



# **Socio-economic Survey Report**

## **Bandhavgarh Tiger Reserve**

### **June 2010**

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## INTRODUCTION

Since ancient times, nature - in its various forms - has been respected and protected in India. The first recorded instance of wildlife conservation occurs in Kautilya's Arthashastra. Later inhabitants of the subcontinent were avid hunters as well as keen naturalists. Paintings and historical records from the Mughal era that detailed the king's hunts provide accurate descriptions of the flora and fauna of those times. With the coming of the British, both hunting and conservation were given a fillip. On the one hand, forests were razed and animals were killed for sport; on the other hand, strict restrictions were imposed on the destruction of forests and animals in certain areas. This era saw the formation of organisations like the Bombay Natural History Society as well as the promulgation of laws such as the Indian Forest Act, 1878 and the Wild Birds and Animals Protection Act, 1912. In 1952, the Indian Board for Wildlife was formed that set the precedent for wildlife conservation in India as it stands today. Since then, a number of wildlife conservation initiatives have taken root in India; while some have failed, others have been considerably successful. The most popularly known amongst these is Project Tiger<sup>1</sup>, which was initiated in 1972. At that time, tiger numbers were reported to have fallen to about 1800 from an estimated 40,000 at the beginning of the century. Today, the official figure is touted as 1411<sup>2</sup>. Conservationists believe the figures are inflated. The reasons for this precipitous decline are poaching and habitat loss.

Tigers are elusive, solitary animals by nature and hence, live in dense forests. Some of these forested areas have been accorded the status of 'tiger reserves', which come under the purview of the NTCA, the rules of which, state that all human activities must be restricted to the fringes of these reserves. However, there are a number of human settlements in and around these reserves, which are subject to crop - raids by herbivores as well as lifting of cattle by carnivores. In the case of the latter, the villagers choose to get back by poisoning the carcass, thus killing the animal. Sometimes, when a particular tiger continually raids the village, the latter get in touch with poachers who kill the animal and pay the villagers for the information. Apart from this, animals can also end up as roadkill, fall into wells or get caught in traps meant for bushmeat<sup>3</sup>.

This conflict is rife in Bandhavgarh Tiger Reserve (BTR) in Madhya Pradesh (MP). The forests of Bandhavgarh are a part of a large semi - contiguous network of forests in Madhya Pradesh, which if linked properly, will result in the creation of habitat that can harbour a healthy, viable population of wild tigers. But the presence of human settlements in these areas leads to conflict between man and animal over the use of resources. In MP, there is a considerable population of tigers outside protected areas. These fragmented populations are vulnerable to poaching and other forms of human interference.

Therefore, it is important to find a solution to this problem. In a country like India with a burgeoning population and a growing economy, the problem continues to worsen. Finding a feasible solution requires a collaborative effort by various agencies (governmental and otherwise), which understand the environmental and social aspects of the problem.

*To this end, we conducted a socio-economic survey of 31 villages in and around Bandhavgarh Tiger Reserve in order to review the living conditions, sources of livelihood (including livestock surveys), demographic profiles and literacy levels of these villages to meet the following objectives:*

- *To provide credible data for all the "high impact" villages in and around Bandhavgarh Tiger Reserve*
- *To highlight on-ground realities and problems faced in wildlife conservation*

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<sup>1</sup> Now called National Tiger Conservation Authority (NTCA).

<sup>2</sup> Figure released as an average estimate as per a monitoring exercise in 2008 by Wildlife Institute of India in association with NTCA and the Government of India.

<sup>3</sup> According to the WPA, 1972, hunting or killing any wild animal in Schedules I-IV, for any purpose, is illegal.

## METHODOLOGY

The survey was conducted over a period of 4 weeks. It included villages in the core area and those villages in the buffer area that fall within a distance of 1 km from the boundary of the core.

### Core Area

The Forest Department has divided the core area into ranges. Each range was considered as a separate cluster. Owing to the critical location of these villages, it was necessary to sample all of them. However, of the 15 villages in the core area, 4 are already being relocated by the Forest Department and other relevant governmental agencies. The remaining 11 villages were sampled.

The core area has been divided into 6 ranges - Panpatha, Pataur, Khitauli, Tala, Magdhi and Kallwah.

In each village, every third house was sampled. *Again, for this survey, the sampled population is 33% of the total population of the village.*

### Buffer Area

For this area the cluster sampling method was used. In this method, groups or clusters are created and selected at random to provide insights into the entire population under study.

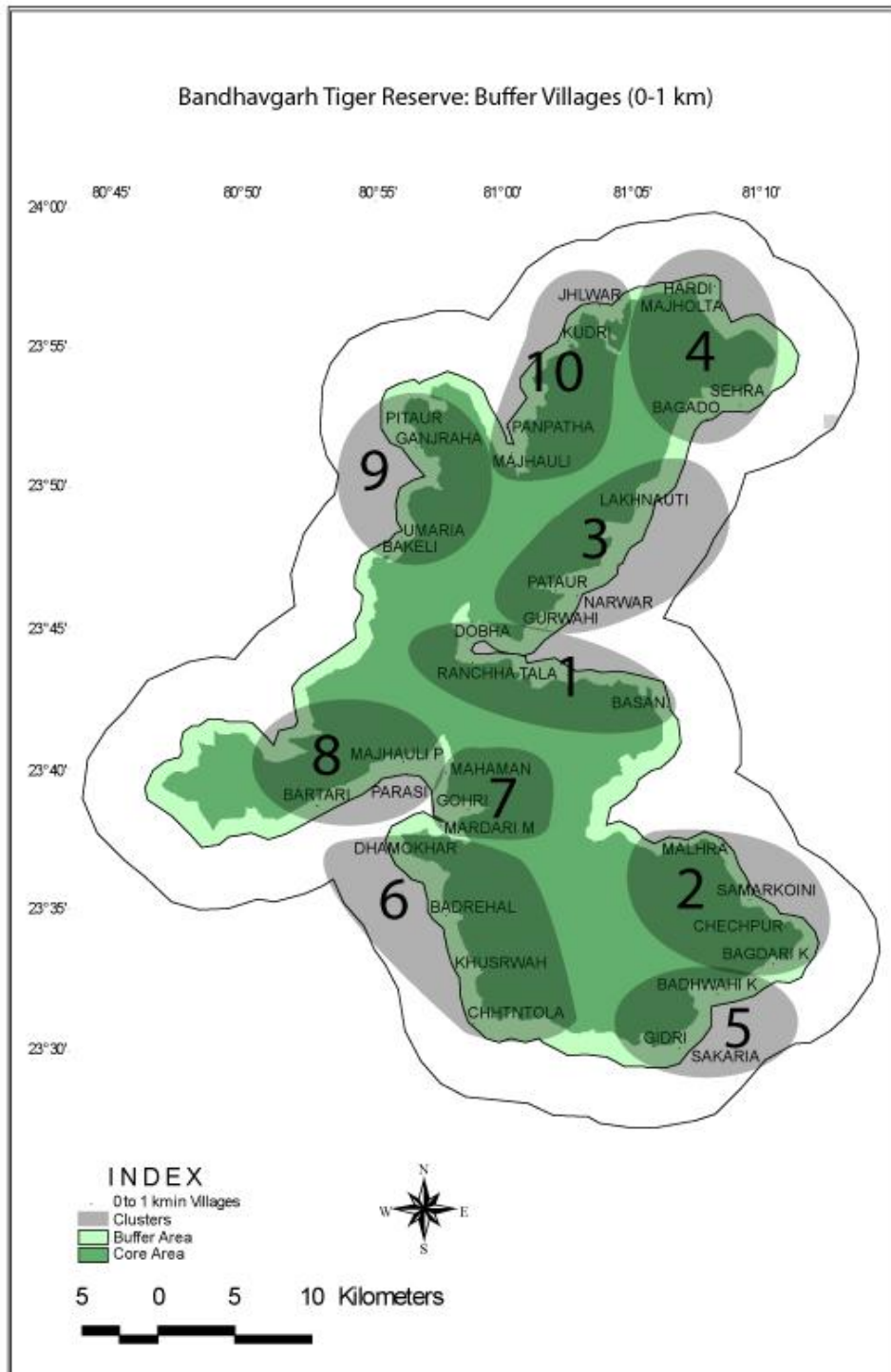
Clusters were formed on the basis of the distance between villages. This distance was determined using a map provided to us by the Forest Department.

There are 57 villages that fall within the radius of 1 km from the core area. Out of these, 8 villages have been surveyed by the RBS Foundation while for 12 villages, the required information was unavailable from the concerned Collectorate office. There was a discrepancy regarding the population figure of a village in the buffer zone which is why 37 villages were taken into consideration instead of 38.

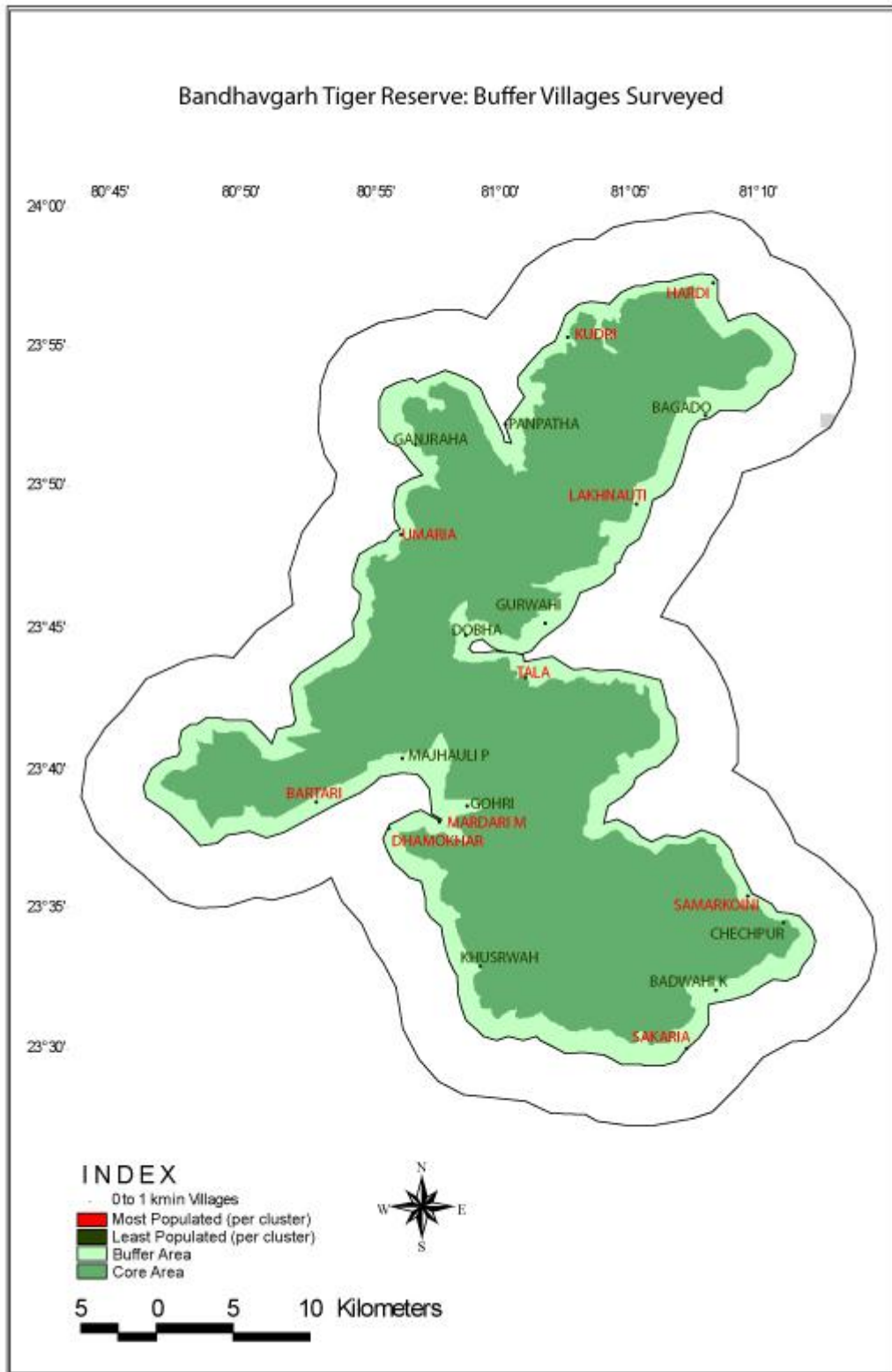
Hence, 37 villages were segregated into 10 clusters. From each of these clusters, the largest and smallest villages (based on the population census of 2001) were selected. In all, 20 villages were sampled.

