % of the Park area is legally open for grazing but the area grazed by livestock is much greater⁶⁵. According to a ground cover study by Nagar (1992) in the vicinity of four villages inside the Park assessing the impact of grazing on Park vegetation, 48 % of the area near the villages is devoid of ground cover as compared to 43 % in the closed compartments and 57 % in the old Park area. This is hardly surprising as the livestock density is quite high, with 263 livestock units/ sq. km⁶⁶ (This includes the 26,563 heads of cattle of the inside villages as well as the peripheral villages legally allowed to graze in the open compartments inside the extension area)⁶⁷. This is an indicator of the pressure of grazing on the Park. Over the years there has been a steady increase in the number of livestock in the inside villages and also in villages surrounding the Park. As the Park is the only grazing area available for the livestock, there are increasing cases of illegal grazing. Even in the old Park area, cases of illegal grazing have been reported (Section 6.2.1). Increases in number of livestock might lead to overgrazing, decrease in forage availability for the ungulates, soil compaction and invasion of weed which are unpalatable to both cattle and wildlife (Saharia 1986). Heavy incidence of grazing and trampling also destroys the germinated saplings, and the forest floor becomes unsuitable for seed germination (Pandey 1993). With the presence of a large number of livestock grazing inside the Park, the constant danger of transmission of disease from livestock to wildlife is also of concern, although no serious cases of this have been reported so far (veterinary doctor, Manpur *pers. comm.*). The practice of lopping trees for feeding the calves and goats poses another problem.

⁶⁵ According to the pressure ranking of the extension area (Section 6.2.2), 42 compartments are officially open for grazing but 57 compartments are actually affected by grazing, i.e., at least 43 % of the Park area.

⁶⁶ The cattle density was calculated by dividing the number of livestock by the area legally open for grazing inside the Park.

⁶⁷ The actual cattle density is suspected to be much higher, as the number of cattle grazing inside the Park is higher than the stipulated numbers.

Sometimes, instead of lopping the branches the people cut down the whole tree also causing damage to the surrounding trees. Tree lopping for fodder even when the trees are in flower or fruit, hampers the photosynthetic process and hampers seed production needed for regeneration of the forest. It also deprives birds and mammals dependent on the fruits (Pandey 1993). The impact of other Park uses are difficult to predict as few ecological studies have been conducted in the Park till date and such an ecological assessment was beyond the scope of this study.

With regards to people responsible for causing damage to the Park due to resource utilization, no clear distinction can be made between the amount of damage caused by people living inside the Park and those living on the periphery of the Park despite the Park authority's records with regards to the number and type of offences which show that more cases are registered against people living outside the Park (Section 6.2.1) and the Park director's assertion that more damage is caused by people from the peripheral villages, as there are 10 times more villages on the periphery than inside the Park. In a study on the extent of people's activities in BNP conducted in the late 1990s that included 34 villages (2 inside villages, Bagdari and Gadpuri, and 32 surrounding villages), Nath (2000) conducted an assessment of the zone of influence of the villages. The results revealed that all villages, without exception, have zones of influence extending inside the Park boundary even though there is an explicit ban (other than grazing in the stipulated compartments by 26 peripheral villages) on the use of the Park (MFP and fuelwood) by the peripheral villages.

With the exception of a study done by Nagar (1992) about the potential negative impacts on the Park of livestock grazing and the attempts made by the present study regarding the geographical extent of grazing, no other empirical study exists on the effects of people's activities on the Park. Nath (2000), did not assess the implications of resource utilization on the Park. Therefore, it is difficult to state with certainty what the possible long-term implications of current resource use are.

Based on the opinion of the forest officials and the records of offences registered in the Park between 1995 and 2000, attempts were made to identify the extent of people's activities affecting the Park, people responsible for causing offences and areas of the Park more susceptible to people's activities.

6.2.1 Extent of damage

Table 6.3 shows the forest officials' responses to the degree of damage caused by the various activities of people. According to the forest officials, illicit felling, grazing, MFP collection, fencing and house construction had led to extensive damage to the Park. Damage due to intentional fire setting and bamboo felling causes great damage with only moderate damage being caused by lopping.

In the opinion of the forest officials, the whole area of the Park is susceptible to activities such as illicit felling, intentional fire setting, illegal grazing, MFP collection and lopping (Table 6.4). This corresponds to the information provided by the forest officials as shown in Table 6.2. *Amla* collection leads to quite extensive damage to the trees, affecting 50-75% of the Park area. Bamboo felling, encroachments, poaching and poisoning of animals (not personally observed during the course of the fieldwork) affect less than 25% of the Park area.

Table 6.3: Degree of damage due to people's activities in the Park (forest official's opinion) (n=17)

Type of activity	Amount of damage (Percentage of respondents)				
	Negligible	Slight	Moderate	High	Extensive
Illicit felling	35	29	18	6	12
Poaching	52	12	0	0	0
Intentional fire setting	41	24	12	18	0
Poisoning of animals	6	0	0	0	0
Illegal grazing	24	6	24	12	35
Illegal MFP collection	18	24	6	12	6
Lopping	35	18	12	0	0
<i>Amla</i> collection	6	0	0	0	0
Bamboo felling	12	0	0	6	0
Damage due to fencing	0	0	0	0	6
House construction	6	0	0	0	6

Table 6.4: Park area effected by people's activities (percentage response) (forest official's opinion) (n=17)

Type of activity	Percentage area effected					
	No damage caused	<25%	25-50%	50-75%	75-100%	100%
Illicit felling	6	76	6	-	-	12
Poaching	-	53	-	-	-	-
Intentional fire setting	-	59	24	-	-	6
Poisoning of animals	16	18	-	-	-	-
Illegal grazing	-	41	24	12	6	6
Illegal MFP collection	-	29	12	12	-	18
Lopping	-	41	12	-	-	6
<i>Amla</i> collection	-	-	-	-	6	-
Bamboo felling	-	6	-	-	-	-
Encroachment	-	12	-	-	-	-
Damage due to fencing	16	-	-	-	-	-
House construction	12	-	-	-	-	-

Between 1995 and 2000, 849 cases of illicit activities were registered in the Park (Table 6.5), i.e., an average of 170 cases per year. Cases of illegal fishing have not been reported in the last five years, but were observed during the course of the fieldwork.

Contradictory information was available from the Park office regarding the total number of cases registered for different illicit activities between 1995 and 2000. According to the range data, 19 cases of fires were registered (Table 6.6), but according to the aggregate data of the Park a total of 73 fire incidences took place during the period. Similarly, a total of 6 poaching cases were registered between 1995 and 2000, but 10 took place between 1995 and 2000. Repeated attempts at obtaining clarification with regard to the discrepancies in the figures at the range level and at the Park headquarters were unsuccessful. The highest number of illicit cases was registered for illicit felling (488 cases), followed by illegal grazing (255 cases) and bamboo extraction (62 cases). Other offences include illegal entry into the Park, antler collection and stone extraction (Table 6.6).

Table 6.5: Cases of illicit activities in BNP* (range-wise) (1995-2000)

Range	1995	1996	1997	1998	1999	2000	Range-wise total number of cases
Khitauli	87	71	65	47	31	75	376
Tala	39	24	22	14	31	35	165
Magdi	18	18	16	33	25	35	145
Kallwah	23	15	12	18	40	55	163
Total number of cases	164	127	116	113	127	262	849

*Includes offences by people from inside villages and by other people.

