

Ensuring Park and PEOPLE Co-existence in nepal
A Case study of
Chitwan national Park

2009



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Author

GanGa nakarmi

Relief fund for Wildlife Victims



Support



2009

Dedication

To my beloved Parents

and

To all who passed their lives on wildlife-induced incident

ACKNOWLEDGEMENT

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ABBREVIATION

APR	Annual Progress Report
BZ	Buffer zone
BZDC	Buffer Zone Development Council
BZUC	Buffer Zone User Committee
CBD	Convention on Biological Diversity
CNP	Chitwan National Park
DNPWC	Department of National Parks and Wildlife Conservation
HWC	Human Wildlife Conflict
IUCN	International Union for Conservation of Nature and Natural Resources
No.	Number
NWDMROC	Northeast Wildlife Damage Management Research and Outreach Cooperative
PPA	People and Protected Areas
PPP	Park People Program
UG	User Group
VDC	Village Development Committee
WWF	World Wildlife Fund

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EXECUTIVE SUMMARY

Wildlife-induced human casualty¹ is one of the many burning issues of human-wildlife conflict (HWC) in the management of protected areas around the globe. The issue is serious especially where limited resources and space are shared by both humans and wild animals. In this regard, this study was undertaken to gain a better understanding of wildlife-induced human casualties and the existing system devised to cope with this issue in the buffer zone of the Chitwan National Park (CNP) in Nepal.

Ten annual reports of the Department of National Parks and Wildlife Conservation (DNPWC) and other relevant literature were reviewed for general knowledge on human casualties. The recorded information on human deaths and injuries was also collected from the Buffer Zone Development Council (BZDC)² and Buffer Zone User Committee (BZUC)³. In between late December 2008 and early April 2009, a questionnaire survey and focused group discussion were conducted in the study area. The data were collected from the settlements close to the park boundary. All of the four management sectors of CNP, viz. southern Madi, central Kasara, eastern Sauraha and western Amaltari were covered (Figure 1). Data on the number of casualties, the animals responsible, the place of incident, the date of incident and the causes behind such incidents as well as the relief scheme were collected.

The results revealed that wildlife caused more human injuries than deaths. However, even though less in number, such deaths caused severe and intolerable loss to the families concerned. The associated impact of human loss is even more brutal on the dependants in cases where a sole bread

¹ "Casualty" refers to death and injury– Oxford Dictionary

² Buffer Zone Development Council (BZDC) is an apex body formed to manage the whole buffer zone

³ Buffer Zone User Committee (BZUC) is a VDC level functional body of Buffer Zone Development Council (BZDC) formed to manage the respective VDC

earner is killed in such incidents. Moreover, the physical deformities suffered as a result of such incidents create emotional and psychological stress for the injured persons. Similarly, human death also results in emotional problems in addition to economic hardship for dependent family members. Thus, wildlife-induced problems are incalculable in terms of economic value and cannot be fully/truly compensated by money.

It was observed that bears (*Ursus maritimus*), rhinos (*Rhinoceros unicornis*) and tigers (*Panthera tigris*) were the main causes of most injuries and deaths. However, other animals such as wild boar (*Sus scrofa*), common leopard (*Panthera pardus*), crocodile (*Gavialis gangeticus*), deer (*Axis axis*), elephant (*Elephas maximus*) and Gaur (*Bos gaurus*), also cause human casualties in the study area.

This study revealed that a total of 424 human casualties took place in a ten – year period between 1997 and 2007 inside and outside the Park. Among the four management sectors, more incidents of deaths and injuries occur in the southern Madi and central Kasara sectors. Similarly, the data also revealed that more human casualties (death and injury) occurred in the buffer zone than inside the park. Most incidents took place when people were carrying out farm and forest-related activities such as collecting fuel wood, fodder, grass, edible fruits, guarding crops, grazing cattle, etc.

With regard to the probable causes of casualties, almost all respondents opined that there was a lack of suitable habitat and ample food for wildlife in the park. Due to this, wild animals strayed out of the park to adjoining villages in search of agricultural crops and livestock. Availability of nutritional forage and easy prey for wild animals in the settlement areas naturally creates higher chances of encounter and confrontation with people leading to incidents that result in death and injury of both human and wild animals in the prevailing situation of insufficient food in the natural areas. Besides this, accidents due to ignorance of people were also reported. Some

respondents also mentioned that such incidents could have taken place due to the increase in wild animals in the park because of successful conservation efforts. All respondents agreed that the increase in human population and the decrease in suitable habitat for key wildlife species had contributed greatly to conflict between humans and wild animals.

The park management has been adopting both preventive and curative relief mechanisms to mitigate the problem of human casualties. The park provides both direct and indirect compensation⁴ to the wildlife victims and their families. During the study period, it was found that provision has been made for providing NRs. 50, 000.00 (US\$ 649)⁵ in case of death and a maximum of NRs. 20, 000.00 (US\$ 260) in case of injury depending upon the extent of damage caused by the wild animal. On an average the park management authority expenses NRs. 4,18,251.00 (US\$ 5,432) per year to compensate for human death and injury caused by wild animals. Besides, the park management through buffer zone committees has been supporting local communities to build biogas plant, animal watch tower (Machan) and toilets in order to reduce their dependency on park resources as well as the chances of encounters between humans and wild animals. Similarly, the park has also been supporting the community to install electric and bio fences in order to prevent wild animals from venturing out of the park. The resources for these direct and indirect measures to reduce human casualties have been arranged from 50% of the park revenue that the buffer zone communities receive every year.

In order to receive compensation, the victim or his/her family should claim for compensation within seven days of the occurrence of incident along with the relevant supporting documents such as report of incident, photo,

⁴ "Compensation" here is actually a kind of relief. The word "Compensation" is a globally used term for support provided in cash or in kind to damage caused by wild animals. Here also, "compensation" is used as synonymous with "Relief".

⁵ US\$ 1 = NRs. 77

relationship certificate etc. Victims and victims' families can claim for compensation only if the incident occurred outside the park boundary. Victims who illegally enter inside the park are not entitled to any compensation. However, victims and victims' families can claim compensation if the incident took place while traveling through the public right-of-way and collecting forest products, e.g., annual grass cutting (Kharkhadai⁶) and other activities granted official permission.

All respondents expressed their dissatisfaction with the compensation procedure and amount. They said that the compensation amount was not proportionate with their loss and the process was quite lengthy and cumbersome. The study found that the delay in releasing compensation was mainly due to two reasons. Firstly, the irregular meetings of the Buffer Zone Development Council (BZDC) and secondly, the lengthy inspection process due to fraudulent claims. The BZDC suggests that there is a need for delegating authority to the BZDC in order to combat such emergency situations immediately.

The majority of the respondents believed that the existing monetary compensation was not viable because the loss of life could not be reflected in terms of economic value. Moreover, the level of acceptance of wildlife damage compensation differs from person to person. Many factors such as fraudulent claims, time, local pressure (agitation), illiteracy, people's attitudes and the capacity of the BZDC institution can influence the compensation scheme until there is formulation of a firm and clear policy on this issue.

Recently, the Government has introduced a new policy to compensate wildlife victims by producing a new guideline. The guideline has formalized the compensation practices adopted by the park authorities since a long time and

⁶ Kharkhadai is an annual grass cutting allowed to community people with permission from the management authority for the purpose of grassland management as well as to meet the local need.

has also increased the compensation amount. The new guideline allows park authorities to grant compensation of NRs.1,50,000.00 (US\$ 1948) in case of death, a maximum of NRs. 50,000.00 (US\$ 649) for serious injury and a maximum of NRs. 5,000.00 (US\$ 65) for simple injury (Wildlife Damage Relief Guideline, 2066). However, its real application is yet to see.

Recommendations of this study include raising awareness among people regarding the ecology and behavior of problematic wild animals so that they can avoid confrontation as a preventive measure. Restoration of the wildlife habitats by effective management of grasslands and wetlands along with sustainable forest use are other necessary measures. The study found that one-time monetary compensation as it exists now seems to be not so desirable and feasible in the long run. Rather, it would be better if the management could establish an insurance system for the people of vulnerable areas. Similarly, provision for (as and when needed) regular allowance and placement of the victims and victims' families in suitable jobs could be a more reasonable and practical approach to compensation for wildlife victims. However, the new guideline has not mentioned such alternatives except monetary compensation for the damage to human life, loss of livestock, damage of harvested crops, damage of house/animal sheds and damage of crop and fruits. Therefore, it is of utmost urgency to search for sustainable solutions in order to ensure that the park revenue has been used in the best manner possible for gaining support of the local people for conservation and management of CNP.

All respondents agreed that a certain level of human wildlife interface would always exist in the buffer zone and that there was no alternative to coexistence or living in harmony with wildlife. The respondents also believed that the rise in human population and the degradation and shrinking habitat for wildlife in the park have been contributing to conflict between humans and animals. However, there are not many studies carried out on the status of habitats. So, it is important to find alternative means by regular

assessment of wildlife habitats and so that both wildlife and humans can live together in harmony as far as possible. Any initiative undertaken in isolation can neither address nor minimize the complex issue of human casualties. Holistic and collaborative efforts from all stakeholders are required and this is of utmost importance for the survival of humans and wild animals in and around the Chitwan National Park.

1. INTRODUCTION

1.1. Background

Traditionally, wildlife management decisions have relied more heavily on insights from the biological sciences than social assessments of the human dimensions (NWDMROC, 2002). But, today, the need for integrating human dimension considerations has been globally accepted in order to ensure human-animal co-existence and sustainable conservation. Human Wildlife Conflict (HWC) is one of the many dimensions to be considered for maintaining harmony between humans and wild animals. The World Park Congress (WPC), 2003 defines HWC as the "consequence from the overlapping of wildlife's requirements with those of human populations, creating costs to residents and wild animals (IUCN, 2003)." A review of case studies carried out by Elisa Distefano in Africa, Asia, South America, North America, Europe and the Middle East reveals that HWC is a growing global problem, which is not restricted to particular geographical regions or climatic conditions. The HWC is more intense in the tropics and in developing countries where livestock holdings and agriculture are an important part of rural people's livelihoods and incomes. In these regions, competition between local communities and wild animals, for the use of natural resources, is particularly intense and direct and resident human populations are very vulnerable (Distefano, E., 2005).

Living in and around Protected Areas (PAs), more often a way of life for many local communities and indigenous peoples, is augmented with multiple risks and threats. They include physical casualties, crop raid, livestock depredation and property loss. Besides these, there are further consequences such as "negative social impacts including missing work and school, additional labor cost, loss of sleep, restriction of movement etc" (Hoare, R.E., 1992) which is incalculable in terms of economic value. These circumstances have often aggravated park and people relationship.

Without properly addressing human-wildlife conflict, conservation efforts to conserve wildlife and their habitats will lose stability and progress, as well as the support of local communities (Francine, M., 2004). Wildlife-induced human casualty is one of the many issues in the conflict between humans and wildlife. In this regard, the importance of addressing challenges in the conservation of biological diversity has been universally acknowledged at the Earth Summit held in Rio de Janeiro in 1992 (CBD, 2004). The 5th WPC¹ held in 2004 also brought human-wildlife conflict (HWC) to the global stage as part of an effort to address the current challenges facing protected area management and conservation (Francine, M., 2004). Similarly, the Convention on Biological Diversity (CBD) has also emphasized the identification and removal of barriers for adequate participation of the community members in all levels of protected areas (PAs) planning, establishment, governance and management (CBD, 2004). The Government of Nepal has already recognized the importance of this and has been sharing 50% of the revenue generated by the parks and reserves for local development and resource conservation activities in the buffer zones. However, there are still some difficulties in achieving conservation goals as desired. There is a need to find out what is wrong? What are the obstacles and how to cope with them?