In each village, every third house was sampled. This enabled us to cover a greater number of villages. *Again, for the purpose of the survey, the sampled population is 33% of the total population of the village.*

## Buffer Area Villages - Clusters



## Buffer Area Villages - Surveyed

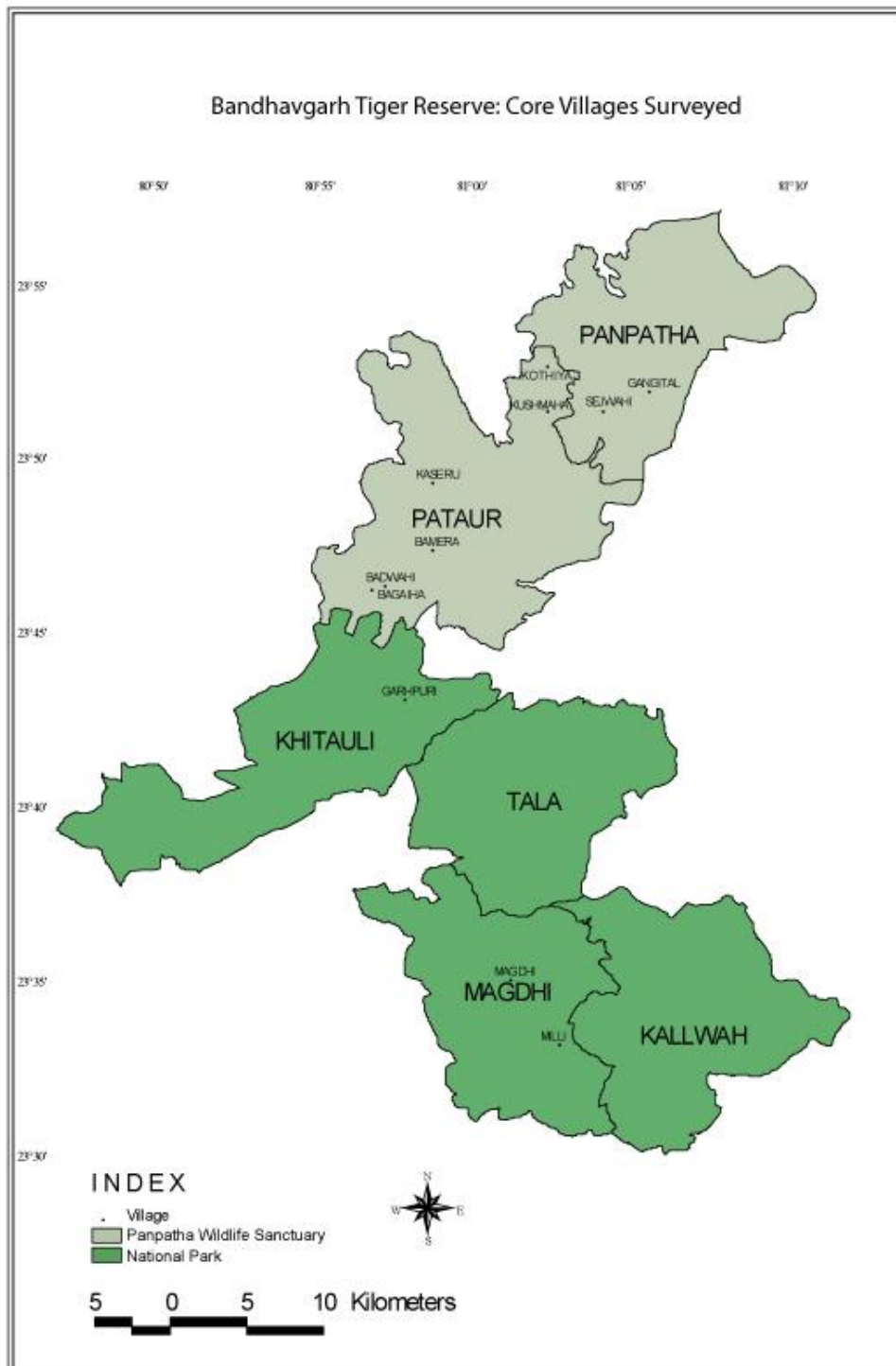


## Villages in the Buffer Area

S. No.	Village	Latitude	Longitude	Population (2001)
<b>Cluster 1</b>				
1	Basan	23.7061388	81.1068889	323
2	Dobha	23.7460556	80.9787499	238
3	Ranchha	23.7319722	80.9820833	666
4	Tala	23.7213608	81.0171302	1220
<b>Cluster 2</b>				
5	Bagdari K	23.5544436	81.1747027	237
6	Chechpur	23.5767397	81.1826764	170
7	Malhra	23.6275834	81.1396106	379
8	Samarkoini	23.5919166	81.1595833	413
<b>Cluster 3</b>				
9	Gurwahi	23.753088	81.0298447	590
10	Lakhnauti	23.8236944	81.0885	1243
11	Narwar	23.7712778	81.0494722	661
12	Pataur	23.7747667	81.0358999	823
<b>Cluster 4</b>				
13	Bagado	23.8756944	81.1325278	323
14	Hardi	23.9564722	81.11525	714
15	Majhtola	23.9481666	81.1088055	367
16	Sehra	23.9838611	81.1535833	389
<b>Cluster 5</b>				
17	Badwahi K	23.5364045	81.1390757	120
18	Gidri	23.5044306	81.1144449	198
19	Sakaria	23.5022494	81.1200193	305
<b>Cluster 6</b>				
20	Badrehal	23.583273	80.9643646	233
21	Chhtn Tola	23.5156499		254
22	Dhamokhar	23.6321973	80.9293581	683
23	Khusrwah	23.5503604	80.9883551	135
<b>Cluster 7</b>				
24	Gohri	23.6455385	80.9795786	122
25	Mahaman	23.6671955	80.964805	295
26	Mardari M	23.6357988	80.9612593	493
<b>Cluster 8</b>				
27	Bartari	23.6473889	80.8829166	663
28	Majhauri P	23.6733889	80.9378888	379
29	Parasi	23.6663055	80.9404722	619
<b>Cluster 9</b>				
30	Bakeli	23.8014167	80.9220555	1071
31	Ganjraha	23.858533	80.9462372	355
32	Pitaur	23.8688824	80.9248188	474
33	Umaria	23.8053333	80.9364999	2104
<b>Cluster 10</b>				
34	Jhlwar	23.9422778	81.0638056	741
35	Kudri	23.9221389	81.0439444	769
36	Majhauri	23.8559167	81.0072777	552
37	Panpatha	23.8699666	81.0035433	514
<b>Already Surveyed</b>				
38	Bijharia			
39	Damana			
40	Gata			
41	Ghaghud			
42	Kathli			
43	Lakhumar			
44	Rakhi			
<b>Information Not Available</b>				
45	Bagdara			
46	Gadawah			
47	Karchaha			
48	Khari Badi			
49	Khusariya			
50	Mair Tola			
51	Makara			
52	Medra			
53	Pathri			
54	Patpariha			
55	Tali			
56	Nawar			
57	Kumhhra			



## Core Area Villages Surveyed



## Villages in the Core Area

S. No.	Village	Latitude	Longitude	Population (2001)
<b>Pataur Range</b>				
1	Badwahi	23.77375	80.9564	167
2	Bagaiha	23.7716	80.949133	259
3	Bamera	23.7907	80.980933	577
4	Kaseru	23.8225	80.980867	883
<b>Panpatha Range</b>				
5	Gangital	23.5544436	81.174703	237
6	Kothiya	23.5767397	81.182676	170
7	Khusmaha	23.6275834	81.139611	379
8	Sejwahi	23.5919166	81.159583	413
<b>Khitauli Range</b>				
9	Garhpuri	23.7195556	80.966611	926
<b>Magdhi Range</b>				
10	Magdhi	23.5854445	81.020944	483
11	Milli	23.5546389	81.046472	392
<b>Villages being relocated</b>				
12	Gadawah	Relocation in process		
13	Kallawah	Relocation in process		
14	Kumarwah	Relocation in process		
15	Mehenwah	Relocation in process		

- This information has been taken from the Forest Department, Bandhavgarh Tiger Reserve.
- All the villages in the core area, except those where relocation is in process, have been surveyed

# BANDHAVGARH TIGER RESERVE

## History

Bandhavgarh Tiger Reserve is situated between the Vindhya and Satpura ranges in the state of Madhya Pradesh in Central India. Long the seat of royal dynasties, it was the hunting grounds of the Maharaja of Rewa, owing to the abundance of game - especially tigers. Recognizing the richness of the region's flora and fauna and to prevent it from degradation, it was declared a National Park in 1965, spanning an area of 105 sq km. The year 1982 saw the addition of three more ranges- Khitauli, Magdhi and Kallawah - resulting in the extension of the park's area. In 1983, 245.847 sq km of land adjoining the national park was declared as the Panpatha Wildlife Sanctuary. The current area of the National Park is 448.84 sq km.

## Topography, Flora & Fauna

The terrain of Bandhavgarh comprises rocky uplands, swamps and valleys. The altitude varies from 440m at Tala to 811m at Bandhavgarh hill (after which the park has been named). Its various meadows are marshy and drained by numerous springs that have their sources in the Charanganga, Damnar, Janad and Umrar streams, which empty into the Son River as it runs along the eastern side of the reserve.

Bandhavgarh has over 500 species of plants, 45 species of mammals, 27 species of reptiles including 16 species of snakes, over 299 species of birds, and 92 species of butterflies have been recorded. Mammals such as the tiger, chital, sambhar, nilgai, chinkara, sloth bear, hyena, small Indian civet as well as reptiles like the python, rat snake and krait are found here. Its avifauna include peafowl, lesser adjutants, Indian rollers, paradise flycatchers, crested serpent-eagles, king vultures, Egyptian vultures and many more.

As Bandhavgarh falls within the tropical moist deciduous belt, the forests are dominated by Sal, Mahua and Bamboo. Apart from this, there are fruit bearing trees like Jamun and Tendu. The grasslands also form an important part of the forest's ecosystem and mostly consist of tall Munj and Kans grass as well as other shorter, finer species in the drier region.

## A Project Tiger Reserve

In 1993, Bandhavgarh was declared a Tiger Reserve. As per NTCA directorates, both the buffer<sup>4</sup> and core areas have been notified. The core area is spread over 624.752 sq km<sup>5</sup> and the buffer area measures 536.719 sq km<sup>6</sup>. As already mentioned, the core area is inviolate and must be free of human interference whereas the buffer area is a multi - usage zone where human beings and wildlife can co - exist.

The purpose of designating these areas is:

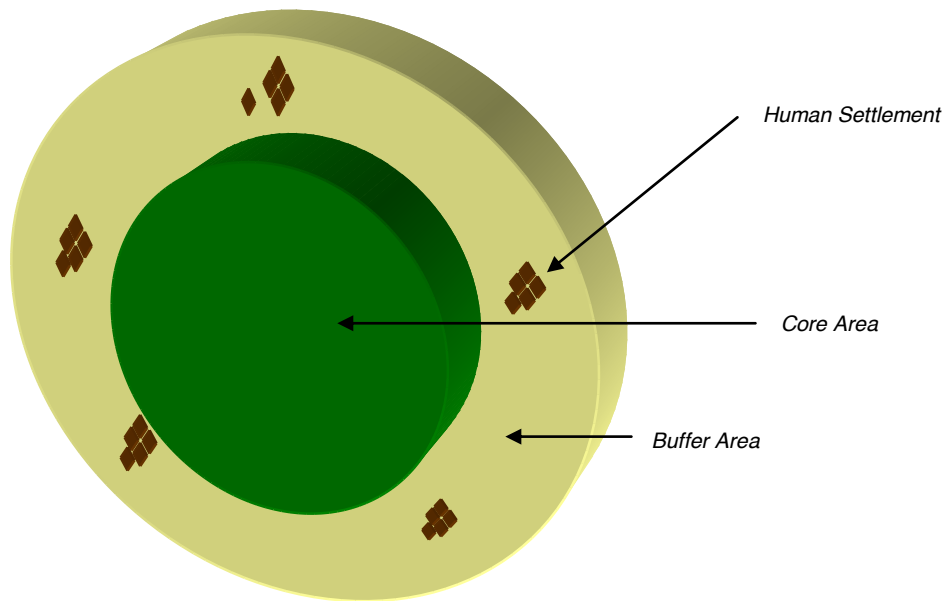
- a) To conserve biodiversity of the area and stop illegal encroachment.
- b) To enable locals to achieve a desirable level of wellbeing by accommodating local communities that have been residing in the area before it was designated as a Tiger Reserve. It also helps in making the area suitable to set up public facilities and infrastructure such as telecommunication towers, roads and electricity installations.

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<sup>4</sup> The buffer area has been delineated on the ground but has not been yet notified by the State Government.

<sup>5</sup> Retrieved August 18, 2010 from [http://projecttiger.nic.in/printableguide\\_bandhav.htm](http://projecttiger.nic.in/printableguide_bandhav.htm)

<sup>6</sup> Ibid



*\*Figure depicting the model of a Tiger Reserve*

## Man – Animal Conflict

Man-animal conflict arises due to various issues, some of which have been detailed below:

**Collection of Non-timber Forest Products (NTFPs):** The villages in and around the reserve exert tremendous pressure on the forest owing to their need for firewood as well as NTFPs such as leaves, bark, fruits etc. According to the directorates of the NTCA, no human activity is permitted to take place within the core area of any reserve. Thus, those people who find themselves living within the said region might resort to obtaining firewood and NTFPs illegally. They encroach upon the area of the reserve, hence increasing the animosity between the villagers and the Forest Department.

**Grazing of livestock:** Another bone of contention is the grazing of livestock within the protected area. Over - grazing of livestock within the reserve limits leads to degradation of forest land as well as reduction in the total vegetative cover, upon which the forest's herbivores feed. Moreover, the entry of domestic cattle into the reserve increases the latter's susceptibility to dangerous diseases, which can make a species locally extinct. Likewise, it exposes livestock to the dangers of predation by carnivores, antagonising the villagers towards protected areas.

**Poaching and revenge killing of wildlife:** This is a serious issue that needs immediate attention.

- *In 1998, Sita, one of the reserve's most photographed tigresses went missing. She was allegedly poached for illicit cross - border trade.*
- *In 2003, B1, a male tiger was killed by a trap that was laid for bushmeat<sup>7</sup> by some villagers.*
- *His sibling, B3, went missing in 2004 and is presumed to have been poached.*
- *Two tigresses of the Banbai (2008) and Pataur (2009) ranges were poisoned by villagers in an act of revenge for having allegedly killed their cattle.*

A shrinking forest cover due to deforestation and overgrazing leads to a sharp decline in food resources. This forces herbivores to venture beyond the forest into farmland in search of food, resulting in crop depredation. Reduced forest cover also leads to a smaller prey base, thus forcing carnivores to stray into villages where they carry off livestock. Quite often, enraged villagers track the carcass down and lace it with poison leading to the death of the feeding carnivore. Another factor contributing to this issue are attacks on humans, which tend to be rare. Not all of these attacks are

<sup>7</sup> According to the WPA, 1972, no wild animal that appears on Schedules I-IV may be may be hunted or killed for any purpose whatsoever.

carried out by man – eaters; more often than not, the attackers are likely to be carnivores that are transients looking to establish territories, old/ injured animals or females with their young.