Source: BNP authorities

Table 6.6: Types of illicit activities in BNP (1995-2000) (range-wise)

Illicit activity	Kihtaui Range	Tala Range	Magdi Range	Kallwah Range	Total number of cases
Illicit felling	223	73	122	70	488
Grazing	102	40	21	92	255
Bamboo extraction	41	21	-	-	62
Illegal entry	-	6	-	-	6
Intentional Fire	6	11	2	-	19
Poaching	1	5	-	-	6
Antler	1	3	-	1	5
Grass extraction	-	1	-	-	1
Breaking barrier	1	2	-	-	3
Stone extraction	-	1	-	-	1
Illegal MFP extraction	-	1	-	-	1
Tiger bones	-	1	-	-	1
Other illicit activity	1	-	-	-	1

Source: BNP authorities

The Khitauli range exhibited the highest number of incidences of illicit felling and of illegal grazing (Table 6.6). This range, like Tala, has an abundance of bamboo, which is used by the people living in Khitauli village outside the Park, lying close to the Park boundary. Bamboo is used by these people for making items for sale. Large-scale bamboo extraction was reported by the forest officials as well as the inside villagers from this range. A total of 41 cases of bamboo extraction were registered in this range between 1995 and 2000⁶⁸. These figures correspond with the opinion expressed by the forest officials as shown in Tables 6.3 and 6.4, which state a high degree of damage due

⁶⁸ Contrary to official statements (FDD # 10 1998), Tala has the second highest cases of illicit felling and bamboo extraction (Table 6.6).

to bamboo felling in certain areas of the Park. Cases of illegal entry into the Park were reported only from the Tala range. This was to be expected as even thoroughfare is banned there. The number of registered illicit cases was the second highest in Tala. Overall, the highest number of illicit activities was registered in the Khitauli range (44 %), followed by Tala and Kallwah (19 % each) and Magdi range (17 %) ⁶⁹.

Of the total cases of illicit activities, 25 % involved inside villagers, 37 % outside villagers, 1 % involved people other than local villagers. In the majority of cases (37 %) the culprit could not be caught (Table 6.7). Only in the Khitauli range have more cases for illicit felling and illegal grazing been registered against inside villagers than against people from outside villages. In all other ranges, people living outside the Park area caused more offences. This shows that overall the villagers inside the Park cause less frequent damage to the Park as compared to those lying outside the Park ⁷⁰. This was also confirmed by the forest officials. Only 2 % of the field-based staff stated more damage being caused by the inside villages compared to the villages lying outside the Park. However, unlike the forest staff in the old Park area, the village-based staff faces more difficulties in carrying out their duties. Stopping villagers already living at the subsistence level from using resources for which they do not have viable alternatives is rife with problems. The resulting daily friction leads to tensions between the staff and the villagers which bodes ill for the relationship between the Park authorities and the people, and consequently for the Park. Therefore, the village-based staff end up being more tolerant towards the people. Also they do not have much option as they have to live amongst the very people they are supposed to stop from using the Park resources, people who by sheer numbers outweigh the handful of Park officials based in the villages. Another reason could be the vested interest of the village-based staff. Although stated by very few people, bribing of field-based staff with ghee or grains for overlooking their activities (mostly for grazing) is not an uncommon practice. Some people also stated that they are asked by the staff for things like ghee or khoya, which, if not complied with, can lead to false cases of illicit activities being registered against them. As this is an extremely sensitive issue, the majority of the people interviewed

⁶⁹ The number of cases registered for illicit activities should be treated as being indicative, as the actual number of illicit activities is much higher. Reasons for the lower number of registrations are discussed in the following pages.

⁷⁰ These percentages should be treated with caution due to the reasons discussed below.

were unwilling to discuss the issue. Such incidents are possible, as the forest guard gets a salary of US\$1071 per annum from which he has to maintain himself in the field and support his family living away from the Park area, i.e., he has to support two households on this meager salary.

Table 6.7: People responsible for different illicit activities

Illicit activity	People responsible (no. of registered cases)			
	Inside villagers	Outside villagers	People other than local villagers	Anonymous
Illicit felling	97	141	-	250
Grazing	103	135	-	17
Bamboo extraction	9	25	-	28
Illegal entry	1	5	-	-
Intentional Fire	-	-	-	19
Poaching	-	-	6	-
Antler	-	5	-	-
Grass extraction	-	1	-	-
Breaking barrier	-	-	3	-
Stone extraction	-	1	-	-
Illegal MFP extraction	-	1	-	-
Tiger bones	-	-	-	1
Other	-	-	-	1
Total number of cases	210	323	9	316
Percentage	25	38	1	37

Source: BNP authorities

6.2.2 Pressure ranking of the Park

Based on the type and extent of people's activities, a qualitative assessment of pressures exerted on the Park by people's activities (both from the inside villages and those on the periphery) was attempted as part of the present study. It demonstrates clearly that the current usage of the Park is indeed excessive and unacceptable. This assessment is based on the information provided and marked out by field-based and other Park staff

on compartment-wise range maps⁷¹. The assessment was made for the extension area only⁷².

The geographical spread of the activities was taken as being indicative of areas of resource overlap between people's activities and wildlife, and hence of conflicting resource use and pressure on the Park. For this purpose, pressure is defined as resource utilization by people in areas officially closed for people's activities and open areas closed for any other activity except for those stipulated by the Park authorities also, resource use in areas of wildlife abundance, leading to adverse effects on wildlife and its habitats were included. This could refer to areas prone to fires and closed compartments with cases of illicit felling or illegal grazing.

Each compartment was scored on the basis of a scale (Appendix A5). The scores were allocated visually based on the information provided by the forest officials (Berkmuller 1987). The higher the score, the higher the resource overlap and thus the higher the pressure due to people's activities.

The Park has a total of 186 compartments. This assessment includes only the 138 compartments in the three ranges of the extension area. Of these, only 28 compartments (23 %) were unaffected by people's activities (information was not available regarding 16 compartments of the Kallwah range). For the extension area as a whole, 77 % of the area is affected by people's activities (Map 5)⁷³. The total number of compartments open for extraction and livestock grazing are 42, but illicit activities were observed in 85 compartments⁷⁴. This indicates that more than double the legally stipulated area is affected by people's activities. Table 6.8 shows that all ranges are subjected to excessive people's activities. Most affected are areas in the Magdi range (71 %), 61 % in the Kallwah range and 56 % in the Khitauli range. This is surprising as

⁷¹ Park officials were asked to mark areas most prone to fire, areas having maximum cases of illicit activities registered, areas of wildlife abundance, cultivation by outside villagers, and open compartments.

⁷² It was assumed that little pressure is exerted on the old park area, as there is no human habitation there, stricter law enforcement and a ban on people's activities.

⁷³ According to the forest officials (Table 6.4), 100 % of the Park area is prone to illicit felling, grazing and fire. However, according to the pressure ranking only 77% of the Park area is affected. Several reasons might contribute to this: i) officials were asked to mark only areas susceptible to maximum fires, grazing and illicit felling, thus compartments with fewer cases might have been excluded, ii) despite repeated attempts, it was not possible to get information regarding 16 compartments in the Kallwah range.

⁷⁴ Even in the open compartments, lopping and cutting of standing trees, cutting of green bamboo, collection of grass, taking a cart for collection of fuelwood, and collection of fallen logs to be used in house construction without permission from the Park authorities are all offences.

the least cases of illicit activities were registered in the Magdi range between 1995 and 2000.

Table 6.8: Compartments in different ranges affected by people's activities

Ranges in extension area	Total number of compartments	Open compartments affected	Closed compartments affected	Total compartments affected
Khitauli	54	11	19	30
Magdi	41	16	13	29
Kallwah	43	15	11	26
Total	138	42	43	85

Source: Author's own calculations based on information provided by the field based staff

A total of 17 compartments were identified as being prone to regular fires, of which ten were located in the Khitauli range. Areas closed for grazing and felling, 37 compartments with most of them (13) located in the Magdi range. Forest officials in the Khitauli range stated more pressure from illicit felling as compared to illegal grazing or fire. This is in accordance with the number of cases registered for illicit felling in this range between 1995 and 2000. Illegal grazing was more common in Kallwah range. According to the number of cases registered for grazing, these were the second highest in this range. This qualitative assessment was reinforced by the data on the number and type of offences registered by the Park authorities between 1995 and 2000 (Section 6.2.1), which indicates that the Park officials' subjective assessment is a reflection of the situation prevalent in the field. This makes the data sufficiently accurate to use them for the pressure assessment (Berkmuller 1987). In eight compartments there is overlap of wildlife- abundance areas with open compartments, resulting in a direct forage conflict between wildlife and livestock. Five of these compartments lie in the Khitauli range and three in the Magdi range.