A wildlife-induced human casualty has been considered one of the key issues in human-wildlife conflict which may discourage people's participation in conservation efforts. Direct contact with wildlife occurs in both urban and rural areas, but it is generally more common inside and around protected areas, where wildlife population density is higher and animals often stray into adjacent cultivated fields or grazing areas" (Distefano, E., 2005). This is true in case of Nepal as well. Frequent attacks on human beings by wild animals leading to death and injury are emerging as a critical park management issue in CNP. However, there is not much information regarding this issue. Neither has any study been yet undertaken to substantiate this nor any analysis carried out to

¹ The 5th WPC was held in Durban, South Africa in September 2004; 30,000 PA experts had participated in the Congress

ascertain the factors causing human casualties and the appropriate mechanism for coping with this problem. Lack of updated information on this issue may become a major constraint to the long term conservation and management of wild animals, which in turn, may ultimately affect co-existence between humans and wild animals. Hence, this study aims to assess the overall reasons of HWC with particular focus on human deaths and injuries by wild animals. This study will provide information on wildlife-induced human casualties and will offer suggestions/recommendations for designing and implementing suitable and effective compensation/relief program for wildlife-induced human deaths and injuries.

1.2. Objectives of the Study

The main objective of the study was to understand the on the ground situation of wildlife-induced human casualties and create a platform for discussion on this issue as an instrument to facilitate human-wildlife co-existence in Chitwan National Park and the buffer zone. The specific objectives of the study were to:

1. Document and assess the prevalence of wildlife-induced human deaths and injuries.
2. Understand the causes behind human deaths and injuries.
3. Assess the existing provisions and practices for providing relief in case of occurrence of such incidents.
4. Recommend feasible and appropriate relief mechanism and necessary interventions to address the problem.

2. STUDY AREA

2.1. Location

Literature review and consultation with the experts suggest that Chitwan National Park (CNP) has the highest HWC in Nepal. Therefore, the buffer zone of CNP was selected for the study. The buffer zone is situated between longitudes $83^{\circ} 50' 44''$ – $84^{\circ} 44' 58''$ E and latitudes $27^{\circ} 16' 56''$ – $27^{\circ} 42' 13''$ N.

Chitwan National Park lies in the southern central part of Nepal. This is the first national park established in 1973 and it was also designated as a World Heritage Site in 1984. This park covers an area of 9,32,000 ha. The peripheral area of 7,50,000 ha of the national park was declared as a buffer zone in 1996 in order to contribute to biodiversity conservation in the protected area through the improvement of socio-economic conditions of the buffer zone communities (DNPWC/PPP, 2001). This park is divided into four management sectors, namely Madi/Bagai sector in the south, Sauraha sector in the east, Amaltari sector in the west and Kasara sector in the centre.

2.2. Biodiversity Features

The CNP and the buffer zone harbor many wild flora and fauna. Sal forest, riverine forest and grassland comprise of tree species such as *Shorea robusta* (Sal), *Terminalia tomentosa* (Asna), *Lagerstromea parviflora* (Banjhi), *Syzygium cumini* (Jamun), *Bauhinia vahhi* (Vorla), *Vitis latifolia*, *Bombax ceiba* (Simal), *Dalbergia sisoo* (Sisoo), *Acacia catechu* (Khayar) and grass species such as *Saccharam orundinacium* (Dhaddi), *Saccharam spontanium* (Kans), *Phragmites karka* (Narakat), *Imprerata cylindrica* (Siru) and *Narenga porphyrocoma* (Khadai). The park is famous for one horned rhinoceros (*Rhinoceros unicornis*). There are 408 rhinos (2008*), 147 tigers (2009*), 296 Gaurs (2007*), 200-250 bears (1993/94*), more than 500 species of birds and 49 species of reptiles and amphibians in CNP. (Note: * indicates the year of census). Besides, there are several wetlands of international importance in the buffer zone of CNP.

2.3. Demographic Features

There are a total of 223,260 people who inhabit in 36,193 households (average family size: 6) in the buffer zone (DNPWC, 2001). People here are mixed with Tharu (26%) and indigenous people such as Darai/Kumal/Praja (5.5%) and Majhi/Mushar/Bote (2.7%) along with various ethnic groups migrated from the hills. The ethnic groups consist of Newar, Gurung, Magar, Tamang (Janajati) (17.6%), Brahmin/Chhetri/Thakuri (38.3%) and Damai/Kami/Sarki (9.0%) (DNPWC, 2001).

People of the buffer zone largely depend on agriculture, park resources, tourism and trade for their livelihood. The major crops are rice, wheat, maize and lentils. People also keep cow, ox, buffalo, goat, etc. to meet their protein needs and to plough fields. Besides, such animals also provide farm manures as well as produce feed material for biogas plant to supply methane gas as an alternative source of fuel for household use for many families. Among the four sectors, the people of Sauraha sector have been greatly involved in the tourism business (Personal observation and DNPWC/PPP, 2000).

The land cover in the buffer zone is dominated by cultivated land i.e., more than 52%, followed by 37% forested land, 1% shrub land and 1% grassland (DNPWC/PPP, 2001). The greater the use of land for cultivation and community forest in the buffer zone, the higher the conflict between humans and wild animals due to crop raids by wild herbivores such as rhino, elephant, deer, etc. in crop fields and during harvest time. For instance, Madi Valley has the highest (70.73%) forest cover of the total forest (25066.5 ha) amongst the four management sectors and also has relatively higher cultivation land (26.6%) of the total cultivation land (35502.5 ha) except the western Amaltari sector which have contributed for higher casualties. Likewise, wild carnivores often come out in the buffer zone areas to attack and take away livestock and cattle from animal sheds. Such movement of wild animals also often creates higher chances of encounter with people, resulting in deaths and injuries. This increases the conflict between the park and the local people. Besides, the changing flow of

boundary rivers such as Rapti, Reu and Narayani erode farmlands and settlements of the people residing near these rivers also adds bad blood on the park people relationship.

2.4. Local Coping Mechanisms to Safeguard Life and Property

The local people have erected bio fence, animal watch tower (Machan), etc. in order to safeguard their croplands and homesteads, and at the same time, to avoid unwanted encounters with wild animals coming from the park. Villagers stay in the Machan to chase away wild animals visiting their crop fields and settlements using various means such as setting fires, making noise by hitting on tin, throwing stones on wild animals, exploding fire crackers, etc. The park management has also provided support for electric and solar fencing to reduce the associated risk of depredation and human casualties. Furthermore, there is also provision for culling/capturing and translocation of problem animals from the affected area.

Despite attempts by the local people to guard their fields and the use of local devices, human-wildlife encounters in the fringe areas of the park have resulted in heavy losses, including deaths and injuries of people over the years.

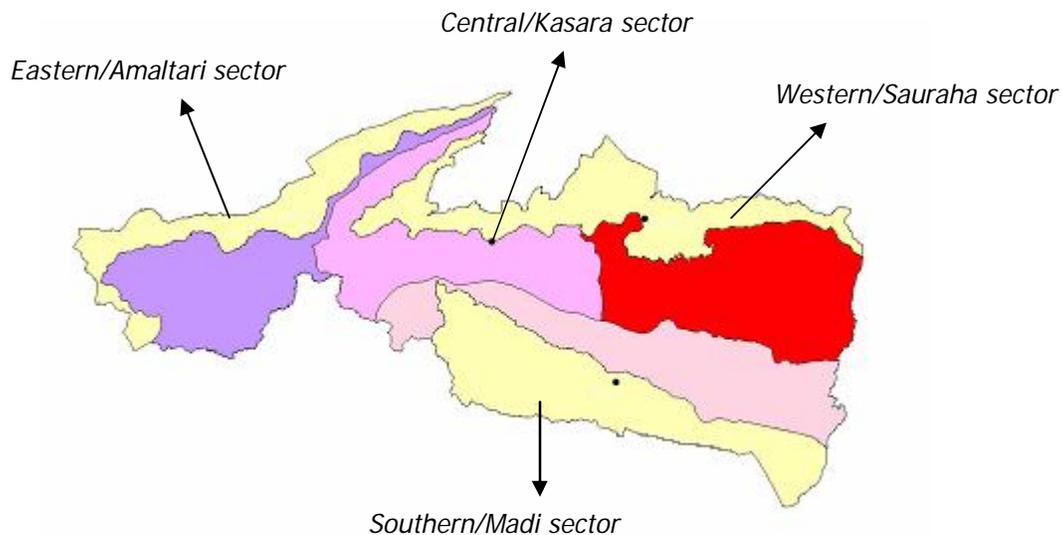


Figure 1. CNP and four management sectors

3. METHODOLOGY

3.1. Literature Review

Relevant literature such as annual reports of the Department of National Parks and Wildlife Conservation (DNPWC), academic papers, articles, reports, manuals and news regarding human casualties were thoroughly reviewed and relevant information such as numbers of death and injury, responsible wild animals, place of incidents, relief schemes for loss, etc. was collected.

3.2. Questionnaire Survey

A semi-structured questionnaire was administered to gather first hand information from the victims as well as members of respective buffer zone committees. Twenty percent (N= 85) of the total incidents reported by the Buffer Zone Development Council (BZDC) was selected for questionnaire survey. Information acquired from the respondents was also triangulated through group discussion and informal conversation with local communities.

During the field work, victims as well as their family members of incidents which had taken place before implementation of the buffer zone program were also met from the selected localities. Important cases (eight cases) before the implementation of buffer zone program were also taken into consideration to understand and gain insight into the research problem. However, they were not used explicitly for analysis.

3.3. Workshop

A workshop for management level staff from the buffer zone, park administration, protection units/agencies and local level community members was conducted to better understand the status of human deaths and injuries caused by wildlife. During the workshop, the reasons as well as the existing practices to combat wildlife-induced human casualties were intensively discussed. The findings on wildlife-induced human casualties from the questionnaire survey were also cross-checked in the workshop. Besides, the preliminary findings of the similar study undertaken in the Madi Valley of the

buffer zone of CNP were presented in the workshop in order to share information on the status of wildlife-induced human casualties, and, at the same time, to draw feed back of the findings.



Photo 1: A Workshop on Human Casualty Conflict Resolution

3.4. Data Analysis

Responses generated through aforementioned means were manually coded and entered into Excel data base software, checked for errors and then analyzed by using simple analytical tools for descriptive statistics. These were presented in the form of numbers and percentage in pie and bar diagrams to show quantitative aspects of the findings. Some real case stories are also provided as qualitative information. Data were interpreted and relevant meanings were derived.

4. RESULTS AND DISCUSSION

4.1. Prevalence of Wildlife-induced Human Deaths and Injuries

4.1.1. Number of Human Deaths and Injuries

A total of 424 human casualties took place during the ten-year period from 1997/98 to 2006/07 in and around the CNP. This shows that almost 43 persons per year (more than 3 persons in a month) were attacked by various wild animals leading to death and injury. Twenty four people (two per month) were killed in CNP in the FY 2003/04 by tiger, rhino and bear (Bhatta S.R., 2005). A total of 11 people were killed between July 2005-June 2006 alone - nearly 1 person in a month. There were 23 per cent (98) deaths and 77 per cent (326) injuries during the ten-year period (Figure 1). Higher casualties (78%) were found among males than females (22%). Likewise, 35% of the victims were from Brahmin/Chhetri, 23% from the Newar/Gurung/Magar/, 21% from the Tharu, 9% from Darai/Kumal/Praja, 8% from the Damai/Sarki and and 4 % from the Majhi/Mushar/Bote ethnic communities.