**Construction of roads inside the reserve:** The construction of roads and highways within Protected Areas is a rampant problem in India and Bandhavgarh is no exception. Highways connecting Umaria with Rewa and Parasi with Katni pass through the reserve. This results in significant ecological damage because of loss of forest cover. Additionally, heavy speeding traffic (especially at night) disturbs the animals and even mows them down. These roadkill may be deer, wild dogs, jackals and even tigers.

## FINDINGS OF THE SURVEY

### Population

While the estimates of the total population in each village are based on our sample population survey, there are very large discrepancies between our estimates and those of the 2001 census. We have not been able to figure out the reasons for the discrepancies, but await the results of the current census to verify<sup>8</sup>.

A total of 453 households (with 863 adult males and 127 adult unmarried females and an aggregate sampled population of 3031 persons) were surveyed in the buffer area. In the core area, 165 households (with 366 adult males and 57 adult females and an aggregate sampled population of 1201 persons) were surveyed. The total estimated population for the 20 villages we surveyed in the buffer area is 9093 according to our survey and 11553 according to the 2001 census. Similarly, the total estimated population for the 11 villages we surveyed in the core area is 5427 according to our survey and 3603 according to the 2001 census (*Refer to Appendix I; Tables 1.5 & 1.6*).

<b>Table 1.1 - Buffer Area Villages - Demographic Profile</b>				
<b>Villages</b>	<b>Sampled Population</b>	<b>Households</b>	<b>Average Family Size</b>	<b>Est.Total Population</b>
Badwahi K	79	11	7.0	237
Bagado	50	9	5.6	150
Bartari	161	22	7.3	483
Chechpur	50	10	5.0	150
Dhamokhar	156	25	6.2	468
Dobha	87	11	7.9	261
Ganjraha	80	10	8.0	240
Gohri	44	6	7.3	132
Gurwahi	126	20	6.3	378
Hardi	234	27	8.7	702
Khusrwah	79	8	9.9	237
Kudri	153	27	5.7	459
Lakhnauti	214	27	7.9	642
Majhauri P	34	6	5.7	102
Mardari M	111	14	7.9	333
Panpatha	80	14	5.7	240
Sakariya	92	15	6.1	276
Samarkoini	76	13	5.9	228
Tala	342	60	5.7	1026
Umara B	783	118	6.6	2349
<b>Grand Total</b>	<b>3031</b>	<b>453</b>	<b>6.7</b>	<b>9093</b>

*\*Only men above the age of 18 years have been included*

<sup>8</sup> The results of the census are scheduled to be released by March 2011 according to the Manpur Tehsil, district Umara, Madhya Pradesh.

**Table 1.2 - Buffer Area - Average members per household**

Villages	Couples	Unmarried Females	Children
Badwahi K	2.5	0.5	1.6
Bagado	1.4	0.0	2.7
Bartari	2.0	0.4	2.9
Chechpur	1.9	0.0	1.2
Dhamokhar	2.3	0.5	1.2
Dobha	1.7	0.2	4.3
Ganjraha	1.5	0.4	4.6
Gohri	2.0	0.0	3.3
Gurwahi	1.7	0.1	2.9
Hardi	2.2	0.2	4.1
Khusrwah	1.8	0.8	5.6
Kudri	1.8	0.1	2.0
Lakhnauti	2.1	0.4	3.4
Majhauri P	2.3	0.2	0.8
Mardari M	2.4	0.8	2.4
Panpatha	1.9	0.1	1.8
Sakariya	1.8	0.3	2.3
Samarkoini	1.8	0.0	2.2
Tala	1.6	0.2	2.4
Umaria B	1.9	0.3	2.5
<b>Grand Total</b>	<b>1.9</b>	<b>0.3</b>	<b>2.6</b>

**Table 1.3 - Core Area Villages - Demographic Profile**

Villages	Sampled Population	Households	Average Family Size	Est.Total Population
Badwahi	53	7	7.6	159
Bagaiha	51	6	8.5	153
Bamera	81	13	6.2	243
Gangital	87	9	9.7	261
Garhpuri	169	25	6.8	507
Kaseru	174	22	7.9	522
Kothiya	35	9	3.9	105
Kushmaha	120	18	6.7	360
Magdhi	203	26	7.8	609
Milli	116	13	8.9	348
Sejwahi	112	17	6.6	336
<b>Grand Total</b>	<b>1201</b>	<b>165</b>	<b>7.3</b>	<b>3603</b>

*\*Only men above the age of 18 years have been included*

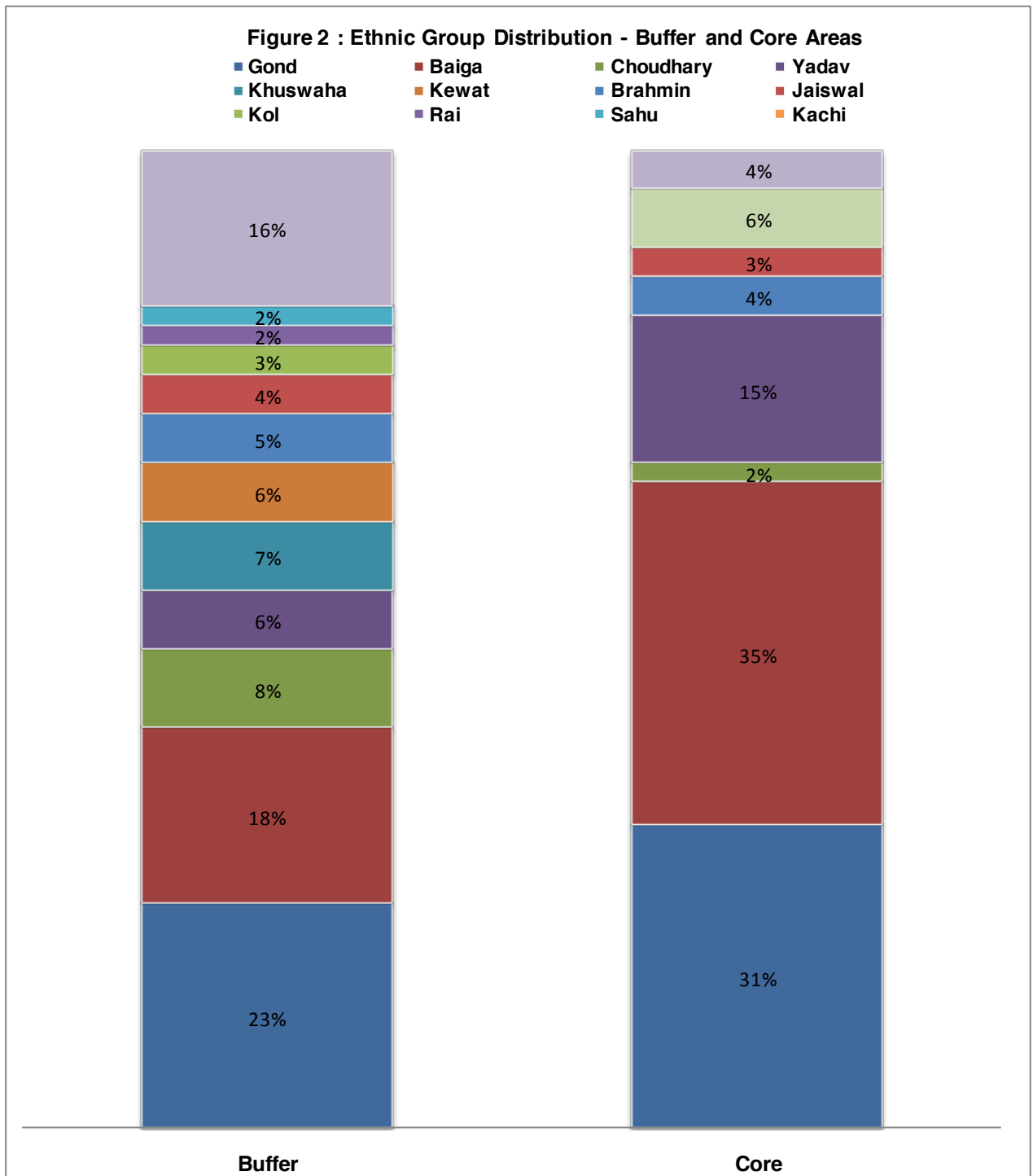
<b>Table 1.4 - Core Area - Average members per household</b>			
<b>Villages</b>	<b>Couples</b>	<b>Unmarried Females</b>	<b>Children</b>
Badwahi	2.0	0.6	3.0
Bagaiha	2.5	1.2	2.3
Bamera	2.3	0.1	1.5
Gangital	2.0	0.7	5.0
Garhpuri	2.2	0.4	1.9
Kaseru	2.4	0.1	3.0
Kothiya	1.7	0.1	0.4
Kushmaha	2.1	0.2	2.3
Magdhi	2.3	0.3	3.0
Milli	3.1	0.5	2.3
Sejwahi	1.7	0.5	2.7
<b>Grand Total</b>	<b>2.2</b>	<b>0.3</b>	<b>2.5</b>

The average family size of the villages surveyed in the buffer and core areas is 7 people- 4 adults and 3 children per family. Most adult males were married by the time they turned 18. Women are generally married before they turn 18.



## Ethnic Groups

The people surveyed belong to over 30 different races and tribes. Gonds and Baigas accounted for more than half of the sampled population in both areas.



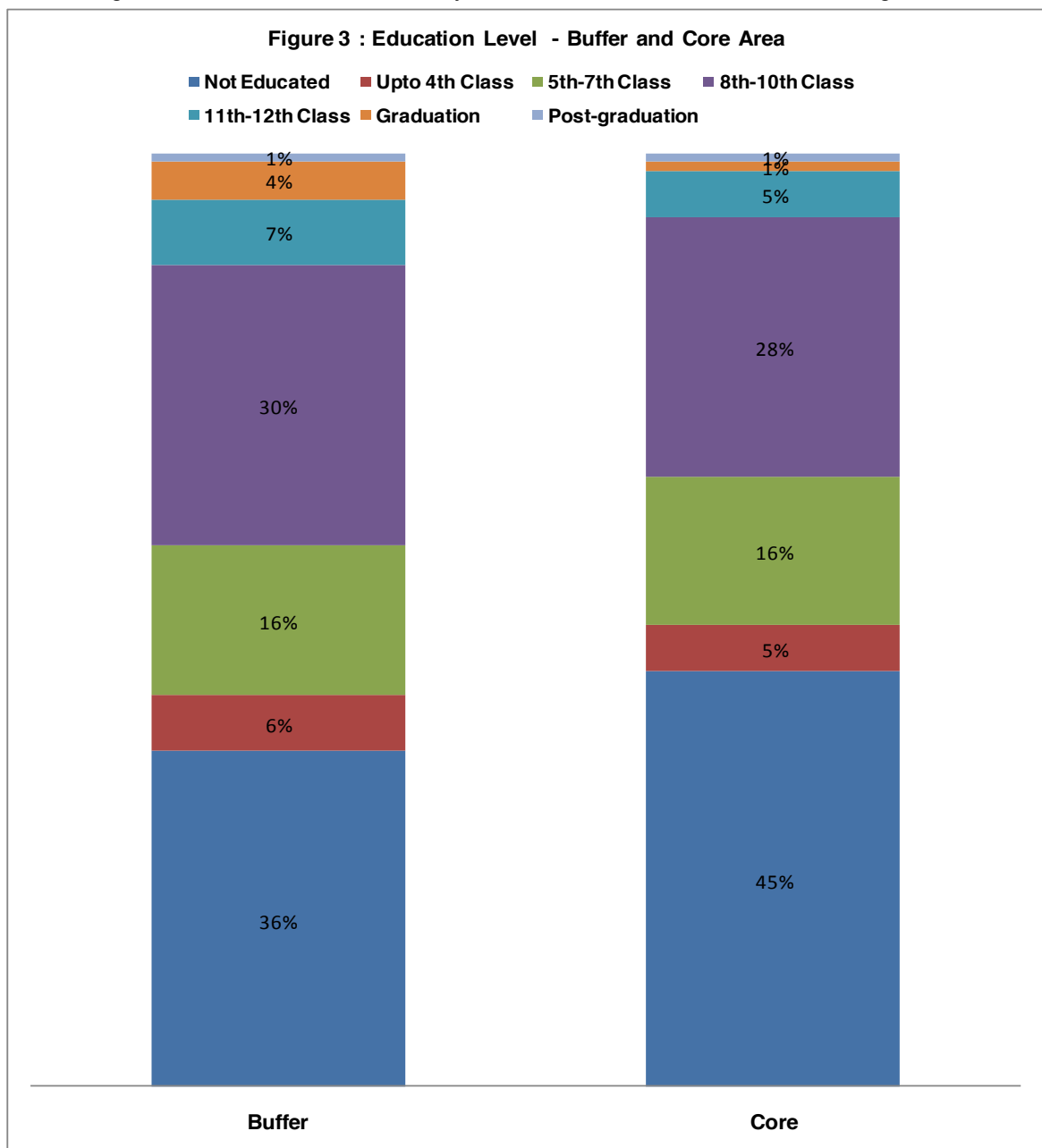
Even though there are various ethnic groups found across the surveyed areas, each village seems to have one or two predominant ethnic groups - so villages seem to have formed themselves based on ethnicity. For example, in the buffer area, Badwahi K has a high Gond population, as does Gangital in the core area (Refer to Appendix I; Tables 2.3, 2.4, 2.5 & 2.6)

## Education

Across the core and buffer areas, the rate of enrolment in schools is very low. 45% of the adult males in core area and 36% in buffer area have never been to school. Only adult males were surveyed for the education profile – education among women in these areas is a rarity. Amongst the educated adult males, 60% in the buffer area and 66% in the core area have studied upto the 7<sup>th</sup> grade (Refer to Appendix I; Tables 3.3 & 3.4).