The different compartments on the basis of their scores were classified into five different pressure categories (Appendix A6). On the basis of the pressure scoring, 8 compartments were placed in the high-pressure category, 13 in the medium-high, 9 in the medium, 2 in the low-medium, and 51 compartments in the low-pressure categories (Map 6). Of the high-pressure compartments, 6 are located in the Khitauli range including Gadpuri village. The other two high-pressure compartments are located in the

Magdi range. All compartments in the high-pressure category coincide with areas of wildlife abundance, which indicates a direct conflict between people and the wildlife and also intensive pressure on pockets of wildlife abundance. For the remaining villages, Kallwah and Kumarwah fall in the medium-high category, Bagdari falls in the medium, and Milli in the low-medium pressure category. The largest number of compartments in the medium-high category is found in the Kallwah range. The main pressure in these compartments is from grazing. Overall, the Khitauli range has the largest number of compartments falling in the medium to high-pressure categories, which coincides with the information in Section 6.2.1 that shows the Khitauli range as having the highest number of illicit activities between 1995 and 2000.

6.3 Conclusion

The Park authorities face many problems in the effective management of the Park mostly due to lack of funds, shortage of staff and inadequacy of training of field-based staff. In contrast, the ground reality with the village-based staff is a feeling of being ill-equipped to deal with the people and their use of the Park resources. The presence of humans makes the Park vulnerable to many kinds of illegal uses. Lack of sufficient staff to keep a check on the activities of the people leads to inefficiency in Park management. Selfish motives sometimes lead to laxity in enforcement of rules. On the other hand, the laws pertaining to conservation are extremely stringent but strict enforcement leads to conflicts with the people and thus tensions. This puts the field staff in a very precarious position. If rules are not followed and people are allowed to extract the resources, the Park authorities are answerable to higher authorities. More often than not, the field-based staff tries to take a middle path of ignoring their duties which leads to overuse of the Park resources and undermines the conservation objective of the Park.

Although qualitative in nature, the assessment by the Park officials revealed that some human activity affects more than three fourths of the extension area of the Park. Overall, the survey results indicate that 77 % of the extension area is affected by people's activities despite the restrictions that have been placed on resource use since the declaration of the Park. The old Park area is also not free from people's activities (Sections 6.2.1) and is vulnerable to several types of damage of varying intensity

Given the high resource use and lack of viable alternatives, exclusion of resource use appears to be impossible. Providing alternative employment opportunities might prove to be a good way to reduce the pressure on the Park and to gain people's acceptance of the Park, as access to alternative sources of income appears to make people less hostile toward the Park (Section 5.4.2). Alternatives for reducing the conflicts between people and the Park described above are discussed in more details in Chapter 7.

7 POTENTIAL STRATEGIES FOR SOLVING THE CONFLICT

The previous chapters have shown the changes the formation of the Park has entailed for the people, the wildlife as well as the forest department. Continued dependence of the people on the resources of the Park has led to competition and conflict between people and wildlife on various fronts and also posed management problems. Solutions have to be found in order to resolve the conflict and diffuse the current situation, as it can only be detrimental for the Park in the long run. The possible solutions range from relocation of the villages from inside the Park, denotification of the village area from the Park, provision of alternative livelihood systems, and people's participation in Park management. Many of these solutions, however, have their own drawbacks and problems. The chapter aims to determine possible alternatives to relocation and to determine alternative sources of income.

7.1 Relocation

Though relocation of villages from inside the Park makes sense for the protection of wildlife, its implementation faces tremendous problems. First, relocation is a highly unrealistic solution for a country like India, which has millions of people living within the boundaries of PAs. Consequently, the requirements for alternative land and resources for relocation are immense (Section 1.2). Pabla (1997:10) concludes that it will take centuries to relocate all the people from all the PAs in India. The author reinforces his statement by an example of Madhya Pradesh (MP). In MP, there are villages in almost all PAs. In 1997 there were 955 villages and 77,339 families living in 45 PAs in MP, i.e., on average 21 villages and 1,718 families per PA. If these figures were to be projected at the national level, the number of families living in the country's PAs in 1997 would be between 859,000 (in 500 PAs). At the Government of India's rate of resettlement expenses (US\$ 2125.39 per family) and 2.5 hectares of land per family, the resettlement would require US\$ 145,377,000 - 180,446,000 in addition to 2,147,500 hectares of agricultural land. This amply shows the scale of the resources required for relocation of the people from within the PA boundaries and shows that relocation – if at all likely – will take a long time. MP has relocated only 33 (3 %) villages to date, 26 of them in Kanha NP (Pabla 1997). In the last five years, the number of PAs has increased

by 86 and continues to grow, with more and more people having to be incorporated in the list of those slotted for relocation. After a supreme court's order to all state governments to settle the rights of the people in all PAs in 1997, Government of Madhya Pradesh filed an affidavit expressing its inability to complete the process of relocation as the state has neither the required finances nor sufficient land for relocation (World Bank 2001).

Even if a decision is made to relocate the villages, the process of relocation itself is not a simple process. A multitude of problems was stated by the Park authorities in relocating the villages. As forceful relocation of people from the Park is not allowed (Section 1.2), 47 % of the interviewed forest officials stated people's unwillingness to move from the Park as the biggest problem in relocating the villages; lack of political will was stated by 41% as the second biggest problem in relocation; lack of an adequate relocation site, lack of funds, and political pressure were considered as problems by 35 %; and 18 % indicated the current policies of the government as a problem. Interestingly, inadequacy of compensation offered was noted by 6 % of the officials (Table 7.1).

Table 7.1: Problems in relocating villages (n=17)

Problem	Percentage
Lack of people's willingness to move	47
Lack of political will	41
Lack of funds	35
Lack of relocation site	35
Political pressure	35
Government policy	18
Lack of proper compensation package	6

Lack of resettlement sites

Even if people are willing to move and there is the political will to support it, there is little possibility of shifting the villagers, given the intense land pressures in surrounding areas (Kothari 1997a). Though land for relocation exists on paper, in reality there is little land available for relocating all the villages from BNP. At present, suitable relocation sites were available for only two of the six villages, namely Kallwah and Magdi (Higher ranking forest official, *pers. comm.*).

Availability of funds for relocation

Since the 1980s, when plans were initiated and funds mobilized for relocating the villages on the initial notification of the extension area, the number of households in BNP has increased. Consequently, the number of people who now have to be compensated as well as the price of land and the cost of provision of facilities to the people in the relocation site has increased, too. At the current rate of US\$ 2125.39 per household in relocation compensation given by the government, it would cost a total of US\$ 1,024,438 to relocate all the villages from inside the Park. This excludes the 21 households in the illegal settlement Kumarwah that are not entitled to compensation. This amount is well above the total outlay of the tiger reserve in 2000-2001 (\$364,080.76) (GOMP 2001). Thus, relocation of the villages would require nearly three times the budgetary allocations of the reserve⁷⁵.

Lack of people's willingness to be relocated

India is party to an International Labor Organization convention (Section 1.2), which prohibits forceful relocation of people from within the PA boundary. This constraints the Park authorities, as 65 % of the villagers were unwilling to relocate. Of the 35 % of the sampled population willing to be relocated, residents in the illegal settlement are most willing whereas those in the RVs are the least willing to move (Table 7.2). This was to be expected considering that the people living in the illegal settlement are the ones facing most restrictions and problems since inclusion in the Park (Sections 5.1.1 & 5.1.2).