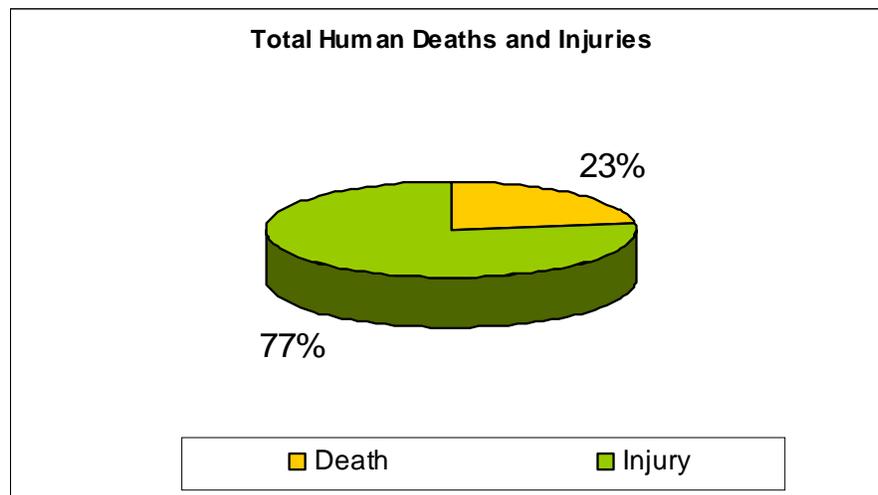


Figure 2. Total Deaths and Injuries by Wild Animals during the Ten- year period

Although human deaths and injuries by wild animals are reported to be relatively less (Dickman A.J., 2008, Shrestha et.al., 2007) compared to the other issues such as livestock depredation and crop raids, they posed significant impact on humans. The data shows human injuries are more common than

human deaths. Human death, though relatively less common, exerts a significant impact because of the loss of a family member and the associated impact on the dependants of the victim. Also, data on males and females show that males are more prone to such attacks. This may be because men play a dominant role in activities carried out in the forest such as collection of fuel wood, taking livestock for grazing, etc. The data also reveals that the highest number of casualties were among the Brahmin/Chhetri groups; this could be because they have the highest population ratio (38.3%) among the various groups residing in the buffer zone.

More than 31% of all reported wildlife-induced human casualties occurred in the south Madi sector. This was followed by 28%, 22% and 19% in Kasara, Amaltari and Sauraha sectors respectively. Figures 2 and 3 below show the details.

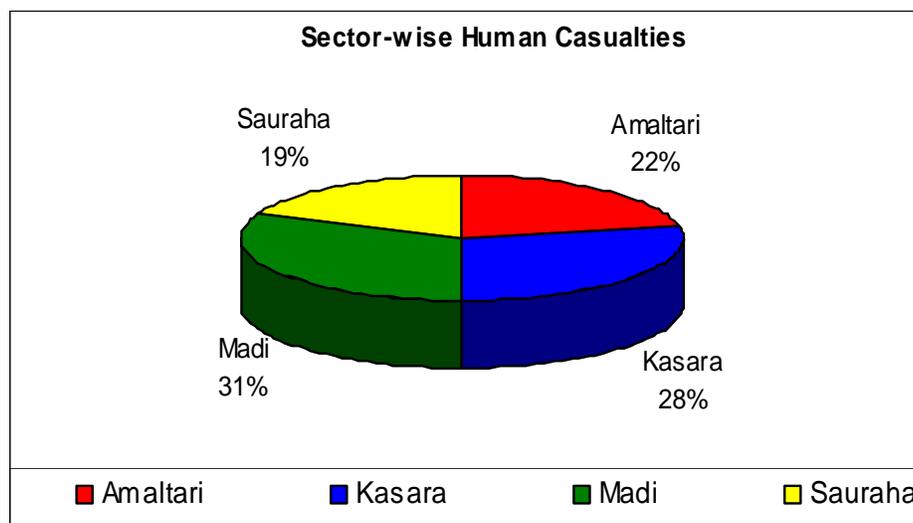


Figure 3. Human Casualties in Four Management Sectors (source: BZ records)

According to Gurung (2008), in between 1979 to June 2006, the highest percentage (31%) of the total human deaths (88) by tiger was reported in south Madi. This was followed by 27% in central Kasara, 22% in western/Amaltari and 13 % in the eastern Sauraha sectors respectively. In between 1978-1988, a total of 78 incidents of rhino attack (23 kills and 55 injuries) took place in the Sauraha area of CNP (Jnawali S.R., 1989).

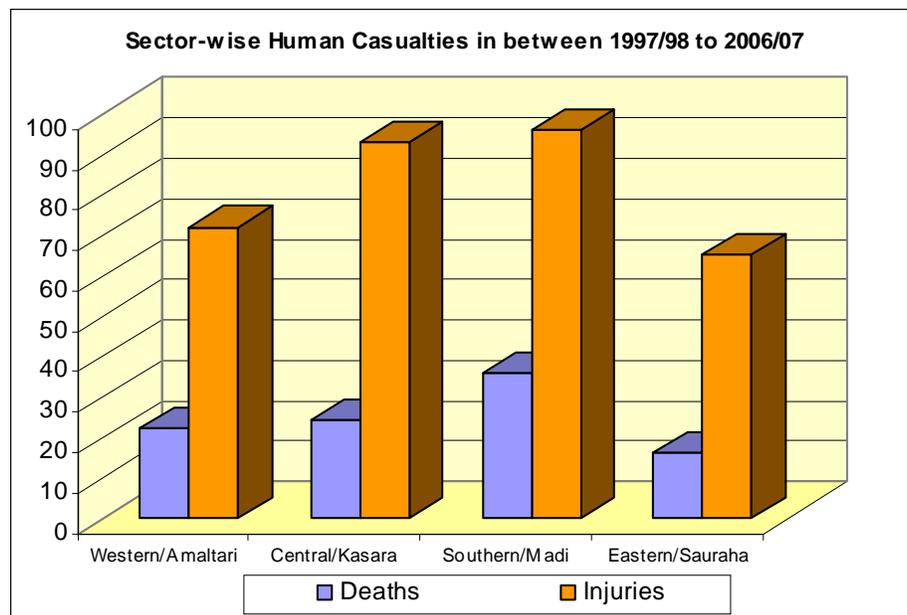


Figure 3. Human Deaths and Injuries in Four Management Sectors (Source: BZDC records)

All these observations indicate that significant injuries and deaths have occurred in southern and central sectors than in the other two sectors. Most cases of death are found to have taken place in the southern sector. In terms of injury, the southern and central sectors do not differ significantly. Amongst all sectors, the eastern Sauraha sector is the least affected both in terms of death and injury. This may be because the people of Sauraha might have alternative opportunities of earning through tourism development, and hence, have lesser dependency on the farms and forest resources in comparison to the other sectors, whereas people in the other sectors mostly depend on the forest and agro-based activities which exposes them to higher risks of encounters with wild animals while working in the forest and fields.

4.1.2. Wild Animals Responsible for Human Deaths and Injuries

Bear (*Ursus maritimus*), boar (*Sus scrofa*), common leopard (*Panthera pardus*), crocodile (*Gavialis gangeticus*), deer (*Axis axis*), elephant (*Elephas maximus*), Gaur (*Bos gaurus*), rhino (*Rhinoceros unicornis*) and tiger (*Panthera tigris*) were reported to be the animals responsible for the most incidents of human death and injury.

Thirty-one percent of the total injuries were reported to be caused by rhino attacks and about twenty-seven percent by bear. The rest of the injury cases were reported to be caused by leopard, tiger, boar, elephant, crocodile, Gaur and deer. Similarly, forty-three percent of total deaths were caused by tiger and that of thirty-three percent by rhino. The rest of the death cases were caused by bear, elephant and boar. In some cases, the animals responsible for death and injury could not be identified. The results are presented in Figure 4 below.

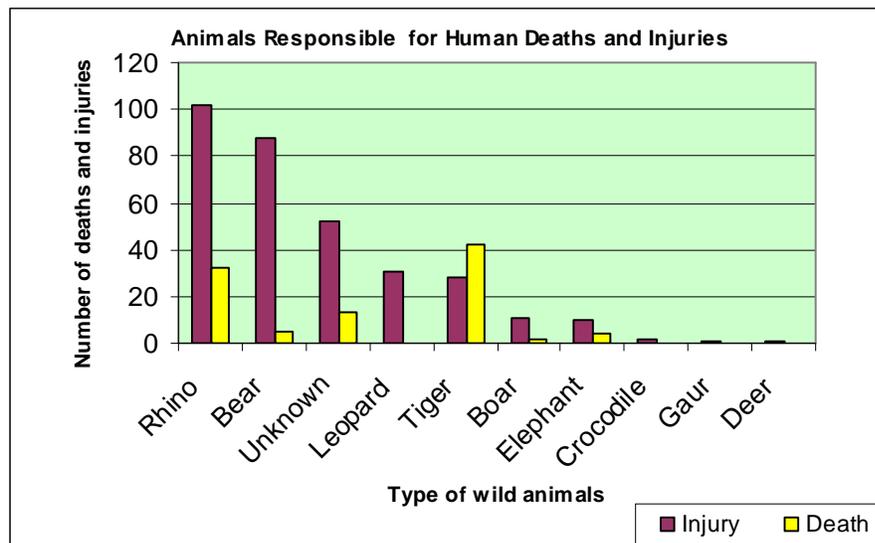


Figure 4. Wild Animals Responsible for Human Deaths and Injuries

The data also shows that human casualties caused by rhinos are the highest in Kasara (58), followed by Amaltari (47), Sauraha (17) and Madi (12). Similarly, tigers caused the highest casualties in Madi (29) followed by Kasara (20), Sauraha (14) and Amaltari (7). Casualties by bears are highest in Madi (67), followed by Amaltari (15), Kasara (6) and Sauraha (5). Likewise, casualties by elephant are highest in Kasara (6), followed by Sauraha and Madi (4 each) and there was no elephant casualty reported from Amaltari. In case of casualties caused by boars, Amaltari is the most (6) vulnerable followed by Madi and Kasara (3 each) and Sauraha (1). Crocodiles also caused casualties in Amaltari, Madi and Kasara sectors while such incidents were not reported in Sauraha sector. Leopards caused the most casualties in Sauraha (25) followed by Amaltari (5) and no casualty by leopard were reported from Madi and Kasara

sectors. One case was reported to be caused by Gaur in the Kasara sector while there was no such casualty reported from the rest of the other three sectors. Deer were also reported to cause one injury case in Sauraha but not in the other sectors. Please refer to Annex 1.

Gurung (2008) reported 88 persons killed by 37 tigers in and around CNP between 1979 to June 2006. According to him, on an average, 1.5 persons per year were killed between 1979 and 1998. However, since 1999, the number of victims killed has significantly increased and reached up to 8.25 persons per year.

The findings indicate that different animals are responsible for different types of incidents in different parts of the buffer zone. Rhino, tiger, bear and boar caused frequent human casualties in all four sectors while animals such as elephant, crocodile, deer, leopard, Gaur seldom cause human casualty in some of these sectors. Rhino attacks are more common in Kasara and Amaltari whereas tigers create more problems in Madi and Kasara sectors. Human casualties by bear mostly take place in Madi sector.