More children nowadays are being sent to schools as compared to before. Therefore, the literacy levels seem to be on the rise. There are various factors that affect the literacy levels, such as, proximity of the school to the village and general economic condition of the household. Although education is available free of cost in most schools, parents prefer to send their children to work to supplement the family income.

There are hardly any resident teachers (Refer to Appendix I; Tables 3.5 & 3.6). Those that come from other villages find it difficult to cope with the heavy workload and are not able to take classes regularly. Also, during monsoons due to inaccessibility of these areas there is a severe shortage of school staff.



## Income

The economic conditions in nearly all the villages are dismal with the average monthly household income in the buffer areas being INR 1009 (USD 22) per month. In the core area this is even lower at INR 831 (USD 18) per month (*Refer to Appendix I; Tables 4.5 & 4.6*). With average family sizes of 7 people, there is extreme poverty in most of the villages around the reserve.

Buffer Area		Core Area	
Villages	Income p.m.	Village	Income p.m.
Badwahi	659	Badwahi	718
Bagado	930	Bagaiha	879
Bartari	641	Bamera	1108
Chechpur	553	Gangital	719
Dhamokhar	1056	Garhpuri	984
Dobha	1772	Kaseru	660
Ganjraha	225	Kothiya	675
Gohri	833	Kushmaha	1064
Gurwahi	1240	Magdhi	385
Hardi	1225	Milli	992
Khusrwah	416	Sejwahi	1104
Kudri	599		
Lakhnauti	1027		
Majhauri P	767		
Mardari M	1116		
Panpatha	807		
Sakaria	397		
Samarkoini	1021		
Tala	2283		
Umaria	642		

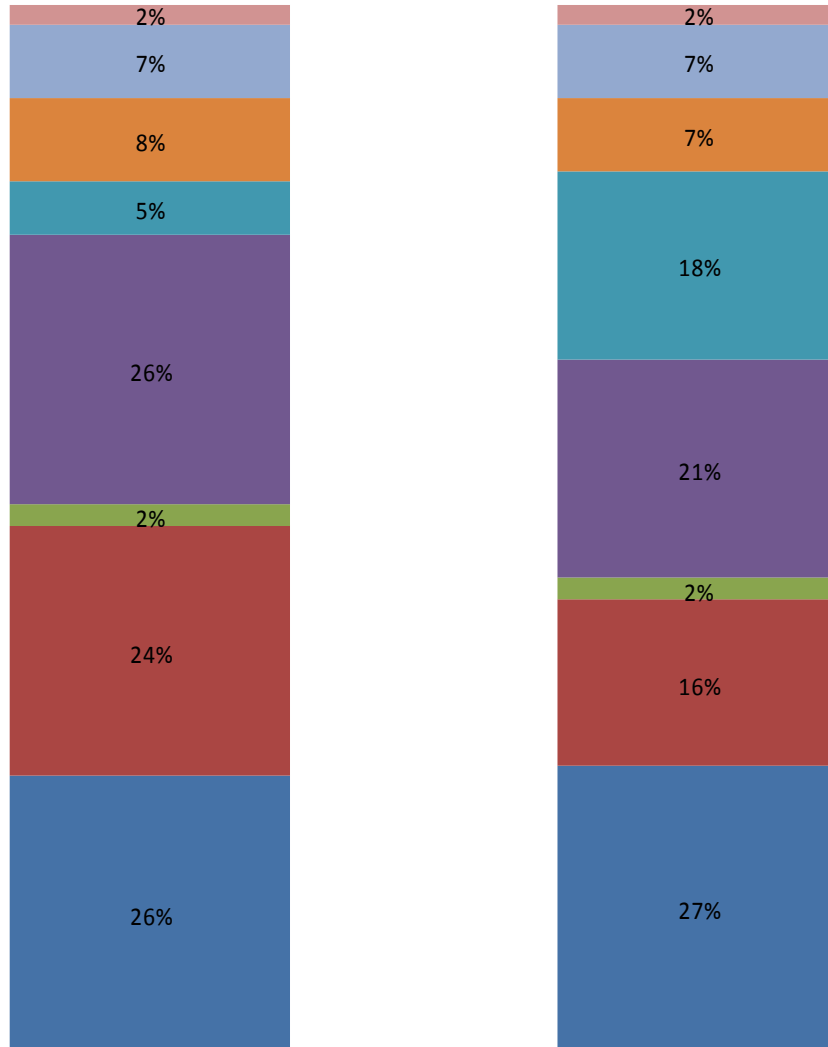
Majority of the people are daily wage labourers - they may be hired by the Forest Department as guards, naturalists/guides or by the state government for construction work or as farmhands on private agricultural lands. Those who own farms earn little from the agricultural produce owing to poor irrigational facilities and crop raids by wild animals. Income derived from the collection of NTFPs such as mahua flowers, tendu leaves, chiraunji fruits and amla fruits is earned on a seasonal basis, resulting in extended periods of unemployment. Villages in both buffer and core area do not have a fixed source of income (*Refer to Appendix I; Tables 4.3 & 4.4*).

According to the figures released by the Planning Commission for the years 2005-06, an Indian citizen earning an *individual* income below INR 368 *per month* for rural areas is considered to fall below the Poverty Line (BPL)<sup>9</sup>. Nearly every person in these villages falls in this category (considering the average family size and average family income).

<sup>9</sup>Retrieved October 13, 2010 from [http://en.wikipedia.org/wiki/Below\\_Poverty\\_Line\\_\(India\)](http://en.wikipedia.org/wiki/Below_Poverty_Line_(India))

Figure 4 : Income Source Breakdown - Buffer and Core Area

- Daily Wage Labour
- Agriculture
- Government Employment
- Mahua Flower Collection
- Tendu Leaf Collection
- Chiraunji Fruit Collection
- Amla Fruit Collection
- Others



Buffer

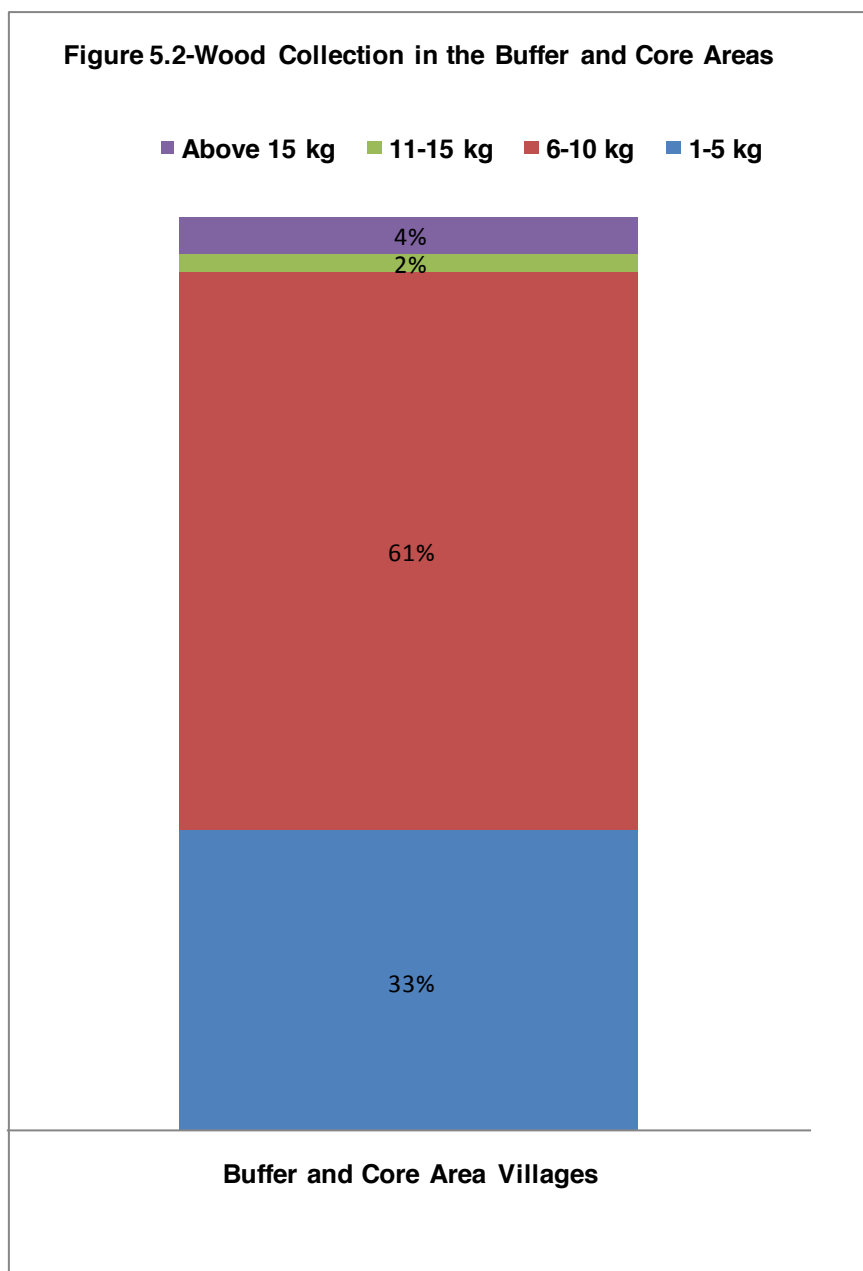
Core

## Housing & Land Ownership

Most of the land in these areas is self-owned (Refer to Appendix I; Tables 5.5 & 5.6). 92% and 99% of the houses in the buffer and core areas respectively are kuccha houses (Refer to Appendix I; Tables 5.7 & 5.8). These require constant maintenance and replacement. They are not able to withstand the elements of nature.

Electricity is unavailable in most houses, especially in the core area. Therefore, tube wells and other media that rely on electricity cannot be used for irrigation. Absence of electricity makes it easier for wild animals to carry away livestock and raid crops.

Most villages use firewood as fuel for household purposes (Refer to Appendix I; Tables 5.11, 5.12, 5.13 & 5.14). This leads to extensive logging around the reserve. Wood collection occurs within the reserve - some people go into the core areas to chop wood and they subsequently sell it to other villagers. Huge quantities of wood are needed to meet the requirements of large families.



## Livestock

Almost all of the cattle are of the non-yielding type (*Refer to Appendix I; Tables 6.4 & 6.5*). Both wild animals inside and domestic animals outside the reserve depend on the forest for food. Since fodder is not easily available outside the reserve, villagers are forced to let their cattle illegally into the forest to feed. The main uses of cattle are to plough farms and for cow dung (*Refer to Appendix I; Tables 6.6 & 6.7*). Cow dung is predominantly used to line house walls or as a fertiliser in farms.

## Predation

Given the extreme poverty, loss of livestock can be very damaging to the villagers. Predation therefore becomes the prime cause of animosity between villagers and wildlife. It can happen when the cattle illegally enter forest land to graze or when carnivores move out of the reserve in search of food. To mitigate the animosity caused by predation and to avoid revenge killings, the Forest Department provides compensation to villagers whose livestock have been killed by predators as long as such incidents have taken place outside the of the core area. (*Appendix I; Tables 7.3, 7.4, 7.5 & 7.6*).

Table 7.1 - Compensation Range		
Compensation Range -INR	Buffer	Core
Below 1000	17%	11%
1000-5000	72%	67%
Above 5000	11%	22%

## Specified Assets

Here, assets like radios, televisions, cupboards, cellphones and vehicles have provided us with additional parameters to assess the economic standing of the villagers. Their spending power is indicated by the goods they own.

Table 8.1- Specified asset ownership in the buffer area							
Village	Radio	Television	Cellphone	Motorcycle	4-wheeler	Tractor	Cycle
Badwahi K	45%	9%	9%	9%	0%	0%	100%
Bagado	11%	0%	0%	0%	0%	0%	11%
Bartari	14%	9%	32%	0%	0%	5%	55%
Chechpur	20%	10%	0%	0%	0%	0%	60%
Dhamokhar	28%	20%	32%	16%	0%	8%	80%
Dobha	9%	9%	0%	0%	0%	0%	73%
Ganjraha	0%	0%	10%	0%	0%	0%	40%
Gohri	33%	0%	33%	0%	0%	0%	83%
Gurwahi	25%	20%	15%	10%	0%	0%	65%
Hardi	30%	4%	33%	11%	0%	0%	63%
Khusrwah	13%	13%	13%	0%	0%	0%	50%
Kudri	7%	0%	26%	4%	0%	0%	48%
Lakhnauti	22%	4%	19%	11%	0%	4%	78%
Majhauri P	50%	0%	17%	0%	0%	0%	83%
Mardari M	0%	0%	36%	0%	0%	0%	86%
Panpatha	14%	14%	14%	7%	0%	0%	36%
Sakaria	13%	0%	13%	0%	0%	0%	87%
Samarkoini	15%	8%	0%	0%	0%	0%	69%
Tala	5%	35%	45%	12%	7%	2%	40%
Umaria (Bakeli)	24%	4%	30%	4%	1%	0%	75%

**Table 8.2 - Specified asset ownership in the core area**

Village	Radio	Television	Cellphone	Motorcycle	4-wheeler	Tractor	Cycle
Badwahi	57%	0%	14%	14%	0%	0%	100%
Bagaiha	50%	17%	50%	17%	0%	17%	83%
Bamera	23%	8%	46%	15%	0%	0%	46%
Gangital	44%	11%	11%	0%	0%	0%	56%
Garhpuri	20%	12%	24%	8%	0%	0%	76%
Kaseru	18%	0%	5%	0%	0%	0%	86%
Kothiya	33%	0%	11%	0%	0%	0%	33%
Kushmaha	28%	6%	11%	11%	0%	0%	44%
Magdhi	8%	0%	4%	0%	0%	0%	46%
Milli	31%	0%	0%	0%	0%	0%	92%
Sejwahi	0%	12%	6%	12%	0%	6%	65%

## Water Availability

The water available for drinking is not fit for consumption. Not every house has a hand pump or a well. Hence, people have to walk long distances in order to gain access to drinking water. Some even depend on natural sources like rivers and streams (*Appendix I; Tables 9.5 & 9.6*).