⁷⁵ Since BNP is now part of Bandhavgarh tiger reserve (BTR), no separate budget comes for management operation of BNP but for the BTR as a whole.

Table 7.2: Proportion of sample population willing to be relocated (n=155)

Type of village	Name of village	Total sampled households	Total households willing to relocate	Percentage
Forest village	Bagdari	18	1	37
	Magdi	24	17	
	Kallwah	18	5	
Revenue village	Gadpuri	44	9	31
	Milli	21	11	
	Mehanwah	15	5	
Illegal settlement	Kumarwah	15	7	47
	Total	155	55	35

Without exception, all those willing to move wanted to move as a result of problems they faced since inclusion in the Park, as many as 40 % stating too much crop damage as a reason (Table 7.3). Inclusion in the Park has also meant that no development facilities, such as roads or electricity, can be provided to the inside villages. This was stated as a reason by 29 % of the households (Section 5.1.3). Another 14 % stated problems and restrictions due to the Park as a reason for willingness to relocate. Other motivations for relocation were lack of employment opportunities, the FDs wish for people to leave, lack of benefits, and harassment by forest officials. However, all those willing to be relocated wanted compensation and of these, 87 % would consider actually moving out only after receiving compensation.

Table 7.3: Reason willing to be relocated (n=55)

Reason	Percentage
Too much crop damage	40
Lack of facilities	29
Too many problems	9
Too many restrictions	5
Lack of employment opportunities	2
Forest departments desire for people to leave	2
No benefits of the Park	2
Harassment by forest officials	2
No answer	13

The impression received from the villagers on the subject of compensation was that people were highly skeptical whether they would get the compensation from the Park authorities in the first place. Many villagers cited the example of Bathan

village⁷⁶, where the relocated people were still waiting to get the compensation they were promised in the relocation package.

People were also asked whether they would move if they were forced to do so. Here, 30 % indicated that they are unwilling to move under any circumstance, whereas the remaining 70 % were willing to move only after getting adequate compensation (Table 7.4). When asked what kind of compensation would be required for relocating, 50 % of the households requested compensation in land equal in area and quality as in the present village. This demand might be difficult to fulfill. As mentioned earlier, relocation sites have been found only for two villages to date, and GOMP had also expressed its inability to find relocation sites for the villages. Of those willing to move, 34 % wanted monetary compensation, but did not wish to indicate the amount of compensation desired, 30 % stated that they wanted development facilities at the relocation site such as roads, electricity, irrigation facilities, school, etc., 11 % wanted both compensation in land equal in area and quality plus monetary compensation. Only 2 % were not sure of the type of compensation they wanted and less than 1 % requested the same set up as in the present village.

The fact that only 7 % of the people perceived relocation as a problem (Section 5.1.2) reflects how lightly they took the issue of relocation. In the 20 years since the Park was first declared, the fact that only one village relocation plan has been drawn up points in the same direction.

Table 7.4: Type of compensation wanted for forced relocation (n=109)

Compensation type	Total households	Percentage
Compensation in land equal in area and quality	54	50
Monetary compensation	37	34
Facilities	33	30
Other type of compensation	14	13
Both compensation in land equal in area and quality and monetary compensation	12	11
Don't know	2	2
Same set up as in the present village	1	1

⁷⁶ Village in the old Park area which was relocated in the early 1970s.

Inadequacy of relocation

Another very important limitation of relocation is that the removal of people from inside the Park would not guarantee a diminished resource use by the masses of people living on the periphery of the Park having equal if not greater dependence on Park resources. Also, an increase in population in the future would entail a higher degree of dependence of the peripheral villages on the Park. This is reflected in the statement of forest officials indicating that relocation of the villages from inside the Park is not likely to make much difference toward a better protection and management of the Park. According to one of the higher forest officials, relocation does not provide a solution to the problems being faced by the Park, as the Park is affected by both inside and outside villages. An increase in wildlife population over time would lead to a spill-over effect causing increased crop damage outside the Park and hence increased resentment against the Park. If the damage caused is higher than villagers are willing to tolerate, they might start killing the animals. The villages located on the periphery of the Park cannot be relocated to accommodate the growing number of wild animals. Neither is it an economically feasible option for the FD as it requires people living in and around the Park for wage labor and once relocated no one is likely to come and work for the FD from great distances.

Government policy

The government does not follow through on its own policy regarding relocation even though it has been clearly stipulated in the laws governing PAs, especially NPs (Section 3.3). The fact that only 3 % of the people living in the PAs in MP have been relocated to date demonstrates the failure of the government to implement its own policies.

Another major drawback with the relocation policy is that, even for those people willing to relocate, the policy does not allow for selected relocation. It stipulates the relocation of the entire village, and therefore, as in the case of Bandhavgarh, even those households who are willing to relocate, can not.

7.2 Delineation of the villages from the Park

Since relocation of the villages proves to be difficult, a proposal for changing the Park boundary by delineating the villages from inside the Park area was sent by the Park

authorities to the cabinet subcommittee of the central government in July 2001 (Higher ranking forest official, *pers. comm*). In the northern extension area (Khitauli range), the plan proposed carving out Bagdari village from the Park. Gadpuri is also to be excluded from within the Park boundary except for 0.6 sq. km of the village agricultural patch, which would be retained within the Park boundary. The rights to the area will have to be acquired by the government. According to the proposal, this would straighten the boundary of the Park and make it easier to manage. For the southern extension areas (Magdi and Kallwah ranges), the plans are to convert the two ranges and some additional forests of the Umaria forest division into the Magdi sanctuary (145.423 sq. km). If the changes proposed by the Park authorities are accepted, a total area of 319.634 sq. km would be free from human habitation and the area could therefore be finally notified as a NP (FDD #7 2001).

The current proposal of deleting selected parts of the Park and converting them into sanctuaries solely for the sake of administrative convenience is unlikely to resolve the problems. Fragmentation of the area would cause problems for the wildlife, as continuous areas are required by the wildlife to maintain a viable population. The area was extended in the first place to accommodate the growing wild animal populations. Downgrading the status from a Park to a sanctuary would defeat the purpose and lead to further degradation of the habitat, especially for the tiger.

7.3 Potential alternative solutions

7.3.1 Need for alternatives

The situation on the ground is too complex to be solved by simple relocation or delineation of the villages from the Park. Without alternatives, people cannot be expected to reduce their use of Park resources (Sawhney 1998) as they depend on these resources for subsistence and already low levels of income. As Wells et al. state:

“...it is often neither politically feasible nor ethically justifiable to exclude the poor who have limited access to resources from the parks and reserves without providing them alternative means of livelihood. (...) Local people should not make sacrifices to protect an area established to provide global benefits (by conserving unique and valuable genes, species and ecosystems)” (Wells and Brandon 1992:2 and 309).

Thus there is a need for the provision of alternatives to reduce the resource dependence of local people on the Park. Working under the assumption that the villages would ultimately be relocated while it is amply clear that in the current environment relocation is highly unlikely only causes difficulties for Park authorities, ultimately leading to ambiguous rules, weak enforcement, and harm to both the people and the resource base.

In response to the question with regard to alternative solutions in the face of the current problems, 53 % of the FD officials interviewed stated a need to generate awareness amongst the villagers concerning the need for protecting wildlife, 29 % suggested involving people in Park management, 12 % held the opinion that even if one or two villages were relocated it would make Park management easier, while 6 % suggested legalizing human habitation within the Park boundaries and on provision of alternative income sources.