These data suggest that wildlife-induced human deaths and injuries differ greatly from location to location. Rhino, bear, boar and tiger are significantly dangerous, causing death and injury to human beings in all sectors. However, leopard and elephant are also a source of danger for human beings compared to other animals such as crocodile, Gaur and deer. The incidents took place particularly because of the fear held by people of being attacked and killed by wild animals and vice versa. This notion has been supported by the Farm Animal Welfare Council (1994) as well which describes wild boar as a highly strung, nervous animal which can be easily excited or frightened, and, thus, becomes highly aggressive. Otherwise, wild animals are not born to kill and injure human beings. Rather, human beings poach wild animals for several purposes. Both humans and wild animals want to be safe and they try to defend themselves whenever they feel unsafe or insecure.

4.1.3. Incident Sites

The survey of victims and victim's families (N= 85) shows that about 40% of human deaths and injuries occurred in the buffer zone community forests. This is followed by 29% in the settlements and fields, 19% in the national park and 12% in other places such as highway and riversides, etc. Figure 5 below shows the details.

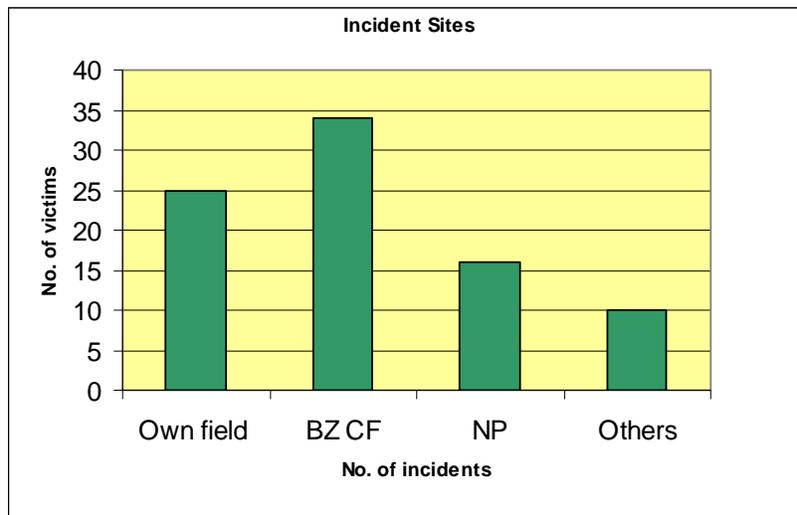


Figure 5. Incident Sites for Human Deaths and Injuries

Gurung (2008) reported that nearly an equal proportion of kills by tiger were inside (49%) and outside (50%) the national park. The increasing trend of people killed was significant for the buffer zone. Jnawali (1989) also reported that most of the rhino-related incidents (89.7%) occurred in the buffer zone. Out of this, 32% was recorded from agricultural fields while guarding crops. About 10.5% of the incidents occurred inside the park.

All these data indicate that significant attacks by wild animals occur more frequently in the buffer zone than in the park. This could be because of expansion of cultivated lands of corn, wheat, lentils and rice in the buffer zone. For example, in BZ, a total of 4,689 ha forest and 922 ha grassland have been changed into cultivated land from 1978-1992 (DNPWC/PPP, 2000). Likewise, restoration of forest by establishing buffer zone community forest or other forms of forest is increasing in the buffer zone. For instance, a total of 3,621.63 ha of

area have been handed over to community as buffer zone community forest in a period of six years from 1998 to 2004 (DNPWC, 2006/07). Such changes offer an attractive and easy alternative for food and shelter to wild animals such as rhinos, bears and elephants. Moreover, since there is grazing restriction in the buffer zone, people go into the forest for collection of forage and grass which has also increased the probability of encounter with wild animals leading to death and injury of people. In case of carnivores, the aged and chased out tigers and leopards find domestic cattle and human in the settlement as easy preys (Poudel, 2004). Therefore, forest cover and food source are the crucial factors for human-animal encounter and casualties. This is a created phenomenon for all creatures that they seek good food and enjoy where they find such opportunity. Diagram 1 below illustrates the situation.

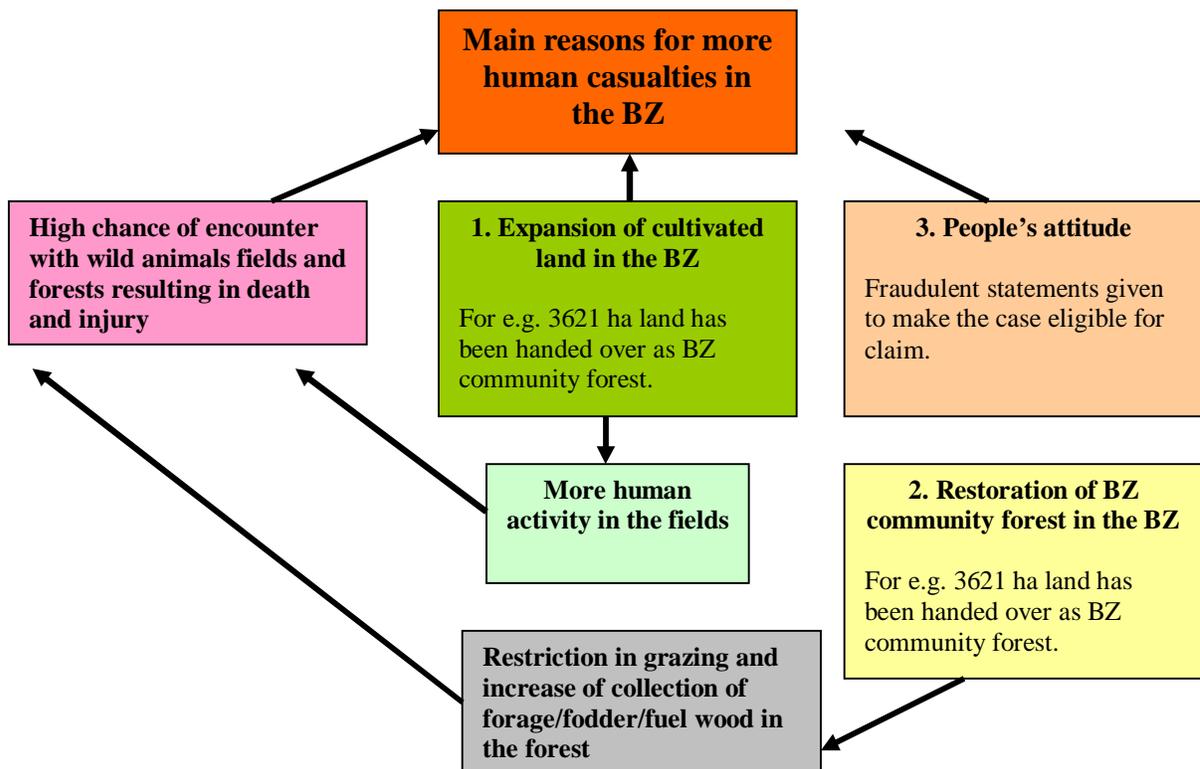


Diagram 1. Reasons for More Human Casualties in the BZ

4.1.4. Local Situation during Human Encounters with Wild Animals

In most cases (42%), the people were collecting firewood, grass, wild edible fruits, etc. in the buffer zone and the park area when the incidents took place. Three cases of death and several cases of injury were reported during thatch grass collection in Kasara sector during field visit in 2009. Likewise, 24% was found to have taken place while working and guarding in the fields, 18% took place while herding cattle in and around the park, 9% happened while walking through the forest, 5% occurred when defecating in the field and 2% took place while bathing near the riverside. Please refer to Figure 6.

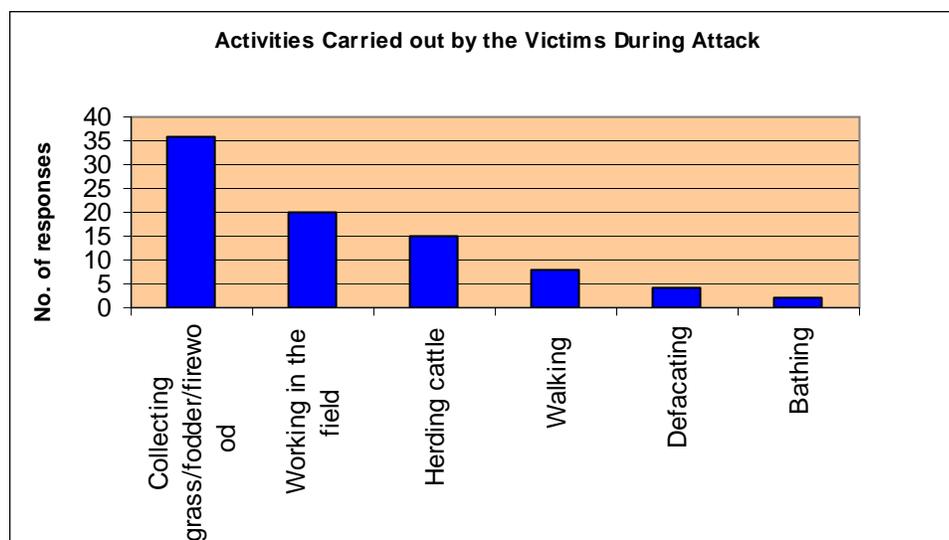


Figure 7. Activities Carried out by Victims during Encounter with Animals



Photo 2: Collection of fuel wood



Photo 3: Herding cattle

A study on Tiger-Human Conflict carried out in the buffer zone of CNP reported about 50% of the total kills (88 persons) by tiger from 1979 to June 2006 occurred when people were collecting grass/fodder for livestock (Gurung, B. et al. 2006). The study also reported five people killed at home while sleeping at night. Likewise, a study undertaken on Park and People Conflict with special emphasis on conflict caused by rhino reported 57.7% of the total incidents (78) occurred outside the park while grazing cattle, collecting fuel wood/fodder and fence materials, walking around in the villages in the evening, collecting snails and fishing near rivers, and local bush toilets. Thirty-two percent was recorded while guarding crops in the fields. He reported 10.5% of the accidents occurred inside the park during thatch grass cutting and illegal activities in the park (Jnawali, S.R., 1989).

This information indicates that most accidents took place while people were carrying out field and forest related activities such as collection of fodder, grass/forage, fuel wood for their daily livelihood subsistence, herding livestock, guarding crops, etc. Most of the local communities follow agro-based occupations that compel them to work in the fields and forest.

4.2. Reasons behind Human Deaths and Injuries

There are many reasons for wildlife-induced human casualties in and around the park. To understand the reasons for human casualties, the respondents were given 6 options for various potential reasons from 1 to 6 numbers where 6 is the highest and 1 is the lowest number. The numbers were summed up to get total score for that option. According to the respondents' answers, option (c) food scarcity in the park and natural preference for agricultural crops received the highest score (316), followed by option (b) shrinkage and degradation of habitat in the park (312), (a) increase in human population and their activities in and around the park (308), (d) increase in animal population (211), (e) ignorance of people (208) and (f) others (149), including elephant sheds near settlement, etc. These are presented below in Figure 7.