There is no perennial source of water for irrigation. Farmers mostly rely on natural sources such as rain, streams and rivers. Wells are also used to irrigate fields (*Appendix I; Tables 9.7 & 9.8*). However, they dry up during summers. Even to facilitate the production of fodder, the irrigation facilities will have to be improved drastically.

Table 9.1 - Source of drinking water		
Source	Buffer	Core
Handpumps	40%	41%
Wells	38%	56%
Natural Sources	22%	2%

Table 9.2 - Source of water for irrigation		
Source	Buffer	Core
Handpumps	36%	33%
Wells	45%	54%
Natural Sources	6%	7%
Surface Pumps	13%	6%



## Health Care Facilities

In the buffer area there are a considerable number of health care centres. However, these are not present in every village - people have to travel distances upto 35 km to avail medical facilities.

Traffic in the tiger reserve is permitted only between sunrise and sunset. The villages inside the core area of the reserve are bound by these timings. Due to the absence of any health care facilities inside the villages, people have to seek treatment outside the reserve. In case of medical emergencies, these timings act as a constraint. According to sources, malaria and other diseases are common during monsoons. As per the respondents, medical camps are held for livestock only.

**Table 10.1 - Health Care facilities in the buffer area**

Village	Nearest Medical Centre	Distance -km	Qualified Doctors
Badwahi K	Karkeli	35	0
Bagado	Manpur	10	5+
Bartari	Khitauli	12	4
Chechpur	Hirauli	8	0
Dhamokhar	Dhamokhar	0	2
Dobha	Tala	7	0
Ganjraha	Sukhdas	3	4
Gohri	Umaria	28	5+
Gurwahi	Gurwahi	3	0
Hardi	Chitrawan	2	1
Khusrwah	Umaria	25	5+
Kudri	Chansura	2	2
Lakhnauti	Manpur	4	5+
Majhauri P	Umaria	22	5+
Mardari M	Umaria	25	5+
Panpatha	Panpatha	0	2
Sakaria	Chechariya	7	1
Samarkoini	Manpur	25	5+
Tala	Tala	0	0
Umaria (Bakeli)	Umaria (Bakeli)	0	0

**Table 10.2 - Health Care facilities in the core area**

Village	Nearest Medical Centre	Distance -km	Qualified Doctors
Badwahi	Manpur	20	5+
Bagaiha	Umaria (Bakeli)	5	0
Bamera	Manpur	18	5+
Gangital	Manpur	18	5+
Garhpuri	Tala	6	0
Kaseru	Barhi	12	0
Kothiya	Chansura	3	1
Kushmaha	Indwar	18	1
Magdhi	Umaria	30	5+
Milli	Umaria	35	5+
Sejwahi	Manpur	15	5+

## Conclusion

The key to saving the tiger lies in securing its habitat and mitigating the twin threats to it i.e. poaching and habitat loss. Both these factors are inextricably linked to the socio-economic conditions that prevail here and are expressed in the form of pressure exerted on the forest's resources by the 170 million<sup>10</sup> people that live in and around India's forests. In order to save the tiger, the needs of both man and animal must be understood.

To this end we undertook a survey to assess the living conditions of people that live within the core area and within a 1 km radius of the core area of Bandhavgarh Tiger Reserve.

Of the 15 villages in the core, we surveyed 11 villages (4 villages are currently being relocated). In the buffer area, we surveyed 20 villages (out of a total of 57) that lie within a 1 km radius of the boundary of the core area. Based on the data collected, the profile of an average family living in the core area and the buffer area has been constructed below.

### Core Area

Family Size	7	4 adults and 3 children
Total Income (per family)	INR 831	Mahua flower collection (26%), Daily wage labour (25%), agriculture (24%), Chiraunji fruit collection (8%), Amla fruit collection (7%), Tendu leaf collection (5%), livestock (3%), government employment (2%)
Education	Males-Upto 5 <sup>th</sup> -7 <sup>th</sup> class Women- Mostly Uneducated	44 % of adult males surveyed are uneducated
Health care facilities	3-35 km from the village	There are no medical facilities inside the core area.
Livestock	1 cow, 1 bull, 1 buffalo/goat/hen;	93% cattle are non-yielding
Fuel used	1.Firewood 2.Gobar (Cow -dung)	61% collect 6-10 kg of firewood

### Buffer Area (within 1km from the boundary of the core)

Family size	7	4 adults and 3 children
Total Income (per family)	INR 1009	This income is derived from: Daily wage labour (26%), Mahua flower collection (21%),Tendu leaf collection (18%), agriculture (16%), Amla fruit collection (7%), Chiraunji fruit collection (7%), livestock (3%), government employment (3%)
Education	Men: Upto the 5 <sup>th</sup> -7 <sup>th</sup> class Women: Mostly Uneducated	36% of adult males surveyed are uneducated
Health care facilities	15 km from village	Not all facilities are adequately staffed.
Livestock	1 cow, 1 bull, 1 buffalo/goat/hen	96% cattle are non-yielding
Primary Fuel Used	1.Firewood 2.Gobar (Cow-dung)	61% collect 6-10 kg of wood

<sup>10</sup> Basu, Prakash Jyoti: *Adaptation, Non-timber Forest Products and Rural Livelihood: An Empirical Study in West Bengal, India*, Retrieved January 20, 2011 from <http://iopscience.iop.org/1755-1315/6/38/382011>

## Inference

As per the average monthly income calculated for a *family of 7* in the buffer and core areas, nearly every person here falls below the poverty line. A large part of their livelihood depends on the collection of Non-Timber Forest Products (NTFPs). Collection of NTFPs in the core area is banned; this means that a large part of the income earned is illegal. Moreover, it results in unsustainable usage of forest resources and harms the forest's ecology.

Although education is provided free of cost, children are sent to work to supplement the meagre family income. Moreover, schools are far away and/or inadequately staffed.

In the core area, among the villages that we surveyed, there are no health care centres. To make matters worse, villagers are hindered by lack of roads/transport as well as restrictions placed on movement within the core area. Although diseases like malaria are common in the monsoons, no medical camps are held (as per the respondents). Medical facilities are found in some villages only the buffer area; not all of them have qualified doctors.

On an average, every household has cattle and /or poultry. *These cattle are non-yielding; they are used to plough land and as sources of cow-dung, which is used as fuel, manure and also to plaster houses.* Although banned, the practice of letting cattle graze inside the reserve is rampant among the villagers. This leads to altercations between the villagers and the Forest Department.

These cattle are prone to attacks by predators. In case of a cattle-kill outside the core area, the villagers are compensated monetarily. However, this money does not account for the full value of the dead animal and seldom reaches them on time. No compensation is given for deaths (animal/human) that occur within the core area because of trespassing.

Owing to their economic condition, the death of a single cow or goat can be disastrous. Incidents such as these lead to 'revenge-killing' wherein carcasses are laced with poison or explosives. There have also been cases of tigers and leopards being caught in traps that have been laid for bushmeat like chital and sambhar.

### Man vs. Animal: Conflict of Needs

To survive, the tiger needs inviolate tracts of forests that are abundant in prey. Hence, the National Tiger Conservation Authority <sup>11</sup>(NTCA) has stipulated that reserves in India operate on the basis of a 'core-buffer' strategy.

Scientific studies <sup>12</sup> have shown that tigers occupy smaller territories in prey-rich areas. This does not imply that increasing the prey density will tantamount to higher tiger numbers. This is because tigers are highly territorial animals-they demarcate their territory by scratching the barks of trees and spraying urine. Their inability to share their territory with other tigers leads to in-fighting which is frequently fatal. However, male tigers may share their territories with tigresses. Cubs are reared by their mothers for 18-24 months. During this period they are vulnerable to disease, starvation and death from infanticide wherein tigers kill offspring that are not their own, so as to mate with the mother and perpetuate their own genes. Those cubs that survive this period have to venture out in search of new territories. Likewise, tigers from other regions might move in. It is important to note that tigers are their most vulnerable at this stage in life, when as sub-adults, they move out to establish their own territories. However, this behavioural tendency is very important ecologically because it prevents inbreeding, thus ensuring a healthy gene pool.

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<sup>11</sup> Formerly called 'Project Tiger'.

<sup>12</sup> As per research conducted by Dr. Ullas Karanth using camera traps and line transect surveys.

Viable tiger populations are those in which, there are 80-100 breeding animals per 800-1000 sq.km.<sup>13</sup>. In a tiger reserve, these form the core areas and must be kept free of all human activity/interference. The purpose of the buffer area is to absorb the spillover population from the core area. In an ideal situation, both the core and buffer regions together will be able to harbour a tiger population that consists of breeding and aged animals, cubs and sub-adults.

The buffer area is a multi-use area wherein humans are permitted to collect limited amounts of wood and NTFPs. This increases the possibility of man-animal conflict. Therefore, as per the NTCA, those villages in the buffer area that lie within a declared National Park and all the villages in the core area be relocated.

Residents of relocated villages are eligible for compensation in accordance with the provisions of the Wildlife (Protection) Act, 1972 and the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006. Subject to their assent, they will be provided with a sum of INR 10 lakh per family<sup>14</sup> as per the 'National Rehabilitation and Resettlement Policy, 2007'. This money will be given to them as a lump sum or will be utilized by the Forest Department to rehabilitate them such that the money will go into procurement of agricultural land, construction of houses, incentives, settlement of rights and provision of civic amenities.<sup>15</sup>

### **Forming a Sustainable and Practical Strategy to Save Tigers**

Given the above, it is clear that the villages in the buffer area of Bandhavgarh Tiger Reserve exert tremendous pressure on its resources. There are 57 villages within a distance of 1 km from the boundary of the core area alone. The population for 37 of these villages as per the 2001 census is 20,139 people<sup>16</sup>. The village density and the population in each village increases dramatically as one moves further away. Therefore, even if all 57 villages are relocated, only an additional radius of 1km of the buffer area will be fully secure. This solution does not address the heart of the issue. In addition, drawing these villages into the folds of wildlife conservation itself will be a long-term programme given the level of poverty in this area. Simply put, the tiger will be gone before this 'long-term' programme is fully implemented.

Moreover, this particular reserve is unable to benefit from the advantages of having a buffer zone, simply because the State Government has not notified it.<sup>17</sup> Therefore, for all practical purposes, there is no legal provision against human activities that are detrimental to the reserve's ecology.

Therefore, in the interests of the tiger and for its sustainable protection, steps taken have to be along the following lines:

1. As a short-term measure, it is important to secure the core area and make it completely inviolate to ensure that there are no incidents of encroachments (poaching or otherwise) in the core area, thus protecting the tiger population there. A policy based on active wildlife management must be used to keep track of predator-prey populations inside the reserve, once all the villages have been relocated and the core area fenced.
2. Simultaneously, as a long-term measure,, measures must be taken to improve the plight of both wildlife and people by making local people stakeholders in wildlife conservation. This will ensure the enforcement of wildlife protection measures and will also alleviate poverty.

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<sup>13</sup> Gopal, Rajesh, Sinha P.R., Jhala Y.V., and Qureshi, Q: *Guidelines for the Preparation of Tiger Conservation Plan, A Technical Document of the National Tiger Conservation Authority, Ministry of Environment and Forests, Government of India*, NTCA/01/07. 2007, p.22, Retrieved January 6, 2011 from [http://projecttiger.nic.in/Assessment\\_%20monitoring\\_tiger.asp](http://projecttiger.nic.in/Assessment_%20monitoring_tiger.asp)

<sup>14</sup>'Family' refers to a male member who is 18 years of age or more.

<sup>15</sup> National Tiger Conservation Authority, Ministry of Environment and Forests, Government of India: *Revised Guidelines for the Ongoing Centrally Sponsored Scheme Of Project Tiger*, NTCA/01/07, pp.10-11, Retrieved January 3, 2011 from [http://projecttiger.nic.in/Assessment\\_%20monitoring\\_tiger.asp](http://projecttiger.nic.in/Assessment_%20monitoring_tiger.asp)

<sup>16</sup> Figures obtained from Umaria collectorate

<sup>17</sup> Retrieved October 26, 2010, from <http://www.scribd.com/doc/32166499/Tigerlink-May-2010-Issue>

## Securing the Core Area

The area's paucity of basic facilities and amenities should encourage people to move out of the reserve. During the course of our survey, almost all the respondents were willing to move out, provided they are provided the compensation that is due to them. Relocation of 4 villages is underway. Among those that we surveyed, the Forest Department had halted all developmental activities in the core area citing imminent relocation.