Table 7.5: Alternative solutions to relocation of villages (n=17)

Alternative to relocation	Responses	Percentage
Awareness campaign	9	53
People's participation in Park management	5	29
Decrease number of cattle	2	12
Relocate 1 or 2 villages	2	12
Change legal provision-making habitation legal	1	6
Alter Park boundary	1	6
Provide alternate employment and resources	1	6
More strictness	1	6
Eco-development	1	6

The strong emphasis on awareness-building stands in contrast to earlier results (Section 5.4.1) that 61 % of the households interviewed said they are in favor of protecting wildlife and realized the importance of conserving wildlife. This reflects the gap in understanding between the forest officials and the local people, which acted as a hindrance to Park protection.

People's participation in Park management

People's participation in the management of the Park is one option for achieving conservation in the presence of local communities. This would, however, require a change in the attitude of the forest officials towards the villagers and vice versa. Presently, the majority of the field-based staff are unwilling to share their powers with the villagers (Higher ranking forest official, *pers. comm.*), which is quite natural as the officials are in charge of managing the Park and participation would imply giving the villagers a say in the management. In addition, there has been a continued lack of trust between the two sides. This is clearly reflected in the opinion expressed by the forest officials and the households when asked about people's participation in Park management. Only 29 % of the forest officials agreed to and believed that the Park could be managed more effectively if both the FD officials and people worked together towards protection of the Park, as against 74 % of the households who believed that the Park could be managed better with people's participation. This gap which exists between the two sides has to be bridged before any headway can be made. According to tenure type, most people in the revenue villages agreed to people's participation in Park management (46 %), followed by 42 % in the forest villages and 11 % in the illegal settlement.

Table 7.6: People's participation in Park management (Percentage) (n=155)

Need for people's participation for better Park management	Total households	Overall	Forest village	Revenue village	Illegal settlement
Yes	114	74	42	46	11
No	26	17	35	62	0.38
Maybe	1	1	-	100	-
Don't know	13	8	23	7	1

Eco-development

In India, the need for involving people in PA protection has been recognized in the last two decades of the 20th century. Eco-development has been launched in the country for the economic upliftment of people living in the vicinity of PAs in order to reduce their dependence on forest resources and ensure their participation in protection of the forests and wildlife (Appendix A7). One major drawback in this program is that the emphasis of eco-development is on reducing the dependence of people living *outside* the Park

boundary. Though there are provisions in the WLPA [33(c)] that do provide scope for collaborative arrangements with people living inside the PAs (Rathor and Dixit 1995), this possibility has largely been overlooked.

Eco-development was started in the villages surrounding BNP in 1992 (Tyagi 1997) under the World Bank funded MP Forestry Project. The first phase of this project finished in 1999 (Misra *pers. comm*). Eco-development committees (EDC) have been formed in all the villages surrounding BNP, and by 2000, eco-development plans had been prepared for 46 EDCs. Under the eco-development scheme, efforts were being made to develop various types of infrastructure facilities for the common use and general well-being of the entire village. Such works included construction of stop dams, water tanks, roads, culverts and causeways, school buildings, development of pastures and non-wood plantations. In addition, villagers are trained in silkworm rearing, bee keeping, poultry farming, carpet weaving, etc. (FDD #2 undated).

The main objectives of eco-development as outlined in the annual operations of the BTR are (FDD #8 2000):

- 1) Amelioration of the hardship faced by the villagers living in and around BTR due to curtailment of their access for grazing, collection of fuel wood, bamboo, fodder, MFP and the like,
- 2) Socio-economic upliftment of the local inhabitants living in close proximity of the reserve,
- 3) Involvement of local communities in conservation,
- 4) Elicitation of public support, and
- 5) Elimination of interface conflict between village communities and Park management.

BNP is the only known case of a Park in the country in which eco-development has been started in villages *inside* the Park boundary. EDCs have been formed in all the inside villages. Though the last EDC was formed in Bagdari (forest village) in January 2001, an eco-development plan has been developed for only two villages so far, Gadpuri and Mehanwah. When asked why eco-development program had been started in the inside villages despite the fact that they were slotted for

relocation, Park officials referred to the improbability of relocation under the present circumstances.

Eco-development activities in the inside villages have been started in a limited fashion as infrastructural facilities such as electricity and roads cannot be provided inside the Park (Section 5.1.2). So far, only diesel sets for irrigation have been provided in two villages. None of the Park officials were willing to comment on the overall success of the eco-development program in and around BNP because they said it was still too early and the results of the eco-development activities would only be visible after a few years. Considering that eco-development was started in a few villages nearly a decade ago, the reluctance of forest officials to comment on its success, can be taken as an indication of the program not living up to its expectations. This was further confirmed by the comments of a few of the officials who stated that, in some outside villages, the EDCs were showing successes whereas in a majority of the cases the work of the EDCs was not up to the mark.

Conceptually, it is also not clear whether eco-development can be expected to be successful in reducing pressure on the Park. The program seems to consist of two main components: (i) increasing the standard of living inside the villages through general infrastructure provision, and (ii) providing alternative income opportunities inside the villages and outside the Park through training and provision of related infrastructure. The latter component appears promising for reducing people's dependence on the Park as long as the alternative activities are not extensive. The increase in the standard of living through the provision of general infrastructure could potentially improve people's attitude towards the Park, but -if any- the effect on resource exploitation is likely to be indirect⁷⁷.

Channeling part of tourism revenue for village development

The Park has been getting increasing returns from tourism over the years due to the large number of people visiting the Park every year. However, all revenue is currently used for maintenance work such as road repairs in the tourism zone and part is returned to the state exchequer. An alternative policy would be to utilize at least part of the tourism revenue for development of inside villages or the provision of alternative

⁷⁷ The effects will also be analysed through a more rigorous econometric analyses in a separate paper with Dr. Stefanie Engel and Prof. Ramon Lopez.

income opportunities. The advantages and disadvantages of village development and alternative income generation have already been discussed in the previous subsections.

Providing better- quality livestock

There is a need to reduce the number of livestock in the Park in order to reduce the grazing pressure. This could be done by encouraging local people to sell off unproductive cattle and to buy better hybrid cattle. Provision of government loans at low interest rates for the purchase of higher-quality cattle would be useful in this respect.

Alternatives to grazing in the Park

Encouraging stall-feeding, strict enforcement of rotational grazing and alternative pasture development on field bunds for more fodder availability especially in the lean period are some of the measures to reduce grazing pressure on the Park.

In order to encourage stall-feeding, fodder collection, which at present is illegal, would need to be legalized. The amount of fodder extraction per household could be limited in terms of number of days extraction takes place in a year, amount extracted and areas extracted from. Monitoring and enforcement problems would, however, likely also apply to such restrictions.

7.3.2 Alternative income generation

Improved possibilities for the generation of alternative income are another potential policy alternative. This includes:

- 1) Increased opportunities to work for the Forest Department in Park management, eco- tourism, etc.,
- 2) Generation of other income opportunities inside the village, and
- 3) Generation of employment outside the Park.

Analysis of the household data collected for this study shows a statistically significant negative correlation between the proportion of income generated from alternative sources (including work for the forest department, work for others in the

Park, work outside the Park, and self employment) and income from collection and sale of MFP⁷⁸. This indicates people having access to alternatives collected less MFP and hence caused less damage to the Park. Moreover, the results of the correlations in Section 5.4.2 show that households, who had members engaged in alternative income generation are more likely to have a positive attitude towards the Park. Thus, alternative income provision, is likely to not only reduce pressure on Park resources directly, but also to affect people's acceptance of the Park.

Although, sampled households who had family members working for the FD did not seem to favor the Park, it might be because most were employed as daily wage employees. As of now only 10 (6 %) out of the 155 sampled households had family members working for the FD on a permanent basis. If more households are provided permanent employment by the FD, then people just might start looking at the Park in a more favorable light. There is potential for employing more inside villagers permanently, especially as tourist guides. As of now, only one household had a member employed as a tourist guide. With increased tourism, the need for tourist guides has been increasing steadily. Work with the FD would serve the dual purpose of providing a steady source of income for the villagers and might affect their attitude positively. As discussed earlier, an increase in the employment of villagers by the FD is hampered by current FD budget and hiring constraints.