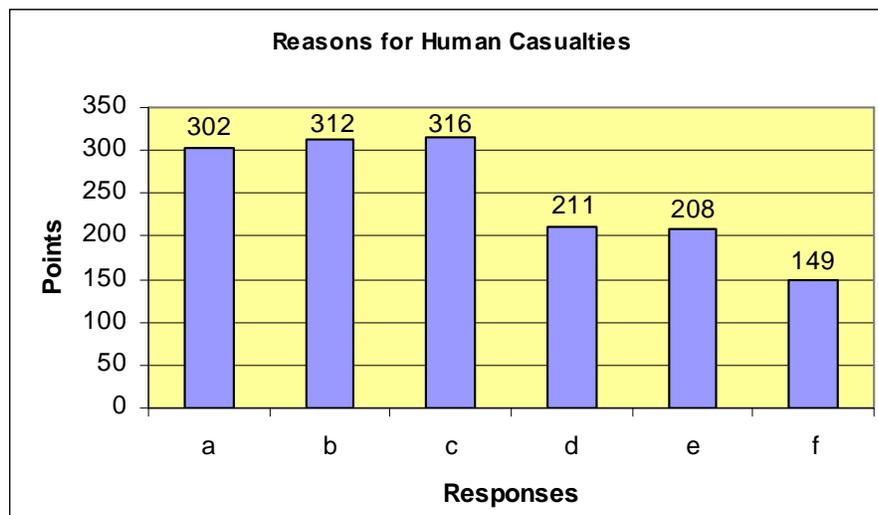


Figure 7. Reasons for Human Deaths and Injuries

4.2.1. Increase in Human Population and Activities in and around the Park

As human populations grow, settlements expand into and around protected areas (IUCN, World Park Congress 2003, Shrestha, R. et.al., 2007) as well as in urban and sub urban areas. For instance, in 1981, Madi Valley of CNP had 29,058 residents, and by 2001 (most recent census data available) that number had increased to 41,344 (DDC Chitwan, 2002), constituting a 30% increase (Gurung, 2008). This increase has certainly altered the land use pattern for settlement and cultivation. Study in Africa reveals human population growth has led to encroachment into wildlife habitats, constriction of species into marginal habitat patches and direct competition with local communities (Siex et al., 1999, quoted in Distefano, E., 2005). Study also suggests that human population growth is correlated proportionately with the number of encounters and serious incidents involving cougar (*Puma concolor*), black bear (*Ursus maritimus*) and grizzly bear (*Ursus arctos*) (Ministry of Water, Land and Air Protection, British Columbia, 2003, quoted in Distefano, E., 2005). With increasing human population in developing countries, human activities that are detrimental have also increased and there have been irreversible effects on the environment (Wambuguh O., 2007).



Photo 4: Grass cutting around the Park

Photo 5: Wearing brightly colored cloth

4.2.2. Shrinkage and Degradation of Habitat in the Park

Plant succession and invasion by weeds have been deteriorating the key animals' habitats in the park. Four types of plant succession have been reported to be affecting ecosystems of the park (DNPWC, 2002). The succession by tall grass species on grass species such as *Imperata cylindrica* and *Cynodon dactylon*, the rapid spread of *Micrania micrantha* in all types of vegetation (CNP Management Plan, 2006), the colonization of sandy grasslands with tall *Saccharum* species and the encroachment of fire-resistant species such as *Bombax ceiba*, *Cordia dichotoma*, *Ehretia laevis*, *Trewia nudiflora*, *Syzygium cumini*, *Xeromorphis uliginoides* were reported to be seriously affecting habitat alteration. Similarly, wetlands are suffering from the threat posed by water hyacinth (*Eichhornia crassipes*) and *Leersia* species (Karaute). Besides, a study carried out in the grassland of the northern part of CNP in the period from 1996 to 2000 reported the presence of seedlings of some invasive tree and shrub species in the grassland. The study reported *Imperata cylindrica* as the most dominant species followed by *Saccharum spontaneum*. But there was a decrease in the dominance of *S. spontaneum* which is the most preferred grass for rhinoceros (Jnwali and Wegge, 2000 In: Shrestha, B.K. et. al, 2006, Management Plan, 2006-2011). The study reported serious changes in grassland habitats which affects wildlife. Likewise, the CNP Management Plan (2006-2011) also reported decrease of grassland from 20% in 1979 to 4.7% in 1992.



Photo 6: Invasion by Mikenia in the Park forest



Photo 7: Attractive crops in the fields

4.2.3. Lack of Food and Natural Preference for Agricultural Crops

Lack of food and natural preference for agricultural crops are interconnected to the above-mentioned situation. More and more wildlife habitats are being converted to settlements, agricultural lands and other forms of land-use in order to cater to the needs of the growing population. For example, over 65% of forest areas were converted for agricultural extension in the valley of Chitwan between 1961 and 1977 (Gurung, 1983, quoted in Shrestha, R. et.al., 2007). Conversion of forest land for the purposes of settlement and cultivation in the buffer zone is another reason for increase in human–animal encounters. Approximately 46.89 sq. km forest and 9.22 sq. km grassland in the buffer zone have been converted into farmland from 1978 to 1992, resulting in shrinkage in natural habitat of wild animals in the buffer zone (DNPWC/PPP, 2000). This change has occurred in all sectors and attributed to increased crop yield and human activities in the buffer zone. When wildlife species lose their natural habitats and their access to natural food sources is also reduced, they eat agricultural crops, prey on livestock, destroy property and injure or kill people (WWF, 2008). Gurung (2008) reported tigers are using buffer zone habitats more frequently in recent years (1998-2006) in comparison with the situation about 20-30 years ago.

A study done in Bandipur, Karnataka reported that man-animal conflict has increased over the years where there were more agricultural fields and human habitation (The Hindu, 2005). The people of Shuklaphanta, Nepal also supported the notion that the natural preference of elephants for agricultural crops is a driving force behind human-elephant conflict (Shrestha et.al., 2007). Likewise, people from Jhapa district of Nepal also realized that the shrinkage of habitat was a driving force behind the elephants' behavior of straying out to the settlements. Thus, rise in conflict is inevitable due to the ever increasing agricultural fields and settlements.

4.2.4. Ignorance of People

Ignorance and carelessness of people are other reasons for human-animal conflict. Behavior such as walking through forest path by short cut, walking through forest after drinking alcohol, wearing brightly colored clothes, disturbing wild animals, carelessness, especially during winter season, etc. often cause casualties. For example, a drunken woman was killed by a rhino while she was walking through the forest area in Meghauli, Kasara. Likewise, Ms. Ganga Maya Sunar, a resident of Ayodhyapuri, Madi was killed in a tiger attack near Reu River when she went for bathing in the morning at around 10 AM in winter season. This was ignorance on her part because "in the morning during winter", it is generally completely foggy and there is no clear sighting. Hazy sighting was also observed during field visit in December/January, 2008/09. Moreover, tiger killed five men because of disturbance created by them at the tiger kills (Gurung, 2008).

4.2.5. Increase in Animal Population

The respondents reported that the population of various wild animals has increased since the establishment of the national park. The increased data of rhino population from 100 to more than 400 (i.e. more than four times) within 25 years of time period verifies this response. Although the wildlife population has increased the park does not have a proper wildlife management program. Also, no regular studies have been carried out of animals that were found to be

responsible for human casualties. Gurung et. al. (2006) pointed out that as forests in the buffer zone and across the Terai Arc Landscape (TAL) project are restored, tiger numbers outside parks have increased. Many other studies show that increase in the wild animal population increases the chances of confrontation with humans. For example, a study undertaken in Jhapa, Bardia and Shuklaphanta of Nepal reported that increased elephant population was one of the main reasons for human-elephant conflict (Shrestha, R. et. al. 2007). Likewise, another study done in Tanzania reported that good conservation records of lion became a major source of conflict with the human population. About one-third of the reported 200 kills were made by lions while the rest of the kills were by crocodiles, leopards and hyenas. It was reported that about 35 people were killed by a single man-eating lion (Baldus, R. D. 2007, quoted in CIC, Belgrade).

4.2.6. Elephant Stables

Some casualties were found to have taken place due to closer proximity of elephant stables of the park and hotels near human settlements. A three-month old baby, Shahil Tamang, was killed when a wild elephant strayed out of the park as there was a domesticated female elephant in the elephant breeding center near Bodreni village of Sauraha. Likewise, Mr. Kambati Tamang was killed by a wild elephant who is believed to have come out of the park in search of a female mate kept in the stable of Narayani Hotel at Patihani. The respondents and the experts reported that male elephants often reside near the location of female elephants, especially during the mating season.

This information reveals that accidents took place due to many reasons. All of these reasons are related to each other. Food scarcity in the park and natural preference for agricultural crops in the buffer zone are related to reduction and degradation of animal habitat in the park whereas shrinkage and degradation of habitat is correlated with the increase in human population and their activities in and around the park. Besides, in several cases, the carefree nature of

community members and their ignorance of wildlife behaviors have also caused irreparable damage to life. Diagram 2 below illustrates the situation.

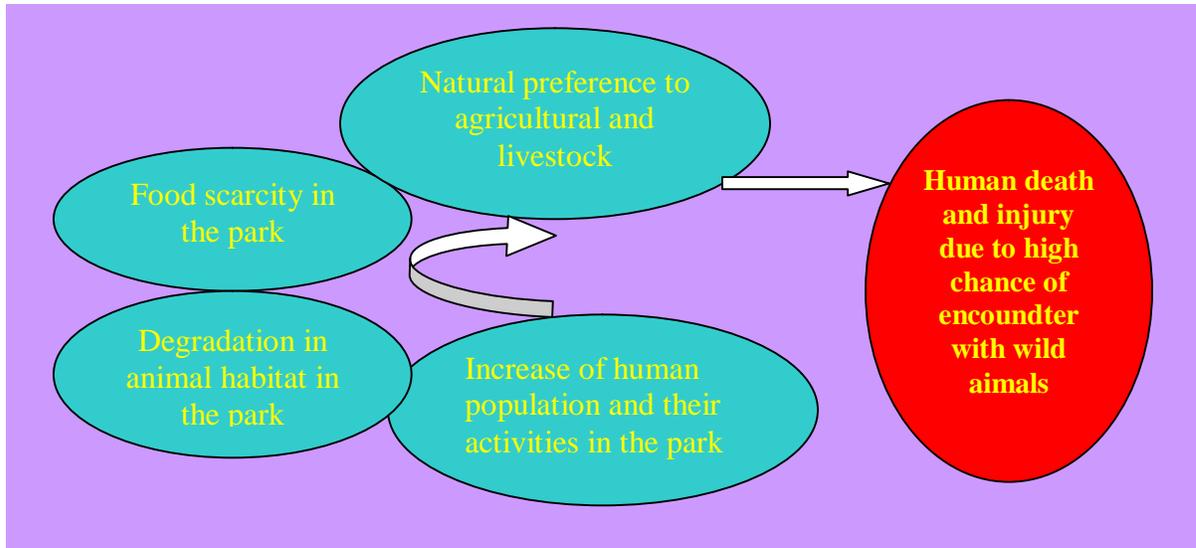


Diagram 2. Relationship of Human casualties with various situations

4.3. Existing Provision of Relief Mechanism for Wildlife-induced Human Casualties

4.3.1. Relief Fund

4.3.1.1. Compensation Amount

The park has been providing a certain amount for relief to wildlife victims from 50% of the revenue received each year for buffer zone development activities. Since 1998/1999 the park management authority had started providing compensation by establishing a relief fund of NRs. 500,000.00 (US\$ 6493.00). Initially, NRs. 25,000.00 (US\$ 325) was provided for death and a maximum of NRs. 10,000.00 (US\$ 130) for injury to humans. This was further systematized by categorizing the injury as per the human body parts and the related compensation. Moreover, a provision to provide stipend to two children of the victim was also developed. This is illustrated in a table below.