The sum of money needed to relocate the remaining 11 amounts to approximately INR 100,00,000. Therefore, we suggest that funds allocated for relocation be utilized on a priority basis, thus ensuring that all villages are moved out of the core area at the earliest. Experience in relocation has shown that villagers who accept the package as a lump sum tend to squander it away. When relocation is announced, the prices of land in the surrounding areas soar making it difficult for villagers to purchase land. Given the problems that accompany the process of relocation and the importance of securing the core area, various agencies (including the Forest Department, other governmental departments, non-governmental organisations and social research institutes) should join hands to carry out the process of relocation in a just and equitable manner.

Having freed the core area from all forms of human interference, it must be fenced. The authorities of Bandhavgarh Tiger Reserve have fenced some villages within the core area. This seems a plausible solution as observed in a study<sup>18</sup> in Africa, where livestock are housed in enclosures, which lowered the risk of predation significantly. However, the need of the hour is to ensure zero-interference by humans in the core zone except by authorized personnel. This can only be achieved by fencing the perimeter of the core area. Doing so will not only eliminate the threat of poaching but will prevent trespassers from entering the reserve in search of wood and NTFPs thus preventing the depletion of natural resources. However, this fence must be strong enough to keep the animals within and unwanted elements outside. However, for this strategy to work, the Forest Department will have to enforce the following:

1. Rigorous measures of protection
2. A policy of active management based on scientific research.

The first policy entails intensifying patrolling in and around the reserve, which necessitates an increase in ground personnel. They should be provided with vehicles and adequate gear to shield themselves from poachers and wild animals. A shoot-at-sight policy must be adopted (as in Kaziranga National Park) in confrontations against poachers. Raids should be conducted regularly; a well-connected informant network should be established. Incentives must be provided to all members of the Forest Department and especially to ground-level enforcers.

The second policy is equally important and unfortunately, this is where we have failed the tiger. First of all, their numbers must be accurately determined. This can be achieved using the techniques of camera-trapping and scat analysis. Tigers are prolific breeders with high birth and death rates. Therefore, the population census should be done at short, regular intervals in order to assess changes in numbers. Tigers can be effectively studied through the process of radio-collaring. However, it is not enough to only monitor tiger numbers. The health of a tiger population depends on the prey-population. Therefore, population surveys of prey populations must be determined using the line-transect and occupancy models.

These populations will have to be managed actively i.e. they will have to be constantly monitored in order to determine the exact number of breeding and non-breeding animals, cubs, sub-adults and transients. It must be kept in mind that the erection of a fence will prevent dispersal of animals leading to internecine conflicts and inbreeding. Therefore, the Forest Department in conjunction with wildlife scientists (either from within India or outside) should translocate animals between PAs that have similar habitat.

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<sup>18</sup> Distefano, Elisa: *Human-Wildlife Conflict Worldwide: Collection of Case Studies, Analysis of Management Strategies and Good Practices*, p.15, Retrieved September 8, 2010 from [http://www.fao.org/corp/google\\_result/en/?cx=018170620143701104933%3Aqq82jsfba7w&q=elisa+distefano&x=0&y=0&cof=FQRID%3A9&siteurl=www.fao.org%2F](http://www.fao.org/corp/google_result/en/?cx=018170620143701104933%3Aqq82jsfba7w&q=elisa+distefano&x=0&y=0&cof=FQRID%3A9&siteurl=www.fao.org%2F)

Even if the above were to be expedited through a programme of constructive co-operation between governmental and non-governmental organizations, it would still take at least two years for implementation. Throughout this period, it is imperative to identify and secure corridors that connect two or more source-populations. Like the core area, these too must be fenced off and set aside entirely for the use of wildlife alone.

## GLOSSARY

### Rules for Relocation

The Government of India (GoI) has laid down a mandate for the relocation of villages within Protected Areas (PAs). These have been stated in the "Revised Guidelines for the Ongoing Centrally Sponsored Scheme of Project Tiger"<sup>19</sup>.

According to the Wild Life (Protection) Act, 1972, and the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, people living in critical wildlife habitats maybe relocated or resettled to provide inviolate spaces for wildlife. However, this requires payment of compensation, the norms of which are as follows:

A package of INR 10,00,000 will be provided to each family<sup>20</sup>. This package can be distributed in two ways:

- The entire amount is paid to the family. The Forest Department will not be involved in the process of relocation. However, the District Magistrate will oversee the process. The Forest Department and external agencies will be expected to render as much assistance as possible after relocation.
- The Forest Department will be responsible for the process of relocation/ rehabilitation. The breakup of the above given package will be as follows:
  - Agriculture land procurement (2 hectares) and development- 35% of the total package.
  - Settlement of rights- 30% of the total package.
  - Homestead land and house construction- 20% of the total package.
  - Incentive- 5% of the package.
  - Community facilities commuted by the family (access road, irrigation, drinking water, sanitation, electricity, tele-communication, community centre, religious places of worship, burial/ cremation ground)- 10% of the total package.

### Protected Area (PA)

A protected area is "A clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values."<sup>21</sup>

### Wildlife (Protection) Act, 1972 (WPA)

The Wildlife (Protection) Act, 1972 refers to a law framed as per the Constitution of India that lays down the rules and regulations regarding the protection of wildlife.

### National Park (NP)

National parks are large natural or near natural areas set aside to protect large-scale ecological processes, along with the complement of species and ecosystems characteristic of the area, which also provide a foundation for environmentally and culturally compatible spiritual, scientific, educational, recreational and visitor opportunities.

Primary objective:

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<sup>19</sup> National Tiger Conservation Authority, Ministry of Environment and Forests, Government of India: *Revised Guidelines For the Ongoing Centrally Sponsored Scheme of Project Tiger*, , NTCA/01/07, pp.10-11, Retrieved January 3, 2011 from [http://projecttiger.nic.in/whatsnew/revised\\_guidelines\\_css\\_pt.pdf](http://projecttiger.nic.in/whatsnew/revised_guidelines_css_pt.pdf)

<sup>20</sup> Here, 'family' refers to every male above 18 years and every unmarried female above 18 years.

<sup>21</sup> Retrieved December 1, 2010 from <http://www.iucn.org/about/work/programmes/pa/>

- To protect natural biodiversity along with its underlying ecological structure and supporting environmental processes, and to promote education and recreation.

**Other objectives:**

- To manage the area in order to perpetuate, in as natural a state as possible, representative examples of physiographic regions, biotic communities, genetic resources and unimpaired natural processes;
- To maintain viable and ecologically functional populations and assemblages of native species at densities sufficient to conserve ecosystem integrity and resilience in the long term;
- To contribute in particular to conservation of wide-ranging species, regional ecological processes and migration routes;
- To manage visitor use for inspirational, educational, cultural and recreational purposes at a level which will not cause significant biological or ecological degradation to the natural resources;
- To take into account the needs of indigenous people and local communities, including subsistence resource use, in so far as these will not adversely affect the primary management objective;
- To contribute to local economies through tourism.

**Tiger Reserve (TR)**

In keeping with the structure of a tiger reserve as stipulated by the National Tiger Conservation Authority or the NTCA (formerly known as Project Tiger), the reserve has been divided into two areas- Core and Buffer. A tiger reserve includes the following criterion:

“buffer or peripheral area consisting of the area peripheral to critical habitat or core area, identified and established in accordance with the provisions contained in *Explanation (i)* above, where a lesser degree of habitat protection is required to ensure the integrity of the critical tiger habitat with adequate dispersal for tiger species, and which aim at promoting co-existence between wildlife and human activity with due recognition of the livelihood, developmental, social and cultural rights of the people, wherein the limits of such areas are determined on the basis of scientific and objective criteria in consultation with the concerned Gram Sabha and an Expert Committee constituted for the purpose. core or critical tiger habitat areas of National Parks and sanctuaries, where it has been established, on the basis of scientific and objective criteria, that such areas are required to be kept as inviolate for the purposes of tiger conservation, without affecting the rights of the Scheduled Tribes or such other forest dwellers, and notified as such by the State Government in consultation with an Expert Committee constituted for the purpose.”



## APPENDIX I

**Table 1.5: Population comparison for villages in the buffer area**

Village	Population (2001)	Sampled Population	Estimated Population (2010)
Badw ahi K	120	79	237
Bagado	323	50	150
Bartari	663	161	483
Chechpur	170	50	150
Dhamokhar	683	156	468
Dobha	238	87	261
Ganjraha	355	80	240
Gohri	122	44	132
Gurw ahi	590	126	378
Hardi	714	234	702
Khusrw ah	135	79	237
Kudri	769	153	459
Lakhnauti	1243	214	642
Majhauri P	379	34	102
Mardari M	493	111	333
Panpatha	514	80	240
Sakariya	305	92	276
Samarkoini	413	76	228
Tala	1220	342	1026
Umaria (Bakeli)	2104	783	2349
<b>Grand Total</b>	<b>11553</b>	<b>3031</b>	<b>9093</b>

**Table 1.6: Population comparison for villages in the core area**

Village	Population (2001)	Sampled Population	Estimated Population (2010)
Badw ahi	167	53	159
Bagaiha	259	51	153
Bamera	577	81	243
Gangital	330	87	261
Garhpuri	926	169	507
Kaseru	883	174	522
Kothiya	280	35	105
Kushmaha	583	120	360
Magdhi	483	203	609
Milli	392	116	348
Sejw ahi	547	112	336
<b>Grand Total</b>	<b>5427</b>	<b>1201</b>	<b>3603</b>

**Table 2.3: Other ethnic groups in the buffer area**

Other Ethnic Groups	Percentage
Muslim	0.9%
Burman	0.9%
Soni	0.9%
Baniya	0.9%
Vishw akarma	0.7%
Basur	0.7%
Mahoiya	0.7%
Prajapati	0.7%
Bishkarma	0.7%
Mahara	0.4%
Khaiw ar	0.4%
Malik	0.4%
Garg	0.4%
Pichlaw a	0.4%
Bhuniya	0.2%
Bisw as	0.2%
Maur	0.2%
Gaherw ar	0.2%
Patw ari	0.2%
Lohar	0.2%
Rajak	0.2%
Rajput	0.2%
Bhukani	0.2%
Bhuriya	0.2%
Pal	0.2%
Gotiya	0.2%
Kachiya	0.2%
Adivasi	0.2%
Majumdar	0.2%
Namdev	0.2%
Napit	0.2%
Sen	0.2%
Vanshkar	0.2%
Patel	0.2%
Kesarbani	0.2%
<b>Grand Total</b>	<b>13.7%</b>

**Table 2.4: Other ethnic groups in the core area**

Other Ethnic Groups	Percentage
Gupta	1.2%
Thakur	0.6%
Kurmi	0.6%
<b>Grand Total</b>	<b>2%</b>

**Table 2.5: Ethnic groups in the villages of the buffer area**

Village & Ethnic Group	Percentage
<b>Badwahi K</b>	
Gond	73%
Baiga	27%
<b>Bagado</b>	
Kol	50%
Gond	13%
Maur	13%
Pal	13%
Patel	11%
<b>Bartari</b>	
Gond	48%
Yadav	19%
Baiga	12%
Garg	10%
Biswas	6%
Brahmin	5%
Gaherwar	5%
<b>Chechpur</b>	
Baiga	90%
Yadav	10%
<b>Dhamokhar</b>	
Baiga	30%
Brahmin	20%
Yadav	19%
Rai	19%
Pichlawar	8%
Sahu	4%

Village & Ethnic Group	Percentage
<b>Dobha</b>	
Baiga	64%
Gond	18%
Yadav	18%
<b>Ganjraha</b>	
Kol	60%
Gond	30%
Gotiya	10%
<b>Gohri</b>	
Baiga	60%
Gond	20%
Yadav	20%
<b>Hardi</b>	
Kewat	97%
Baniya	3%
<b>Khuswah</b>	
Baiga	50%
Muslim	38%
Yadav	12%
<b>Kudri</b>	
Jaiswal	42%
Choudhary	14%

Village & Ethinc Group	Percentage
Muslim	2%
Patw ari	2%
Burman	2%
Rajak	2%
Rajput	2%
Bhuniya	2%
Banskar	2%
<b>Um ari a (Bakeli)</b>	
Khusw aha	23%
Choudhary	16%
Baiga	14%
Yadav	7%
Kachi	5%
Loni	4%
Banskar	3%
Burman	3%
Bishkarma	3%
Rai	3%
Soni	3%
Sahu	2%
Gond	2%
Baniya	2%
Kachiya	1%
Brahmin	1%
Bhuriya	1%
Majumdar	1%
Namdev	1%
Napit	1%
Prajapati	1%
Sen	1%
Vanshkar	1%
Bhukani	1%

Village & Ethinc Group	Percentage
<b>Kudri</b>	
Jaisw al	42%
Choudhary	14%
Kol	12%
Vishw akarma	12%
Yadav	12%
Gond	4%
Brahmin	4%
<b>Lakhnauti</b>	
Gond	92%
Brahmin	4%
Kesarbani	4%
<b>Majhauri P</b>	
Gond	67%
Baiga	33%
<b>Mardari M</b>	
Gond	100%
<b>Panpatha</b>	
Jaisw al	36%
Mahoiya	21%
Gond	14%
Mahara	14%
Basur	8%
Brahmin	7%
<b>Sakariya</b>	
Gond	87%
Choudhary	13%
<b>Samarkoini</b>	
Brahmin	15%
Choudhary	23%
Gond	62%
<b>Tala</b>	
Baiga	32%
Brahmin	10%
Gond	8%
Sahu	7%
Yadav	7%
Choudhary	5%