The provision of alternative income opportunities inside the villages is one of the components of eco-development and was discussed in the previous section. By providing better irrigation facilities, the FD hopes for more production so that people could sell the surplus outside. This would serve the dual purpose of increasing people's income as well as decrease their reliance on MFP collection, at least for sale.

At the time of the study, 21 % of the households had members going outside the Park for employment but mostly as agricultural laborers. However, few job opportunities, apart from agriculture labor, are available outside the Park therefore emphasis will have to continue to be on alternative income generation activities within the Park.

⁷⁸ Pearson correlation coefficient was -0.209 which was significant at the 1% level (two-tailed test).

7.4 Conclusion

Relocation of the villages is a prerequisite for the final notification of the Park. But it is amply clear that relocation in the near future is improbable due to various reasons primarily financial ones. The option suggested by Park authorities of delineating the villages from within the Park appears more of an administrative convenience to avoid settling the rights of the people than making the Park more manageable. The Park authorities would still have to contend with the people living outside the Park boundary who use more Park resources.

At the same time it is clear that current levels of resource use are detrimental for the Park and alternatives to reduce pressure on the Park have to be found. Involving people in Park management is one such alternative; eco-development, which aims at improving the economic status of people by providing income generating alternative and at the same time reducing their dependence on the Park resources is another. BNP is the first NP in the country where eco-development committees have also been formed in the inside villages. This reflects the recognition of difficulties involved in relocating the villages. Other alternatives include channeling part of the tourism revenue for the development of the inside villages, provision of better irrigation facilities, and provision of alternative sources of income inside and outside the Park. At present, very few alternative income-generating opportunities outside the Park exist for the people; therefore, the emphasis will continue to be on alternative income provision inside the Park.

Given the heavy dependence of the inside villages on Park resources and the present *status quo* of relocation, involvement of the inside villagers in Park management is not an indulgence but a real need. One obvious reason for taking this step is that it often leads to an improved understanding of the substantive needs of the local people, gives them a personal stake in the say of the Park, and contributes to trust-building between Park authorities and the people. Therefore, solutions have to be found where wildlife protection gets the priority, but at the same time does not overlook the needs of the people living inside the Park.

8 CONCLUSION AND RECOMMENDATIONS

Conservation in some form or another was being practiced by different countries even before it became an international agenda in the 1970s, which saw the global appearance of Protected areas (PAs). From its inception, the concept of PA has given rise to ambiguities, ranging from how one decides which areas to protect, how much area to protect, which species are to be protected, to the controversy regarding the notion of PAs as undisturbed areas of wilderness. The latter is rarely the case, especially in the tropics and sub-tropics where most of the PAs tend to coincide with places of human habitation. Declaration of PAs in categories that do not allow any human use of the PA resources, has led to hardships for communities dependent on the PA resources for subsistence and income generation. Legal stipulation of eviction of such people further compounds the problem leading to uncertainty and accelerated forest degradation. The fact that people think they might be relocated gives them less incentive to use the resource sustainably, because they feel they might not be there in the future to bear the costs of unsustainable extraction. The fear of relocation also leads to resentment against the wildlife and to tensions with the forest authorities. In the face of lack of viable alternatives, people continue to rely heavily on the PA resources, further aggravating the situation. Although attempts are being made to involve people in the management of forests through programs such as Joint Forest Management (JFM), JFM is only being tried in degraded forestlands and not in PAs.

The study clearly reveals that obvious conflicts exist between the conservation objectives of the Bandhavgarh National Park and the resource utilization by the resident human population. Despite policy stipulations regarding relocation of the people, as Bandhavgarh is a designated national park (NP), the situation on the ground is far too complex. Both, the people and the Park authorities have their own set of problems, some of which are not localized but influenced by decisions taken far away from the Park. However, it must not be forgotten that the first claim on the Park is that of the wildlife. The choice between relocating the people and conservation of threatened species is not a choice. While the specific nature of problems may vary between PAs, Bandhavgarh is representative of the general problem faced by many Indian PAs of numerous competing demands on the PA resources (Chapter 4). Given the high human

population density of India and the great reliance of a large segment of the rural population on the forest resources, pressure on the PAs is likely to intensify in the foreseeable future (Bashir 2000:12.24). Ignoring the presence of humans within the boundaries of the PAs, especially NPs, will not make these resource-dependent people leave. There is, therefore, an urgent need to find innovative and pro-active solutions to the problems concerning natural resources, which seeks to balance biodiversity conservation with meeting other demands on the resources.

This study attempted a quantification of resource use by people residing inside a PA in India and no known attempts have been made to do this kind of quantification inside a NP in India till date. It was thus decided to carry out such a study to highlight the complexities involved in resource utilization in a PA, which technically should be free from human habitation. Such an analysis is also a prerequisite for the definition of appropriate compensation packages or the design of other more suitable policies. The study also analyzed the changes inclusion in a PA entail for the people, what kind of changes are involved and to which degree people's continued activities within the Park boundary pose a problem for the wildlife, the management implications of the presence of people within the PA boundary, and possible solutions to the problems being faced by the Park and the resident human population.

The study set out to test the following hypotheses:

1) Park objectives are in direct conflict with the interest of the local people

The main aim of the Park is conservation of nature and wildlife in the area. The current levels of local people's use of Park resources are thus contradictory to the Park objectives. Inclusion in the Park has entailed changes for the people in the form of restrictions, which have brought problems and hardships in their wake. There are restrictions on some subsistence activities of people, while income-generating activities are an outright violation of the law. Nevertheless, in the absence of alternatives, people cannot but continue to rely on the Park for subsistence and income generation. As a consequence, there is resource overlap with the wildlife and also day-to-day friction with the forest department.

- 2) The nature of these conflicts differs with the official rights of the people, particularly their land tenure type

It was expected that people having legal entitlements to the land they live on and cultivate (revenue villagers) and those not having legal entitlement (forest villagers and illegal settlers) would react differently to their inclusion in the Park. However, the results showed that there were few differences in the restrictions, problems and costs incurred by the people. Inclusion of the revenue villages within the Park has meant that having legal entitlement to the land *does not* make a difference in the kind of restriction and problems faced and costs that have to be borne by the revenue villagers. Despite having entitlement to the land, they can no longer get loans against their land, sell the land or set it up as security against bail if required. The situation is further aggravated by the threat of being relocated. It is thus not surprising, *ex post*, that legal entitlements do not have a significant effect on people's behavior. Some restrictions and costs were stated exclusively by the revenue villages, such as restriction on fodder collection, unavailability of timber and rocks for well repair, harassment by forest officials and restrictions *per se*. Whereas the ban on the entry of vehicles, use of crackers for crop protection, setting fire around the *mahua* tree for easier collection, inability to cut trees, lack of fodder, inability to sell forest produce, lack of facilities and other development activities were stated exclusively by the forest villages, access to extraction facilities and grazing were reported exclusively by the illegal settlement.

- 3) Access to alternative sources of income reduces pressure on the PA

A significant correlation exists between the proportion of income generated from alternative sources of income (work for the forest department, work for others in the Park, work outside the Park, and self-employment) and income from collection and sale of minor forest produce (MFP). Thus, people having access to alternatives were found to collect less MFP and hence can be assumed to cause less damage to the Park.

Presence of alternatives not only reduces the dependence of the people on the PA directly, which is crucial to ensure the future viability of the PA, but also influences people's acceptance of the PA. The section on factors affecting people's attitudes towards the Park (Section 5.4.2) revealed that villagers having alternative sources of income are more likely to be in favor of the Park. In contrast, people who experienced

livestock losses due to predation, had crop damage or perceived a decrease in accessibility to MFP were more likely to be against the Park. These results are consistent with a similar study conducted by Dhaundiyal (1997).