Table 1: The Monetary Compensation for Human Deaths and Injuries

Extent of Loss	Compensation
Loss of one leg	US\$ 26 (NRs. 2,000) and Wheelchair worth US\$ 90 (NRs. 7000)
Loss of two legs	US\$ 128 (NRs.10,000)
Loss of one hand	US\$ 64 (NRs. 5,000)
Loss of both hands	US\$ 128 (NRs. 10,000)
Loss of one eye	US\$ 64 (NRs. 5,000)
Loss of both eyes	US\$ 128 (NRs. 10,000)
Serious injury of any organ	Maximum of US\$ 128 (NRs. 10,000)
Death or serious injury	Stipend of Rs.1,500 each per year up to School Leaving Certificate (SLC) for two children of the victim

Source: Annual Progress Report of Buffer Zone 2004/05(unpublished)

Later, the 66th meeting² of the BZDC had decided to provide NRs. 35,000.00 (US\$ 454). This decision was to come into effect from FY 2063/4/1 (2006/07). At the same meeting, (in its decision number 4), it was also decided to provide NRs 1500.00 (US\$19) per year in two installments for all children of the victims who lose their lives or are seriously injured by wild animals.

The management authority again decided to increase the compensation amount to NRs. 50,000.00 (US\$ 649) during the 70th meeting³ of the BZDC held in 2064/5/11 (2007/08) for the loss of human life and a maximum of NRs. 20,000.00 (US\$ 260) for bodily harm.

² Meeting Minute, Miscellaneous 13 (Nga)

³ Meeting minute, decision 7

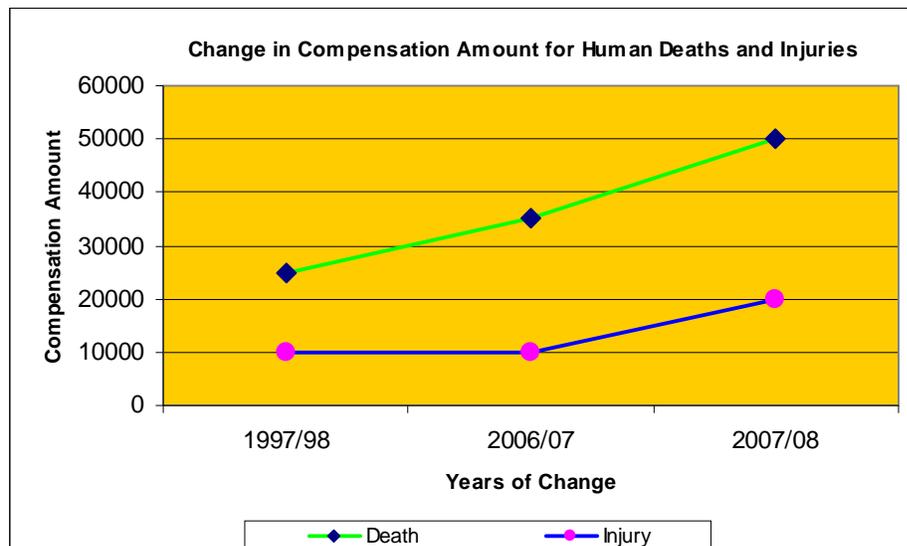


Figure. 8 Compensation for Human Deaths and Injuries

Thus, the compensation amount was increased highly for death cases in 2006/07 and 2007/08, while the amount was increased for injury cases in 2007/08 only. The data showed a 40% (NRs. 10,000) increase in the initial compensation amount (NRs. 25,000) after 9 years (1997/98- 2006/07), and this reached up to 100% after 10 years (1997/98- 2006/07) for death cases – showing a drastic increment by 43% in a one-year period. Unlike this, no such increment in cash compensation was found in cases of injury within a period of 9 years. However, it was also increased by 150% (NRs. 15,000) compared to the initial amount of NRs. 10,000 (US\$ 130) after 10 years, effective from 2007/08. On an average the park authority expenses NRs. 4,18,251.2 (US\$ 5,432) annually in compensating wildlife-induced human death and injury.

The relief amount could have been increased due to the strong and organized protest by the local people against the disproportionate cost of wildlife conservation. For example, there was one incident of rhino attack in Kalyanpur VDC while the 24th Wardens' Seminar was being conducted in the Madi Valley. The local people exerted strong pressure, and finally, the park authority paid NRs. 35,000.00 (US\$ 455) to the victim's family for the first time although it

was supposed to give NRs. 25,000.00. Moreover, there was a local campaign against low compensation in other protected areas (CDO, 2008) as well which might have influenced and forced park management authorities to rethink upon this issue. Another probable reason could be the capacity and influence of the BZMC to increase the amount.

However, the local people still desire a higher relief amount. All victims strongly raised their voices against underestimation of their loss by the park authorities. Out of 85 respondents, more than 50% asked for NRs. 100,000.00 (US\$ 1299) while the rest agreed that NRs.10, 00,000.00 (US\$ 12990) should be given per death case. These amounts seemed to be somewhat cut-throat demands. Thus, the demands seem to depend on individual opinion and are never ending. Upon the researchers' question as to why they needed such a larger amount, they responded that this amount could be of meaningful use to the victims' family members as it could be invested to obtain long-term earnings. However, one case found during the study contradicts this idea and possesses significant meaning (box1).

Box 1. "Not getting compensation is not only a problem but getting it is also a problem"

Mrs. Budhani Mahato received Nepali rupees twenty-five thousand after her son was killed in a tiger attack in 2002. She lent that money to one of the villagers upon interest. She is now struggling to get her money back as the borrower did not respect the understanding between them. She is afraid of losing her money. Thus, the relief amount here was "good for nothing."

Many other respondents have also told that one-time monetary compensation has not been effective so far.

Source: Field visit, 2009

It should be noted here that before the implementation of the buffer zone program, there was no provision for providing relief to wildlife casualty cases.

After its implementation, people started getting NRs. 25,000.00 in case of death, and up to NRs. 10,000.00, for injury. These amounts gradually increased, and now, there is provision for NRs. 50,000.00 for death, and up to NRs. 20,000.00, for injury. Yet, the villagers mentioned that this amount is nothing compared to the loss. Obviously the cost of death cannot be compensated by money. Moreover, there is no basis to fix such amounts as relief. Furthermore, similar cases in other protected areas showed that “the more the villagers/victims agitate the more relief amount they get.” For example, NRs. 45,000.00 was donated collectively by the park authority, user groups and local communities to two victims injured by bear in Makalu Barun National Park in 2007 (PPA, 2007). It was also reported that in 2007, the park authority was forced to pay NRs. 1,00,000.00.00 each for the two deaths caused by wild elephant after a strong local campaign in Bardia National Park (PPA, 2007). Such inconsistency indicates that park management policy is quite feeble and there is urgent need for implementation of a firm and clear policy to address this issue. Most importantly, monetary compensation is not the remedy for all conflicts.

Although villagers suggested that a large amount of NRs. 1000,000.00 should be provisioned as they can invest it in some income-generating activity, there is room for doubt regarding this idea as one case was found where the mother of the late Krishna Mahato was left with nothing after lending the compensation amount (NRs. 25,000.00) to a villager (See Box. 1). So, what is the use if the money *is of no value to her anymore?* No one knows whether she will get the money back or not. In fact, further burden was added on her shoulders. However, in most cases, this may not happen, yet, these cases are indeed probable among poor, illiterate and underprivileged villagers. In such cases, the benefit of help may be reaped by an unintended person. By saying this means not going against monetary compensation but to draw attention on proper use of the compensation that the victims and the families get. Otherwise, the monetary compensation does not make sense to the victims and their families.

Monetary relief will not be a sustainable strategy because it depends on park revenue. Elisa Distefano defined "Sustainable strategy", as a definitive solution which does not need any additional inputs such as financial investment or labor, and "Short term strategy", if it is used as the opposite of sustainable strategy (Distefano E., 2005). In the context of CNP, the buffer zone institutions are heavily dependent on the park revenue and this cannot be ensured always. It is because tourism is the major source of greater revenue generation. More than 95% of park income comes from tourism (Budhathoki, P., 2004), which may fluctuate according to various circumstances such as low tourist flow, inadequate visitor facilities, interest of tourist, etc. The park management authority once experienced shortage of funds for addressing the damage caused by wildlife to humans (CNP, Buffer zone Annual Progress Report 2003/04 unpublished). In such conditions the victims may respond negatively and take the path of agitation, because inadequacy of funds may not be a satisfactory explanation for the victims. This would obviously aggravate park-people relationship again.

As the result of a strong campaign by the local people and pursuance of the park managers, the government has now recognized the issue and formulated a new guideline -Wildlife Damage Relief Guideline 2066, which was approved on 5th July 2009, by the Ministry of Forest and Soil Conservation. This new guideline 2066 has fixed NRs. 150,000.00 as compensation amount in case of death, a maximum of NRs. 50,000.00 for serious injury⁴, and a maximum of NRs. 5,000.00 for simple injury⁵ by wild animals (Wildlife Damage Relief Guideline 2066). However, the guideline has not mentioned anything about other associated issues such as taking care of dependants, etc. The relief amount is released upon the recommendation of the Relief Releasing Committee through the administration of the national park or reserve, and that of the District Forest Office where there are no national parks or reserves.

⁴ Serious injury – injury with loss of bodily parts such as eye, limbs, etc. (handicapped)

⁵ Simple injury – injury without loss of bodily parts

4.3.1.2. Eligibility for Claiming Compensation Amount

A victim and victim's family can claim the compensation amount only if a person is killed or injured by wild animals outside the park area. However, in the buffer zone, the victim and victim's family can get compensation if a person is killed or injured when he/she had legal permission to enter the park (such as permission for Kharkhadai and permitted public routes). This may be the reason for villagers often mentioning that the incident took place outside the park, especially in the nearby buffer zone forest to make the case eligible for compensation. The box below illustrates a similar case. The newly approved guideline states that all incidents except those occurring in the park, reserve or national forest are eligible for compensation.

Box. 2. Eligibility of Local Claims

Mr. Hom Lal Gautam, a resident of Gaurinagar, Kalayanpur 9 was attacked by a tiger in 2006 while he was taking his buffaloes for grazing. He claimed for compensation by explaining that the incident took place in the community forest. But after investigation of the case it was found that the incident actually happened inside the park. The claim was proven illegal and rejected as the victim had illegally entered the park.

Unlike the above mentioned case, Mr. Heduniya Mahato of Baghauda 6, although injured by a bear attack in Dhoba Chowk inside the Park in 2003 B.S, was provided with NRs. 10,000.00 as compensation because the incident occurred during annual grass cutting (Kharkhadai) period during which locals are permitted by the national park authorities to enter the park.

Source: Field visit, 2008

4.3.1.3. Procedure for Claiming Compensation Amount

Wildlife victims or their families have to follow a certain procedure to obtain the compensation amount from the park authority. According to the process, firstly, the victim or the associate informs about the incident either in writing or verbally to the respective BZUC. In order to manage such cases effectively, the

meeting held in 2004/05 emphasized that the claim should be made within seven days of the incident and a site inspection report (Muchulka) should be prepared in the compulsory presence of a park staff. For the validity of this process, the victim needs to submit doctor's prescription, medical bills, photograph of incident, recommendation from the respective VDC or Municipality, recommendation from the respective BZUC in case of injury, and in case of death, a death certificate, police report, postmortem report, photograph, recommendation from the respective BZDC/BZUC, relationship with the claimer along with the application of the victim's associate as well as the decision of the respective BZUC. Moreover, photo of death or injury is also needed as possible as it can be taken as far as possible. The diagram below represents the process of claiming compensation amount.