Table 3.3: Education level achieved in the villages of the buffer area

Village & Education Level	Percentage
<b>Badwahi K</b>	
Not Educated	43%
5th-7th	18%
8th-10th	36%
Graduation	3%
<b>Bagado</b>	
Not Educated	54%
5th-7th	31%
8th-10th	15%
<b>Bartari</b>	
Not Educated	33%
11th-12th	7%
5th-7th	20%
8th-10th	29%
Graduation	4%
Post-graduation	2%
Upto 4th	5%
<b>Chechpur</b>	
Not Educated	63%
5th-7th	11%
8th-10th	21%
Upto 4th	5%
<b>Dhamokhar</b>	
Not Educated	19%
11th-12th	10%
5th-7th	16%
8th-10th	37%
Graduation	14%
Post-graduation	2%
Upto 4th	2%
<b>Dobha</b>	
Not Educated	53%
5th-7th	21%
8th-10th	21%
Upto 4th	5%
<b>Ganjraha</b>	
Not Educated	53%
5th-7th	47%

Village & Education Level	Percentage
<b>Gohri</b>	
Not Educated	50%
5th-7th	17%
8th-10th	25%
Upto 4th	8%
<b>Gurwahi</b>	
Not Educated	26%
11th-12th	18%
5th-7th	6%
8th-10th	32%
Graduation	6%
Post-graduation	3%
Upto 4th	9%
<b>Hardi</b>	
Not Educated	36%
11th-12th	5%
5th-7th	19%
8th-10th	31%
Graduation	2%
Upto 4th	7%
<b>Khusrwah</b>	
Not Educated	100%
<b>Kudri</b>	
Not Educated	28%
11th-12th	9%
5th-7th	13%
8th-10th	40%
Upto 4th	10%
<b>Lakhnauti</b>	
Not Educated	35%
11th-12th	8%
5th-7th	13%
8th-10th	31%
Graduation	2%
Upto 4th	11%

Table 3.4 Education level achieved in the villages of the Core Area

Village & Education Level	Percentage
<b>Majhauri P</b>	
Not Educated	36%
11th-12th	7%
5th-7th	36%
8th-10th	21%
<b>Mardari M</b>	
Not Educated	36%
11th-12th	4%
5th-7th	9%
8th-10th	42%
Graduation	9%
<b>Panpatha</b>	
Not Educated	26%
11th-12th	14%
5th-7th	19%
8th-10th	30%
Graduation	4%
Upto 4th	7%
<b>Sakariya</b>	
Not Educated	26%
11th-12th	11%
5th-7th	15%
8th-10th	30%
Graduation	11%
Upto 4th	7%
<b>Samarkoini</b>	
Not Educated	38%
11th-12th	25%
8th-10th	29%
Graduation	8%
<b>Tala</b>	
Not Educated	28%
11th-12th	5%
5th-7th	17%
8th-10th	33%
Graduation	7%
Post-graduation	3%
Upto 4th	5%

Village & Education Level	Percentage
<b>Umaria (Bakeli)</b>	
Not Educated	39%
11th-12th	6%
5th-7th	17%
8th-10th	27%
Graduation	3%
Upto 4th	8%

**Table 4.5: Income range of the buffer area**

Income Range*	Percentage
Below 100	4%
101-299	19%
300-499	21%
500-749	8%
750-999	11%
1000-1999	18%
Above 2000	19%

**Table 4.6: Income range of the Core Area**

Income Range*	Percentage
Below 100	1%
101-299	24%
300-499	18%
500-749	15%
750-999	19%
1000-1999	15%
Above 2000	8%

\* Income is monthly and the monetary unit is Indian Rupee

**Table 5.5: House ownership in the villages of the buffer area**

Village	Self-owned	Rented	Government-owned
Badwahi K	100%	0%	0%
Bagado	100%	0%	0%
Bartari	95%	5%	0%
Chechpur	100%	0%	0%
Dhamokhar	100%	0%	0%
Dobha	100%	0%	0%
Ganjraha	100%	0%	0%
Gohri	100%	0%	0%
Gurwahi	95%	5%	0%
Hardi	100%	0%	0%
Khusrawah	100%	0%	0%
Kudri	100%	0%	0%
Lakhnauti	100%	0%	0%
Majhauri P	100%	0%	0%
Mardari M	100%	0%	0%
Panpatha	93%	7%	0%
Sakaria	100%	0%	0%
Samarkoini	85%	15%	0%
Tala	92%	0%	8%
Umaria (Bakeli)	98%	2%	0%

**Table 5.6: House ownership in the villages of the core area**

Village	Self-owned	Rented
Badw ahi	100%	0%
Bagaiha	100%	0%
Bamera	100%	0%
Gangital	100%	0%
Garhpuri	96%	4%
Kaseru	100%	0%
Kothiya	100%	0%
Kushmaha	100%	0%
Magdhi	100%	0%
Milli	100%	0%
Sejw ahi	100%	0%

**Table 5.7: Type of house in the villages of the buffer area**

Village	Pukka	Kuccha
Badw ahi K	0%	100%
Bagado	11%	89%
Bartari	0%	100%
Chechpur	0%	100%
Dhamokhar	24%	76%
Dobha	0%	100%
Ganjraha	0%	100%
Gohri	0%	100%
Gurw ahi	15%	85%
Hardi	4%	96%
Khusrw ah	0%	100%
Kudri	4%	96%
Lakhnauti	0%	100%
Majhauri P	0%	100%
Mardari M	0%	100%
Panpatha	14%	86%
Sakaria	13%	87%
Samarkoini	8%	92%
Tala	32%	68%
Umaria (Bakeli)	2%	98%



**Table 5.8: Type of house in the villages of the core area**

Village	Pukka	Kuccha
Badw ahi	0%	100%
Bagaiha	0%	100%
Bamera	0%	100%
Gangital	0%	100%
Garhpuri	0%	100%
Kaseru	0%	100%
Kothiya	0%	100%
Kushmaha	0%	100%
Magdhi	0%	100%
Milli	0%	100%
Sejw ahi	6%	94%

**Table 5.9: Average area of houses in the villages of the buffer area**

Village	Area*
Badw ahi K	18
Bagado	18
Bartari	11
Chechpur	21
Dhamokhar	16
Dobha	20
Ganjraha	17
Gohri	15
Gurw ahi	21
Hardi	14
Khusrw ah	18
Kudri	12
Lakhnauti	14
Majhauri P	11
Mardari M	10
Panpatha	9
Sakaria	8
Samarkoini	22
Tala	15
Umaria (Bakeli)	8

**Table 5.10: Average area of houses in the villages of the core area**

Village	Area*
Badw ahi	9
Bagaiha	9
Bamera	13
Gangital	22
Garhpuri	17
Kaseru	14
Kothiya	17
Kushmaha	20
Magdhi	17
Milli	15
Sejw ahi	12

\* The unit of area is dismal

**Table 5.11: Type of fuel used for household purposes in the villages of the buffer area**

Village	Wood	LPG	Gobar
Badw ahi K	100%	0%	0%
Bagado	100%	0%	0%
Bartari	100%	0%	0%
Chechpur	100%	0%	0%
Dhamokhar	100%	24%	24%
Dobha	100%	0%	0%
Ganjraha	100%	0%	0%
Gohri	100%	0%	0%
Gurw ahi	100%	0%	0%
Hardi	100%	4%	0%
Khusrw ah	100%	0%	0%
Kudri	100%	0%	0%
Lakhnauti	100%	0%	0%
Majhauri P	100%	0%	0%
Mardari M	100%	0%	0%
Panpatha	100%	0%	0%
Sakaria	100%	0%	0%
Samarkoini	100%	0%	0%
Tala	92%	12%	3%
Umaria (Bakeli)	99%	3%	3%

**Table 5.12: Type of fuel used for household purposes in the villages of the core area**

Village	Wood	LPG
Badw ahi	100%	0%
Bagaiha	100%	0%
Bamera	100%	0%
Gangital	100%	0%
Garhpuri	100%	0%
Kaseru	100%	0%
Kothiya	100%	0%
Kushmaha	100%	6%
Magdhi	100%	0%
Milli	100%	0%
Sejw ahi	100%	0%

*Note: Some households may have multiple sources of fuel*

**Table 5.13: Wood collection for household purposes in the villages of the buffer area**

Village	1-5 kg	6-10 kg	11-15 kg	Above 15 kg
Badw ahi K	45%	55%	0%	0%
Bagado	0%	100%	0%	0%
Bartari	32%	63%	0%	5%
Chechpur	30%	70%	0%	0%
Dhamokhar	44%	56%	0%	0%
Dobha	36%	46%	0%	18%
Ganjraha	20%	80%	0%	0%
Gohri	17%	67%	16%	0%
Gurw ahi	35%	65%	0%	0%
Hardi	26%	59%	0%	15%
Khusrw ah	38%	50%	12%	0%
Kudri	33%	67%	0%	0%
Lakhnauti	44%	52%	0%	4%
Majhauri P	33%	50%	17%	0%
Mardari M	43%	57%	0%	0%
Panpatha	57%	43%	0%	0%
Sakaria	53%	40%	7%	0%
Samarkoini	23%	77%	0%	0%
Tala	28%	62%	2%	8%
Umaria (Bakeli)	31%	63%	2%	4%

**Table 5.14: Wood collection for household purposes in the villages of the core area**

Village	1-5 kg	6-10 kg	11-15 kg	Above 15 kg
Badw ahi	43%	57%	0%	0%
Bagaiha	67%	17%	16%	0%
Bamera	23%	69%	8%	0%
Gangital	22%	78%	0%	0%
Garhpuri	28%	68%	0%	4%
Kaseru	27%	68%	5%	0%
Kothiya	33%	67%	0%	0%
Kushmaha	44%	50%	0%	6%
Magdhi	35%	57%	4%	4%
Milli	31%	54%	0%	15%
Sejw ahi	35%	59%	0%	6%

**Table 6.3: Livestock in the villages of the buffer area**

Village	Buffalo	Cow	Bull	Goat	Pig	Hen	Total Livestock
Badw ahi K	18	20	22	2	0	40	102
Bagado	2	5	8	7	0	0	22
Bartari	5	11	26	2	0	0	44
Chechpur	4	9	14	0	0	2	29
Dhamokhar	14	32	33	18	0	0	97
Dobha	7	18	8	5	0	0	38
Ganjraha	1	6	11	1	0	16	35
Gohri	1	9	5	0	0	6	21
Gurw ahi	0	25	37	8	0	20	90
Hardi	11	35	45	10	0	0	101
Khusrw ah	2	15	12	6	0	15	50
Kudri	5	20	29	10	0	3	67
Lakhnauti	31	52	43	11	0	0	137
Majhauri P	0	13	17	13	0	4	47
Mardari M	0	22	33	0	0	0	55
Panpatha	0	7	15	0	0	0	22
Sakaria	4	18	37	0	0	0	59
Samarkoini	5	23	20	3	0	0	51
Tala	9	53	7	19	3	4	95
Umaria (Bakeli)	20	133	174	34	0	3	364

**Table 6.4: Livestock in the villages of the core area**

Village	Buffalo	Cow	Bull	Goat	Pig	Hen	Total Livestock
Badw ahi	3	4	15	16	0	0	38
Bagaiha	11	26	12	15	0	0	64
Bamera	19	44	22	9	0	0	94
Gangital	2	14	14	2	0	0	32
Garhpuri	7	27	48	3	0	0	85
Kaseru	18	55	59	11	0	0	143
Kothiya	1	4	18	0	0	0	23
Kushmaha	0	22	26	1	0	0	49
Magdhi	25	33	44	0	0	0	102
Milli	0	29	26	0	0	5	60
Sejw ahi	2	18	25	0	0	4	49
<b>Grand Total</b>	<b>88</b>	<b>276</b>	<b>309</b>	<b>57</b>	<b>0</b>	<b>9</b>	<b>739</b>

**Table 6.5: Productivity of cattle in the villages of the buffer area**

Village	Yielding	Non-yielding
Badw ahi K	0%	100%
Bagado	0%	100%
Bartari	0%	100%
Chechpur	0%	100%
Dhamokhar	0%	100%
Dobha	0%	100%
Ganjraha	0%	100%
Gohri	0%	100%
Gurw ahi	0%	100%
Hardi	5%	95%
Khusrw ah	0%	100%
Kudri	7%	93%
Lakhnauti	0%	100%
Majhauri P	0%	100%
Mardari M	0%	100%
Panpatha	0%	100%
Sakaria	0%	100%
Samarkoini	0%	100%
Tala	35%	65%
Umaria (Bakeli)	2%	98%

**Table 6.6: Productivity of cattle in the villages of the core area**

Village	Yielding	Non-yielding
Badw ahi	0%	100%
Bagaiha	25%	75%
Bamera	0%	100%
Gangital	0%	100%
Garhpuri	22%	78%
Kaseru	0%	100%
Kothiya	0%	100%
Kushmaha	10%	90%
Magdhi	0%	100%
Milli	0%	100%
Sejw ahi	17%	83%

**Table 6.6: Purpose of cattle in the villages of the buffer area**

Village	Agriculture	Gobar	Milk
Badw ahi K	100%	100%	0%
Bagado	100%	100%	0%
Bartari	100%	100%	0%
Chechpur	60%	100%	0%
Dhamokhar	96%	100%	0%
Dobha	60%	100%	20%
Ganjraha	100%	100%	0%
Gohri	100%	100%	0%
Gurw ahi	63%	100%	0%
Hardi	100%	100%	4%
Khusrw ah	100%	100%	0%
Kudri	94%	100%	6%
Lakhnauti	96%	100%	0%
Majhauri P	100%	100%	0%
Mardari M	100%	100%	0%
Panpatha	100%	100%	0%
Sakaria	100%	100%	0%
Samarkoini	92%	100%	0%
Tala	8%	88%	54%
Umaria (Bakeli)	99%	100%	2%

**Table 6.7: Purpose of cattle in the villages of the core area**

Village	Agriculture	Gobar	Milk
Badw ahi	100%	100%	0%
Bagaiha	100%	100%	20%
Bamera	100%	100%	0%
Gangital	100%	100%	0%
Garhpuri	95%	100%	18%
Kaseru	100%	100%	0%
Kothiya	100%	100%	0%
Kushmaha	64%	100%	7%
Magdhi	90%	95%	5%
Milli	91%	100%	0%
Sejw ahi	93%	100%	14%