Hence, presence of alternative sources of income can help in reducing the dependence of the people on the Park resources and at the same time influence people's attitude towards the Park. In the long run, if the PA is to survive, it will only do so if people are in its favor. Resentment and discontent would only lead to an accelerated deterioration of the Park resources. Genuine efforts are already being made by the FD to reduce the dependence of the villages on the Park through programs like eco-development. In fact, BNP is the only NP in India where eco-development has been launched in villages inside a NP. This might be in acknowledgement of the problems involved in the implementation of the official relocation policy (Chapter 7).

Another way of achieving people's co-operation is by involving them in the decision-making process of the Park. At present, this is difficult as the Park officials do not consider the villagers to have the necessary know-how to manage the Park, nor are they willing to share their powers with them. Much needs to be done to build up trust between the people and the Park authorities. Unless people have a reason to be involved and thus have a personal stake in conserving the resources, the future of the Park cannot be secured. The uncertainty imposed by the constant threat of relocation is counterproductive in this regard. It creates an incentive to gain short-term benefits from unsustainable resource extraction, as villagers do not know whether they will stay in the Park in the long run and thus feel the consequences of their actions. Considering that there is a heavy dependence by the inside villages on the resources of the Park together with the present *status quo* of relocation, involvement of the inside villagers in Park management is not an indulgence but a real need. This will provide a means for understanding the substantive needs of the local people and give them a personal stake in the say of the Park which is necessary for building trust between the Park authorities and the people, a prerequisite for securing the Park's future.

The main findings of the study are the following:

- As expected, the people residing inside the Park are to a very large extent dependent on the Park resources.
- Fewer people go outside the Park for employment than expected.
- Most households members have sought employment outside the Park only after the inclusion of the extension area in the Park in 1982.
- Although crop damage, livestock and human loss were perceived to be the greatest costs incurred, inability to freely extract forest produce and inability to hunt were stated by a surprisingly large proportion of households.
- There is no major difference in the resources being extracted by the people living inside or on the periphery of the Park. In fact, peripheral villages make more use of the Park resources than the inside villages. This being the case, the wiseness of the policy of relocating the inside villages has to be seriously questioned. There is no denying the fact that once the inside villages are relocated, the Park will be closed for all of people's activities, e.g., grazing, which is currently being allowed due to the presence of the villages inside the Park. But seeing the current number of illegal extraction and grazing cases in the closed compartments as well as in the old Park area, it is doubtful that relocation of inside villages would stop the continuation of illicit activities inside the Park by the peripheral villages. These will become issues requiring immediate attention once the decision to relocate the villages is implemented.
- Since relocation at present is highly unlikely, more concerted efforts are needed to provide villagers with alternative sources of income, and preferably involve them in Park management. Local support of the villagers needs to be developed, as at present a majority of the people are against the Park despite the fact that many understand and favor wildlife preservation in general.
- Having access to alternative income sources reduces dependence of people on Park resources to some extent, at least for income generation.
- The results of this study suggest that, without more concerted effort to manage the present patterns of resource use, further ecological degradation of the Park is likely.
- Current monitoring and enforcement is weak. This is partly due to inherent problems resulting from differences in regulations between inside and outside

villages (e.g., difficulty to distinguish cattle or visitors from insiders). But it is also partly the consequence of inadequate equipment, lack of funds and shortage of staff.

- Rules are often ambiguous (some activities are officially prohibited but *de facto* tolerated or almost not monitored and enforced).

Recommendations of the study

If the policy continues to insist on relocation the following aspects has to be assured in order to make relocation more acceptable to the people:

- Provision of opportunities for income generation: People should be provided with assured employment opportunities in the relocated site. Currently the minimum average income derived by households inside the Park is US\$170 per annum. This is, however, only a very rough estimation as it neither includes amounts used for self-consumption nor undisclosed sources of income. Without having employment opportunities in the relocated site that generate income equaling or exceeding their current minimum income, it is highly unlikely that the people would be willing to be relocated. In fact, one might expect people to insist on not only the minimum income, but also a level of income equivalent to their current one.
- Voluntary relocation scheme: It is easier for the forest department to control the situation within the confines of the PA by laying out stricter rules and regulating the resource use by the people living inside the Park. Those villagers who feel that rules are strict tend more likely to relocate voluntarily. For voluntary relocation to take place in an equitable manner, the government needs to change the current policy in which compensation for relocation is given only if the entire village agrees to move. Thus, under the current relocation scheme, even those villagers who are actually willing to relocate cannot do so. Instead, the policy should permit these people to leave and provide them with a just and prompt relocation package. Speedy and adequate compensation might entice others to also move out eventually. At present, 35 % of the sampled households are willing to be relocated (Section 7.1.1), which is a significant proportion of the total Park population. Voluntary relocation would serve the same purpose as that of relocation of one or two villages from within the

Park and make the management of the Park easier as stated by 12 % of the forest officials (Section 7.3.1).

- Alternative skill provision: If people are relocated, it is unrealistic to expect everyone to sell agricultural produce in the resettled location. Therefore, training on alternative skills should be provided so that people can find jobs in the secondary or tertiary sectors.

In case relocation does not take place:

- Adoption of different PA categories: Although the policy requires NPs to be free from human habitation it appears to be a difficult task. Therefore, it is necessary to make changes in the policy. As it is economically not feasible to move all the villagers out of the PAs, it might be better to adopt categories of PAs in the Indian context that are different from the IUCN categories. The two new categories of PAs proposed in the planned Wildlife (Amendment) Act of the country, resource and community reserves (Kothari et al. 1997), allow scope for resource utilization and conservation at the same time. Yet this categorization is intended to apply only to new PAs and not to the existing ones. With the current problems in relocating people from within the PA boundaries, however, changes in the existing PA categorization also need to be considered.
- Improved monitoring and rules enforcement: In view of the current overuse of the Park resources by people there is a need for improved monitoring and enforcement of rules. However, this is fraught with problems. Since people currently have no other alternatives for reducing their dependence this may lead to conflicts. Budget constraints also add to the problem of hiring adequate staff to monitor people's activities constantly.
- Eco-development: Once the government makes changes with regard to compensating those willing to be relocated, eco-development could be carried out more effectively, because resources could be allocated among less people. This would serve the dual purpose of enhancing the quality of life of the villagers and reduce their dependence on the Park resources. Marked improvement in the living standards would also ensure decreased dependence on Park resources at least for income generation, and lead to a better understanding between villagers and the FD.

Better rapport would mean co-operation of the people in Park protection. If the inside villagers co-operate with the FD staff, outsiders can be stopped to a large extent from entering the Park for illegal activities. More research on the determinants of success of current eco-development initiatives is, however, necessary to test the validity of this recommendation and to improve understanding of which elements of current projects are more effective than others. The possibility of provision of alternative employment opportunities outside the Park also needs to be explored.

- Buffer zone under the control of Park authorities: Once declared as a NP or a tiger reserve, the surrounding buffer zone should automatically be transferred from the territorial division to the jurisdiction of the Park authorities, as differences in the objectives of the two divisions of the FD currently poses a problem for Park authorities. Conservation of the area is the priority of the Park authorities, whereas forest exploitation for income generation is the main concern of the territorial division. This being the case, co-ordination for carrying out the eco-development activities in the buffer zone becomes difficult for the Park authorities.
- Lift on ban on recruitment: The current ceiling on recruitment of new staff should be lifted, as the impact is felt at the lowest level of the FD structure, which is the most important level for maintaining the link between the FD and the people and for carrying out day-to-day protection of the Park.
- Closing areas of wildlife abundance for grazing and resource extraction: Qualitative assessment of the areas in the Park affected by the people and their activities revealed that there are certain pockets in the extension areas that have wildlife abundance, but at the same time are areas open for extraction and grazing. Such areas should be closed for grazing and resource extraction.
- Alternative forests for meeting people's requirements: Development of alternative forested tracts for the people living on the periphery of the Park would reduce their dependence on Park resources. This can be accomplished by stopping forestry operations in the buffer zone.
- Lessening the burden of beat guards: There is a need for creating a separate post for the eco-development committee (EDC) secretary in order to manage EDCs more efficiently. At present, the beat guard is the secretary of the committee. It is already

difficult enough for him to efficiently carry out his protection duties, but now that he is also the secretary of the EDC his work is made more difficult as he has to organize monthly meetings and maintain all the records of the committee. If a separate post cannot be created then someone from the village should be made joint secretary to reduce the beat guard's workload and also to give the people the feeling they have a say in the eco-development activities of the village. To give a fair representation to those villagers not represented on the village *panchayat* (village level governing body), it would be preferable if the EDC secretary were not a *panchayat* member.