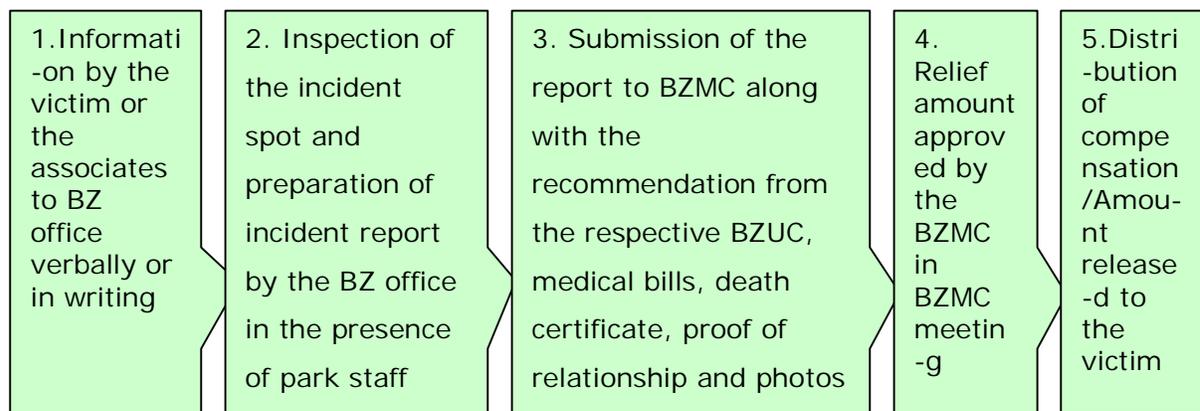


Diagram 3. Steps of the Process for Claiming Compensation

The new Wildlife Damage Relief Guideline 2066 states that a victim or victim's family should claim for compensation within 35 days of the incident in the respective national park, reserve or District Forest Office along with the required documents.

4.3.1.4. Decision-making Body for Releasing Compensation Amount

To date, the Buffer Zone Development Council (BZDC) consisting of twenty-two Chairpersons from twenty-two Buffer Zone User Committees and the Chief

Warden decide upon release of the relief amount. The Chief Warden acted as the Member Secretary of the Committee.

However, once the new guideline has come into practice, a five-member Relief Releasing Committee will be formed. This committee will consist of the Chief Warden/Warden in case of protected area, and that of the District Forest Officer (DFO) in case of areas other than protected area, or at least of a Ranger nominated by the Chief Warden/Warden/DFO to act as the coordinator. The other four members will be Chairperson of the respective Buffer Zone User Committee, Chairperson of the Community Forest, representative from the VDC or Municipality, and representative from the District Agriculture Development Office or Livestock Development Office depending upon the type of the loss.

4.3.1.5. Difficulties Faced in Receiving Compensation Amount

a. Victim's Perspective: Delay in receiving the relief amount was reported as one of the major difficulties by all respondents during the survey. The study found that delay occurred mainly due to two main reasons. One was the irregular meetings of the BZDC which has the authority to decide on the compensation amount and another was the time taken for investigation to check fraudulent claims. The box below illustrates a case of delay in releasing the relief amount.

Box 3. Delay in Releasing Compensation due to Fraudulent Claim

Mrs. Khagisara Neupane of Kalyanpur VDC, Madi was attacked by a bear in 2002. She claimed NRs. 10,000.00 for the treatment which was the maximum amount the park/BZ could provide for injury case. But she got only NRs 4,000.00 for her treatment in 2004, almost after 2 years. This was because after the careful examination of the bills, the Ranger found that she (along with associates) had submitted fake bills. She had submitted 8 bills for anti-rabies vaccine; however, it was unusual to take anti-rabies vaccine more than 5 times. She might have submitted higher bills to get more money. This opened the room for further doubt in the submission, and later, NRs. 4,000.00 was released. Thus, there was some delay in providing the compensation amount and the actual amount provided was less than the claimed amount, taking into account the fraudulent claim.

Source: Field visit, 2008/09

b. BZUC's Perspective: The BZUC has also faced difficulties in handling compensation cases due to delay in releasing budget by the buffer zone management authority and public pressure when the relief amount was not made available in time. Mr. Surya Khanal, Office Assistant of Rewa User Committee, Kalyanpur recalled one case when the official had to provide compensation amount to a victim due to delay in releasing budget for compensation. Moreover, the BZUC officials reported that the compulsory presence of a park staff while making an inception report and taking pictures of incidents also posed difficulties. The BZUC officials reported that they should be given the authority to decide upon release of the relief amount in order to reach out to the victim and victim's family in time.

Based on this information the differences between the previous and the present system of compensation are summarized below in the table.

Table:2 Difference between the Existing and the New Guidelines for compensation

Existing practice	New guideline 2066
Human death NRs. 50,000.00	Human death NRs. 150,000.00
Injury NRs. 20,000.00 (Maximum)	Serious injury NRs. 50,000.00 (Maximum) Simple injury NRs. 20,000.00 (Maximum)
Claim should be made within seven days	Claim should be made within 35 days
Not well defined committee, Relief amount is decided by the meeting of BZMC	Well defined five – member committee
No monitoring system	Will be monitored by the Directorate of Regional Forest Division

The new guideline should be carefully implemented in order to avoid complains from the victims and their families regarding several complications such as delay in releasing compensation amount, etc. Furthermore, it is also important to

rethink upon the guideline in order to address actual needs of the victims and their dependents.

4.3.2. Other Existing Provisions to Support the Victims and Victims' Families

4.3.2.1. Support to the Children of Victims

Besides monetary compensation, the park management has been supporting the children of victims in their education. So far, about twenty one children of victims have been admitted to the Murrya English School at Bharatpur Municipality run by Murrya Foundation (Per. Comm. with Mr. Ajib Poudel, Coordinator, 2009). The foundation has been providing NRs. 1,500.00 per month stipend to the children. However, many victims reported that it is very difficult to get their children admitted.

4.3.2.2. Employment to Victim's Family Members

During the field study, two members of victims' families were found to have been privileged to get employment opportunity on contract basis in the park office at Kasara. Mrs. Sumitra Timsina, the wife of a victim killed by an elephant near his home in Ayodhyapuri, Madi Valley has been appointed as a helper to the Park Office at Kasara on the contract basis. Similarly, a boy who lost his brother in a wild animal attack has also been working for the Buffer Zone Development Council. However, this system of providing employment opportunity to victim's family members is not explained in any meeting minute.

4.3.2.3. Subsidy for Material Purchase

Electric and Solar Fences: The park management has provided support for electric and solar fences by collaborating with other organizations to reduce human-animal conflict. Three sectors *viz* Sauraha, Kasara and Amaltari have received electric fences while Madi has received solar fences since there is no electricity supply in this sector.

Biogas Plant and Latrine: The management authority has provisioned subsidy for biogas plant installation and for building a latrine. In general, NRs. 1,500.00 is provided per biogas plant and NRs. 1,000.00 per latrine. However, some UCs have been providing a maximum of NRs.3,000.00, depending upon the economic status of the people especially to so- called occupational castes.

The existing relief mechanism for human death and injury seemed to be working on an *ad hoc* basis. Several questions are still not answerable. For example, release of compensation as per the local pressure, the basis for fixing the compensation amount, fraudulent claim and its inspection, etc.

All these indicate that the victims and victims' families are not satisfied with the existing one-time monetary support and *ad hoc* system of the other relief measures. There is a need to find out a sustainable solution in this regard.

4.3.3. Global Practice for Compensating Human Deaths and Injuries

In Nepal, some other protected areas have been providing relief funds to the victims with the help of other conservation and development organizations. For example, the Western Terai Landscape Project (WTLCP) has been supporting the BZDC of Bardia National Park (BNP) and Shuklaphanta Wildlife Reserve (SWR) in establishing a Relief Fund. The WTLCP has provided cash amount of NRs. 500,000.00 each to BZDC of SWR and BNP which has been kept in fixed deposits in the bank and the interest earned is used as a relief fund for wildlife damage, including human casualty and property damage. In 2008, a total of NRs. 77,478.00 was distributed to 36 victims in BNP. Likewise, in 2008, the SWR supported by providing NRs. 127,000.00 to 71 victims (68 house damage cases and 3 human injury cases) from the interest earned from the endowment fund.

The Government of India also has a compensation policy which has set provision for US\$ 415 (IRs. 20,000.00) in case of death, US\$62 (IRs.3, 000.00) in case of permanent disability, and not much for depredation (Gureja et. al., 2002).

However, compensation as such cannot be generalized as different state governments have set different amounts and this is also dependent on the type of wild animal. For example, in West Bengal, the relief amount per death by elephant is US\$ 2078 (IRs. 100,000.00), US\$ 1039 (IRs. 50,000.00) for permanent disability, US\$ 156 (IRs. 7,500.00) and free treatment for loss of limbs and simple injury (Personal communication with B.A. Daniel, Scientist/Convenor, Associate Editor, 2009 and ZOO, 2009).

In Southern Africa, the Botswana Government pays compensation for damage caused by elephant to the life of a human being. In Kenya, compensation schemes are very problematic because of corruption, overestimated damage, lack of funds for compensation, and ignorance of local people's needs. The government compensates US\$ 545 for human death and US\$ 273 for human injury, but, this is reported to be insufficient to cover funeral expenses or hospital bills. It also does not take into consideration the impact of such incidents on dependent children who are often taken out of school because of the lack of funds to pay their fees" (KWS, 1996 and 2007).

The information on compensation reveals that the compensation amount in Asia is higher than in Africa where the provision for compensation in case of human death and injury by wild animals is also in practice.

Erwin Bulte and Daniel Rondeau (2007) report that the Government-run schemes, in particular in India and Kenya failed due to a host of reasons including lack of funds, fraudulent claims, bureaucratic inadequacies, and the practical barriers those illiterate farmers from remote areas must overcome to produce a claim. In practice, such institutional hurdles are critically important.

4.3.3. Local People's Opinions Regarding Compensation

The respondents expressed different opinions regarding compensation. They opined that firstly the amount of compensation is not enough so far, and secondly, it takes a long time to receive the amount. Most of the respondents

reported that the park management should take care of their dependants. The responses (c) Taking care of dependants received the highest points (55), showing the greatest desire after the incidents which is followed by Insurance (50), Allowance (41), (c) Monetary compensation (40), and (d) Training and jobs (35). The details are shown below in Figure 9.

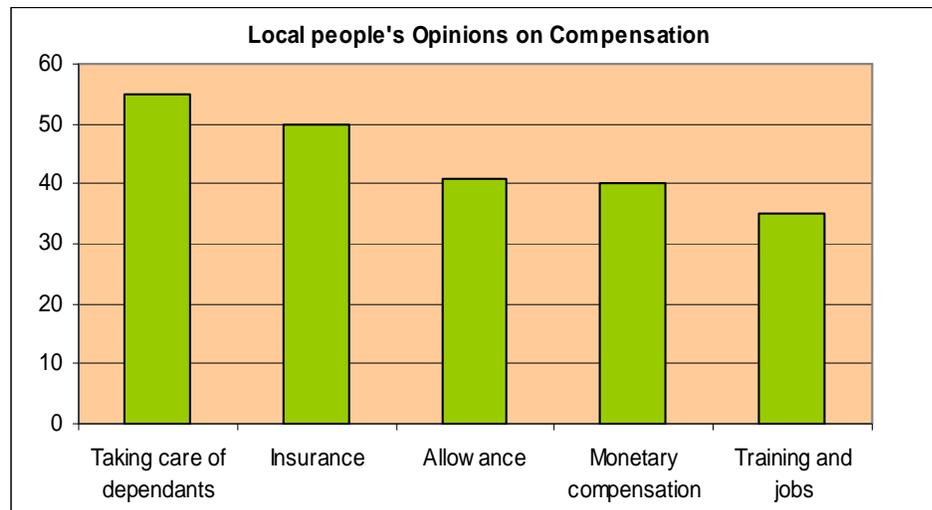


Figure 9. Local People's Opinions on Compensation

The locals' perceptions regarding on various options is appreciable. It is not always practical that the responsibility for taking care of all dependants should be borne by the park management. However, the buffer zone management authority should think upon to tackle this issue. Regular allowance to victim and victim's family is appreciable and could be of some help.