**Table 7.3: Predation in the buffer area**

Village	People Affected*	Filed**	Not Filed**	Received***	Not Received***
Badw ahi K	18%	0%	100%	0%	0%
Bagado	22%	50%	50%	0%	50%
Bartari	14%	100%	0%	67%	33%
Chechpur	20%	100%	0%	0%	100%
Dhamokhar	48%	58%	42%	58%	0%
Dobha	45%	100%	0%	80%	20%
Ganjraha	10%	0%	100%	0%	0%
Gohri	33%	100%	0%	0%	100%
Gurw ahi	15%	100%	0%	67%	33%
Hardi	7%	0%	100%	0%	0%
Khusrw ah	13%	100%	0%	0%	100%
Kudri	33%	44%	56%	11%	33%
Lakhnauti	11%	67%	33%	67%	0%
Majhauri P	33%	100%	0%	50%	50%
Mardari M	21%	100%	0%	67%	33%
Panpatha	29%	100%	0%	75%	25%
Sakaria	60%	56%	44%	33%	22%
Samarkoini	38%	80%	20%	20%	60%
Tala	23%	86%	14%	29%	57%
Umaria (Bakeli)	16%	63%	37%	21%	42%

**Table 7.4: Predation in the core area**

Village	People Affected*	Filed**	Not Filed**	Received***	Not Received***
Badw ahi	29%	50%	50%	0%	50%
Bagaiha	0%	0%	0%	0%	0%
Bamera	38%	80%	20%	60%	20%
Gangital	11%	100%	0%	100%	0%
Garhpuri	40%	100%	0%	30%	70%
Kaseru	41%	67%	33%	56%	11%
Kothiya	22%	0%	100%	0%	0%
Kushmaha	39%	57%	43%	29%	29%
Magdhi	31%	88%	13%	25%	63%
Milli	38%	100%	0%	40%	60%
Sejw ahi	24%	75%	25%	0%	75%

\* Families whose livestock have been attacked by wild animals

\*\*Application for compensation

\*\*\*Compensation given by the Forest Department

**Table 7.5: Compensation range in the villages of the buffer area**

Village	Below 1000	1000-5000	Above 5000
Badw ahi K	0%	0%	0%
Bagado	0%	0%	0%
Bartari	50%	50%	0%
Chechpur	0%	0%	0%
Dhamokhar	0%	86%	14%
Dobha	0%	50%	50%
Ganjraha	0%	0%	0%
Gohri	0%	0%	0%
Gurw ahi	0%	100%	0%
Hardi	0%	0%	0%
Khusrw ah	0%	0%	0%
Kudri	100%	0%	0%
Lakhnauti	50%	50%	0%
Majhauri P	0%	100%	0%
Mardari M	0%	100%	0%
Panpatha	33%	67%	0%
Sakaria	0%	100%	0%
Samarkoini	0%	100%	0%
Tala	0%	75%	25%
Umariya (Bakeli)	50%	50%	0%

**Table 7.6: Compensation range in the villages of the core area**

Village	Below 1000	1000-5000	Above 5000
Badw ahi	0%	0%	0%
Bagaiha	0%	0%	0%
Bamera	33%	34%	33%
Gangital	0%	100%	0%
Garhpuri	0%	0%	100%
Kaseru	20%	80%	0%
Kothiya	0%	0%	0%
Kushmaha	0%	100%	0%
Magdhi	0%	100%	0%
Milli	0%	100%	0%
Sejw ahi	0%	0%	0%



**Table 9.5: Source of drinking water in the villages of the buffer area**

Village	Handpumps	Wells	Natural Sources
Badwahi K	100%	100%	100%
Bagado	11%	11%	100%
Bartari	100%	100%	100%
Chechpur	100%	0%	100%
Dhamokhar	100%	100%	0%
Dobha	100%	100%	0%
Ganjraha	100%	0%	0%
Gohri	100%	0%	0%
Gurwahi	100%	100%	0%
Hardi	100%	100%	100%
Khusrawah	100%	100%	0%
Kudri	100%	0%	100%
Lakhnauti	100%	100%	0%
Majhali P	0%	100%	0%
Mardari M	100%	100%	0%
Panpatha	100%	100%	0%
Sakaria	0%	100%	0%
Samarkoini	0%	100%	0%
Tala	100%	100%	0%
Umaria (Bakeli)	100%	100%	100%

**Table 9.6: Source of drinking water in the villages of the core area**

Village	Handpumps	Wells	Natural Sources
Badwahi	0%	100%	100%
Bagaiha	0%	100%	0%
Bamera	0%	100%	0%
Gangital	0%	100%	0%
Garhpuri	100%	100%	0%
Kaseru	100%	100%	0%
Kothiya	0%	100%	0%
Kushmaha	100%	100%	0%
Magdhi	100%	100%	0%
Milli	100%	100%	0%
Sejwahi	100%	100%	0%

*Note: Most households have multiple sources of drinking water*

**Table 9.7: Source of water for irrigation in the villages of the buffer area**

Village	Wells	Natural Sources	Tubewells	Surface Pumps
Badwahi K	100%	100%	0%	0%
Bagado	11%	100%	11%	0%
Bartari	0%	100%	0%	0%
Chechpur	0%	100%	0%	0%
Dhamokhar	100%	100%	0%	0%
Dobha	100%	0%	0%	0%
Ganjraha	0%	100%	0%	0%
Gohri	0%	100%	0%	0%
Gurwahi	100%	100%	0%	0%
Hardi	100%	100%	100%	0%
Khusrawah	100%	100%	0%	0%
Kudri	0%	100%	100%	0%
Lakhnauti	100%	0%	0%	0%
Majhauri P	0%	100%	0%	0%
Mardari M	0%	100%	0%	0%
Panpatha	0%	100%	0%	0%
Sakaria	100%	100%	0%	0%
Samarkoini	100%	100%	0%	0%
Tala	100%	100%	0%	0%
Umariya (Bakeli)	100%	100%	0%	100%

**Table 9.8: Source of water for irrigation in the villages of the core area**

Village	Wells	Natural Sources	Tubewells	Surface Pumps
Badwahi	100%	100%	0%	0%
Bagaiha	100%	100%	0%	0%
Bamera	100%	100%	0%	0%
Gangital	100%	100%	0%	0%
Garhpuri	0%	100%	0%	0%
Kaseru	100%	100%	100%	0%
Kothiya	100%	100%	0%	0%
Kushmaha	100%	100%	0%	0%
Magdhi	0%	100%	0%	0%
Milli	0%	100%	0%	0%
Sejwahi	100%	100%	0%	100%

*Note: Most households have multiple sources of water for irrigation*

## APPENDIX II

### Population

Adult- it refers to any male/ female who are 18 or above years of age.

Estimated population/ males/ females- it is an approximate value derived after multiplying the sampled population/ males/ females by 3<sup>22</sup> and thereafter by the average family size/ males/ females.

### Education

Teachers- only resident teachers have been taken into consideration. The presence of resident teachers is an indicator of the regularity with which classes are taken.

### Income

Mahua tree (scientific name: *Madhuca longifolia*)- commonly known in English as honey tree or butter tree<sup>23</sup>.

Tendu leaf (scientific name: *Diospyros melanoxyton*)- commonly known in English as Coromandel Ebony<sup>24</sup>.

Chiraunji fruit (scientific name: *Buchanania latifolia*)- commonly known in English as cudpah nut<sup>25</sup>.

Amla fruit (scientific name: *Emblica officinalis*)- commonly known in English as Indian gooseberry or hogs plum<sup>26</sup>.

Other sources of income- these include professions like small-scale business, compounder, computer operator, doctor, forest guide, jeep driver, teacher, resort worker and lawyer.

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<sup>22</sup> Every third house was surveyed by us.

<sup>23</sup> Retrieved October 13, 2010 from [http://en.wikipedia.org/wiki/Mahua#Other\\_names](http://en.wikipedia.org/wiki/Mahua#Other_names)

<sup>24</sup> Retrieved October 13, 2010 from [http://en.wikipedia.org/wiki/Diospyros\\_melanoxyton](http://en.wikipedia.org/wiki/Diospyros_melanoxyton)

<sup>25</sup> Retrieved October 13, 2010 from <http://www.mamtaskitchen.com/glossary.php>

<sup>26</sup> Ibid

## Housing & Land Ownership

Kuccha house- it is a building made of natural materials such as mud, grass, bamboo, thatch or sticks and is therefore a temporary structure. It requires constant maintenance and replacement. The only advantage is that the construction materials are cheap, easily available and require relatively little labour<sup>27</sup>.

Pukka house- it is a structure made from materials resistant to wear such as forms of stone or bricks, clay tiles, metal or other durable materials and sometimes using mortar to bind. This structure does not need to be constantly maintained or replaced. It is more expensive and requires more labour<sup>28</sup>.

Dismil- the conversions are as follows:

1 acre= 43,560 sq ft

1 acre= 100 dismil

1 dismil= 435.6 sq ft

## Predation

Affected people- it refers to people whose livestock has been killed by wild animals outside the core area.

Filed- it refers to people who have filed an application seeking compensation for livestock owned by them and killed by wild animals outside the core area.

Not filed- it refers to people who have not filed an application seeking compensation for livestock owned by them and killed by wild animals outside the core area.

Received- it refers to people who have received compensation for livestock that was owned by them and has been killed by wild animals outside the core area.

Not received- it refers to people who have not received compensation for livestock that was owned by them and has been killed by wild animals outside the core area.

## Water Availability

Hand pumps- these use human power and mechanical advantage to move fluids or air from one place to another. They are widely used in every country in the world for a variety of industrial, marine, irrigation and leisure activities. There are many different types of hand pumps available, mainly operating on a piston, diaphragm or rotary vane principle with a check valve on the entry and exit ports to the chamber operating in opposing directions. Most hand pumps have plungers or reciprocating pistons, and are positive displacement<sup>29</sup>.

Wells- it is an excavation or structure created in the ground by digging, driving, boring or drilling to access groundwater in underground aquifers. Well water is drawn by an electric submersible pump, a vertical turbine pump, a handpump or a mechanical pump (e.g. from a water - pumping windmill). It can also be drawn up using containers, such as buckets that are raised mechanically or by hand<sup>30</sup>.

Natural sources- these include water sources like rainfall, rivers and streams.

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<sup>27</sup> Retrieved October 13, 2010 from [http://en.wikipedia.org/wiki/Pucca\\_homes](http://en.wikipedia.org/wiki/Pucca_homes)

<sup>28</sup> Ibid

<sup>29</sup> Retrieved October 13, 2010 from [http://en.wikipedia.org/wiki/Hand\\_pump](http://en.wikipedia.org/wiki/Hand_pump)

<sup>30</sup> Retrieved October 13, 2010 from [http://en.wikipedia.org/wiki/Water\\_well](http://en.wikipedia.org/wiki/Water_well)

Tube wells- it is a type of water well, in which a long 100-200 mm (5 to 8 inch) wide stainless steel tube or pipe is bored into the underground aquifer. The lower end is fitted with a strainer, and an electric pump at the top lifts water for irrigation<sup>31</sup>.

Surface pumps- they are the most economical (non submersible) water pumps. They can reduce pumping energy consumption by half or more and can pull the water upto 20 feet and lift or push upto 900 feet<sup>32</sup>.

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<sup>31</sup> Retrieved October 13, 2010 from [http://en.wikipedia.org/wiki/Tube\\_well](http://en.wikipedia.org/wiki/Tube_well)

<sup>32</sup> Retrieved October 13, 2010 from [http://www.innovativesolar.com/index.php?cPath=27\\_62](http://www.innovativesolar.com/index.php?cPath=27_62)

## Survey Questionnaire

Date .....  
 Name of village.....

WATER AVAILABILITY	
Source of drinking water	Source of water for irrigation
Hand pumps	Wells
Wells	Tube wells
Taps	Surface pumps
Pond	Pond
River	River
Canal	Canal
Streams	Streams
Others	Others

HEALTH CARE FACILITIES	
Nearest medical centre	
Distance between nearest medical centre and the village	
Number of doctors	

Date .....  
 Name of village.....  
 Family head.....

PERSONAL DETAILS				
Name of respondent	Age	Sex	Ethnic group	Education


HOUSING/ LAND OWNERSHIP					
Ownership	Self-owned		Rented		
Type of house	Kuccha		Pukka		
Area of house					
Is the house electrified	Yes		No		
Type of fuel used	Gobar	LPG	Wood	Coal	Kerosene
Quantity of fuel used on a daily basis					

SOURCE OF INCOME		
What is the respondent's main source of income		Family income (per month)
Agriculture		Above 2000
Livestock		1000-1999
Government employee		750-999
Handicrafts		500-749
Trading		300-499
<i>Dependence on forest products:</i>		101-299
Mahua flower collection	Fishing	Below 100
Tendu leaf collection	Honey Gathering	
Chiraunji fruit collection	Amla fruit collection	
Others		

LIVESTOCK			
Does the respondent own any of the below mentioned livestock. If yes, how many			
Buffalo		Pig	
Cow		Hen	
Goat		Others	
Purpose of cattle	Milk (quantity)	Gobar	Agriculture
Financial compensation promised by the government, in case of livestock predation by wild animals			
Financial compensation received from the government			
Time in which compensation was received			

SPECIFIED ASSETS	
Does the respondent have any of the mentioned/other specified assests	
Radio	Jeep
Transistor	Motorcycle
Television	Car
Bed (number)	Tractor
Cupboard	Cycle
Cellphone	Others



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