- Employment generation: There is a need for more employment generation for the inside villagers so that they have a stake in its protection. Efforts by the Park authorities have already been made to provide employment to the inside villagers. At present, 41 % of the sampled households have members employed by the FD mostly as daily wage employees. However, there have been instances where jobs as manual laborers have been given to outsiders that could have been just as well done by inside villagers. Another option could be hiring inside villagers as tourist guides.
- Compensation for crop damage: At present, the state government does not have a scheme for providing compensation for crop damage, which has led to a lot of resentment against the Park. There is, therefore, a need for providing limited crop compensation.

Areas for further research

Although attempts were made in this study to ascertain the type and extent of people's activities in the Park, these findings have to be backed by sound ecological data. Therefore ecological studies need to be carried out in the Park in order to determine the long-term implications of different activities of people on the Park. Effects of future population growth in terms of resource utilization and thus future pressure on the Park need to be estimated and strategies worked out, especially if relocation does not take place.

In order to involve people in Park management, there is a need to establish whether local institutions exist. Glimpses of these were revealed during the course of the fieldwork, but their analysis was beyond the scope of this study. If the Park

authorities seriously want people to participate in Park management and protection, these institutions can be made use of and strengthened if need be.

Results of the study indicate that the provision of alternative income might reduce the pressure of local people on Park resources, this needs to be examined further. Eco-development is a step in this direction. It's focus, is on increasing the standard of living of people, but the extent to which it is successful in reducing people's dependence on the PAs resources have not been examined. More research is needed to assess the actual impact of eco-development, the reasons why they might have been more successful in some villages than in others, and how it compares to the option of providing alternative sources of income.

Very few attempts, like in this study, have been made on quantification of resource dependence in order to gauge the extent of dependence and the resulting resource pressure on the PA. Such information can prove to be vital to formulate management options at the PA level. In case relocation of the villages from the PA takes place, this kind of quantification also provides an indication of the minimum income people will need to derive in the relocated site. Expecting people to relocate without having opportunities to meet minimum levels of income in the relocated site is highly unrealistic. In case relocation does not take place in the foreseeable future, knowing the extent and type of reliance of people on the resources of a PA and knowing the pressure exerted as a result of this resource use can help in formulating programs for reducing or eliminating the dependence by provision of alternatives. Programs aimed at reducing pressures on the Park without assessing the extent and type of dependence cannot hope to be successful in reducing people's dependence and securing the future of the PA. Although, this study was able to assess the type and degree of pressures on the Park to some extent, there is a need for more research along these lines possibly also encompassing those elements, which could not be covered in this study.

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APPENDICES

Appendix A1: Information collected during village mapping exercise

1. Location of houses
2. Caste distribution in the village
3. Houses marked according to the different castes present in the village
4. Location of agricultural fields
5. Types of crops grown
6. Compartments open for grazing, fodder and fuelwood collection
7. Water resources (rivers, ponds) perennial and seasonal
8. Drinking water sources (wells, hand pumps) in working condition or not
9. Roads and streets in the villages, if connected to metalled roads
10. Location of forest with reference to the village
11. Miscellaneous (religious site, school, forest department)

Appendix A2: Major forestry policies and legislation in India

Legislation	Year of Legislation
Indian Forest Act	1865
Indian Forest Act	1878
National Forest Policy	1894
Administration of forests became a state subject	1921
Indian Forest Act (currently being revised)	1927
National Forest Policy	1952
National Commission on Agriculture	1970
Wildlife Act	1972
Forest transferred from state list to concurrent list	1976
Forest Conservation Act	1980
Amendment of Forest Conservation Act	1988
National Forest Policy (currently being revised)	1988
GOI Policy circular	1990

Source: Palit S (1999) Structural changes in Forest Departments (Policy and JFM series: 2), WWF, New Delhi.

Appendix A3: Differences in livestock ownership according to tenure type

Types of livestock	Mean differences between different types of villages		
	Revenue and forest village	Revenue and illegal settlement	Forest and illegal settlement
Number of cattle	-.58 (-.809)	-5.05*** (-2.980)	-5.63*** (-3.247)
Number of buffalos	1.04 (.742)	-11.94 (-7.009)	-10.90***(-4.099)
Number of goats	.83(.939)	-	-

Figure in brackets are the *t*-statistics

* Significant at the 10% level, ** significant at the 5% level, *** significant at the 1% level.

Appendix A4: Estimated wildlife population (1996-2000)

Name of species	Census Year				
	1996	1997	1998	1999	2000
Tiger (<i>Panthera tigris</i>)	51	53	53	56	56
Leopard(<i>Panthera parus</i>)	30	36	35	43	43
Spotted deer (<i>Axis axis</i>)	8516	7473	11300	8931	16343
Sambar deer (<i>Ceryus unicolor nigra</i>)	913	812	1700	2291	2267
Bluebull (<i>Boselaphus tragocamelus</i>)	769	671	2300	2165	2912
Wild boar (<i>Sus scrofa</i>)	1964	1861	4500	5168	6351
Four horned antelope (<i>Tetraceros quadricornis</i>)	13	19	30	3	5
Indian Gazelle (<i>Gazella gazella bennatti</i>)	315	183	620	427	1140
Barking deer (<i>Muntiacus muntjak</i>)	269	200	480	405	783

Source: BNP authorities

Appendix A5: Scoring matrix for measuring pressures on the Park

Closed compartment unaffected by human activities	0
Compartments affected by one activity Open compartment, closed compartment affected by illegal grazing Closed compartment affected by illicit felling Areas prone to regular fires Areas with cultivation through outside villages	1
Compartments affected by one or two activities Areas prone to fire ,with illegal grazing Areas prone to fire ,with illicit felling	2
Open compartments with wildlife abundance affected by human activities Areas of wildlife abundance being subjected to grazing Areas of wildlife abundance being subjected to fire	3
Closed compartment with wildlife abundance having illegal grazing	4
Compartment with wildlife abundance affected by two activities Open compartment with wildlife abundance being subjected to illegal grazing and fire Closed compartment with wildlife abundance being subjected to illegal grazing and fire	5

Appendix A6: Pressure scoring of the compartments

Score	Pressure category
0	<i>Areas unaffected by human activities</i>
0-1	<i>Low pressure</i> (compartments affected by one activity)
1-2	<i>Low- Medium</i> (compartments affected by one or two activities)
3	<i>Medium</i> (compartments with wildlife abundance affected by human activities)
4	<i>Medium –high</i> (closed compartments with wildlife abundance affected by human activity)
5	<i>High</i> (compartments with wildlife abundance affected by more than one activity)

Appendix A7: Components of Eco-development

1. Forest and wildlife protection
2. Plantation on field bunds
3. Reducing livestock grazing pressure on forest
4. Increasing agricultural production by natural means
5. Income generating activities
6. Small savings
7. Giving up intake of intoxicating drinks and substances
8. Health care by natural means
9. Adoption of energy-saving devices
10. Other necessary activities

Source: BNP authorities

MAPS

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