4.4. Evidence of Impact of Wildlife Attack on Humans

Here are some case stories of victims and the victim's family.



Photo 8: A Bear attack on face

I am Ganesh Bahadur Nepali and I live in Kalyandpur VDC of Madi sector. I was attacked by a bear in 2002 when I was looking after buffaloes in the forest near home.

I have received only NRs. 5000 for treatment after about 3 years although I was seriously injured and should get NRs. 10,000. It was because I could not submit all bills. I and my family did not know about such provision of relief amount so we did not keep all the bills safely for this purpose.

I am suffering from facial deformity and extreme poverty now.

It would have been better for me if some means of livelihood was available.

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I am Pabitra Dhakal of Baghauda 6, Madi Valley. I was attacked by a bear in 2002 and suffered from head damage. when I had gone to the open toilet in the field close to my home.

The damaged head was treated by transplanting flesh from other parts of head and thigh. I received NRs. 10,000 for treatment but I spent more than this.

Being a woman of a farmer family, I have to perform several farm-related activities which cannot be avoided but which I also cannot perform perfectly. So, I am worried about psychological pressure.

Now I want to work in an office as office helper or something similar where no physical pressure is exerted for work.



Photo 9: Bear attack on head



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Photo 10: A rhino attack on leg

I am Til Maya Dawadi of Jagatpur VDC, Kasara. I was seriously attacked by a rhino in 2005 when I was coming out of my home to call my grand daughters playing outside. In this accident, I lost my right leg for ever.

I got NRs. 10,000 for treatment along with a wheel chair. But I spent a lot of money for the treatment.

I am suffering greatly from this injury; I need to take medicine regularly. The wheel chair is broken now. So, I have difficulties in mobility.

My situation would improve if I could get some allowance which at least can be used for buying medication regularly.

I am Kale Bahadur Darai of Jagatpur 2, Kasara. I was attacked by a rhino in 2006 and this completely damaged my right hand which is the primary hand for work.

I received NRs. 10,000 for treatment but I spent more than this for the actual treatment. I am suffering very much due to this hand. Now I want to cut it off if somebody helps me financially because this hand is of no more use to me.



© Nakarmi Ganga, 2009

Photo 11: A rhino attack on hands

I am Mithu Mahato of Meghauri VDC. I was seriously attacked by an elephant in 2003. My face was badly damaged. I received NRs. 10,000 for the treatment. But this was not sufficient. I spent more than NRs.1,00,000 for the treatment.

Later, I underwent plastic surgery with the help of my family. Now I have a dental disorder problem due to this attack.



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Photo 12: An elephant attack on face



© Nakarmi Ganga, 2009

Photo 13: A tiger kill

I lost my youngest daughter Ganga Maya Sunar, in a tiger attack near the river in 2006 when she was bathing.

I received NRs. 25,000 for her funeral expenses.

I have borne the sorrow of the loss of my beloved daughter who could be of help in my old age.

I am Bodh Raj Timsina, resident of Ayodhyapuri VDC. I lost my wife Sita Timsina (Pictured in small photo) in a tiger attack in 2006. I received NRs. 25,000 for her funeral expenses.

Now I am facing difficulties in looking after my home and children alone. I have one handicapped daughter and old father as well. My wife would have been of great help to me in farm and home activities as well as raising children if this incident had not taken place and I had not suffered her loss.



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Photo 14: A family of a Victim

These situations of victims and victims' families show that attacks by wild animals exert different impacts on them. Living under such threats could obviously make people distraught which may hinder the conservation process or create obstacles in conservation efforts.

They pointed out that if a person kills a wild animal damaging their property, then there is a fine of NRs. 100,000.00 or 15 years of imprisonment or both, but if a person is killed by a wild animal, then there is negligible compensation. This raises the contesting and challenging reality of valuing wildlife versus local people's lives as the locals can be responsible custodians of wildlife conservation, and at the same time, an agency to resist conservation.

4.5. Impact of Human Casualty on Wildlife and Park Management

Human casualty by wild animals has not only impacted the local communities, but also wildlife and the park management, to a greater extent. In some cases, the park management has to cull some problem animal for the sake of safeguarding the community. One case in Kasara sector provides a clear picture of the impact of such incidents. A female tiger roaming around in the community forest with her little cubs killed two local persons in the buffer zone community forest in 2003. The community forest was opened for grass collection at that time. Later, she was killed by the park management body. The cub (Narayani) was taken by the authorities and kept in the Kasara orphan animal management center. If we analyze the loss here, the park management has borne the greater loss in three major ways – firstly, the loss of flagship animal for the conservation of which the park management has been putting greater efforts. Secondly, the relief amount provided to the victim's family and thirdly, the management has had to bear added load both in terms of money and human resources to take care of the orphaned animal. Previously, the food supply for Narayani had been managed somehow with sponsorship. But now there is no sponsorship to supply food for Narayani. However, the park management has been supplying food to her. So, who is responsible for making Narayani an orphan? Who can calculate the psychological pressure and imprisoned life of Narayani? Besides, the electric

fence installed to deter wild animals, retaliatory killing by local people, etc. also have adversely impacted wild animals a lot. Species most exposed to conflict are also shown to be more prone to extinction (Ogada et.al., 2003) because of injury or death caused by humans. Therefore, human casualty has exerted impact on the local communities, wild animals and park management as well. Therefore, practical solutions for preventive measures should be explored and implemented effectively.

5. RECOMMENDATIONS/SUGGESTIONS

The problem of human casualty persists till now due to the overlap of limited resources for wild animals and human beings. So, the issue of human casualty cannot be eliminated. However, it can be minimized by exploring innovative ways. Thus, the buffer zone program should focus on achieving practical solutions for sustainability. This can be done in two ways – one by addressing the preventive solutions, and the next, by introducing curative solutions. Moreover, there is the need to assess the relief requirements as the victims opined on various measures. The following recommendations are given for self-sustaining human wildlife co-existence.

5.1. Identification of Vulnerable Areas in and around the Park

It is urgent to identify the vulnerable areas in and around the park based on the movement of wildlife, dependency on the park resources, economic background of the community residing nearby, etc. They should be categorized as- 1. Most affected/vulnerable area, 2. Affected area and 3. Less affected area. For instance, Gurung (2008) reported 66% of tiger kills occurred in 1km distance from the forest areas. This might be a useful reference for the identification of vulnerable areas. Once the vulnerable areas are identified, sign posts should be placed indicating “dangerous” areas or “no go” zone. Moreover, BZUC should design and implement conservation and development programs accordingly in such a way so that the affected communities receive a greater share of the benefits and bear fewer costs of living with wild animals.

5.2. Habitat Management

The study recommends the immediate need for improving habitat in order to provide ample food and appropriate shelter to wild animals in the park. There is lack of information based on scientific studies on the wildlife habitat. For this, it is urgent to carry out research on the condition of habitats and carrying capacity of the park. The emerging problem of rapid invasion by *Mikania* weed and plant succession in the terrestrial habitat and that of *Pater* and water hyacinth in the wetlands have further aggravated the habitat conditions which has greatly affected wild animals and birds.

5.3. Awareness Raising /Conservation Education

Awareness-raising programs related to the behavior and movement of wild animals and the tactics to be used during encounter with wild animals should be designed and implemented, especially in the fringe areas of the park. It is because the people residing in the fringe areas are the ones who very frequently go in to the forest and they are the first ones who usually encounter wild animals. Incidents have often occurred due to the ignorance of the people and the lack of knowledge. For examples, wearing colorful clothes while working near forest areas and in farms, walking through forest after drinking alcohol were also the causes of wildlife-induced human casualties. So, these aspects should be clearly addressed while designing an awareness program. Awareness would help people to internalize the facts, and thus, help to reduce ignorance of them. Moreover, programs focusing on public safety measures should be conducted in the potentially vulnerable areas of the buffer zone. Sign posts should be posted in the dangerous sites within the buffer zone and the park in order to warn people of danger.

5.4. Introduction of Innovative and Feasible Mechanisms

As the Government of Nepal now provides NRs. 150,000.00 for a death case, a maximum of NRs. 50,000.00 for serious injury and a maximum of NRs. 20,000.00 for simple injury it would be useful if the relief amount that was obtained from 50% of the revenue could be used in an innovative way.

Innovative and feasible mechanisms such as insurance system and trust fund for regular allowance to the victim and victim's family could be feasible for the best use of resources.

a. Establishing Life (Death and Injury) Insurance

The BZ program should create a fund to establish life and accidental insurance, at least in the highly vulnerable areas. For this, the BZMC, BZUCs, UGs should conduct a dialogue with the land owners of the land near the park boundary to bear a premium partially. More than 50% of the victims were found to be doing *Adiya kheti* under this great threat. So, the responsibility should be borne by the land owners as well. However, there is need for more work in order to understand this system and for it to be accepted by all.

b. Establishing Fund for Regular Allowance to Victims and Victims' families

A trust fund for regular allowance to victims and victims' families should be established. This could be helpful for meeting their needs regularly, and at the same time, could be helpful to avoid chances of misutilization of the money as was found in the case of Mrs. Budhani Mahato who lent the NRs. 25000.00 received as compensation for the loss of her son, Krishna Mahato. It is indeed possible for such a case to be replicated because the majority of the victims and/or farmers are illiterate and have no or less knowledge about the system. Hence, it would be much better if victims could get some amount regularly as allowance.

c. Providing Subsidy for Alternative Energy

It is recommendable to improve and enhance the existing provision of subsidy for biogas installation in order to promote alternative energy. The existing subsidy of NRs.1,500.00 for biogas is not sufficient. However, it is worth mentioning here the increment of subsidy to NRs. 3,000.00 by all BZUCs of Madi Valley to support sixteen biogas plants for the victims and their families that

were supported by this research oriented project. Such improvements should be continued in the future too.

d. Encouraging Stall-feeding of Livestock by Providing Subsidy

As the study shows most of the incidents occurred when the victims were collecting fodder for livestock and grazing livestock, it is recommended to encourage stall-feeding by providing subsidy to produce grass on their own land or in the barren community land. By doing this, people would not have to go to the dense forest for grazing livestock and collecting fodder, which would ultimately reduce the chances of human-animal encounter and resulting casualty. Moreover, since the local people are keeping more goats than cows and buffaloes, it will be easier for them to graze little livestock in their own fields. So, the buffer zone program should encourage the local people to grow palatable grass and fodder in their own fields and stall-feed their livestock.

e. Growing Bio-deterrents and High-Value Less-Preferred Crops by Animals

Growing bio-deterrents around the fields and settlements could be helpful in minimizing conflict. For example, chili and tobacco-based deterrents are grown to keep elephants out of fields in Kenya, Malaysia, Mozambique, Namibia and Tanzania (WWF, 2006). Likewise, high-value crops not preferred by wild herbivores should be encouraged for cultivation by communities.

f. Meeting the Supply Demands of Local Communities

It is often heard that the buffer zone management program has been diverted more towards trade/commercial purposes than towards social welfare/service for which the buffer zone had been declared (local response during field visit). The commercialization of local needs has deprived local people of access to fuel wood, fodder, timber, etc. and this has led to the poor always remaining poor. So, the buffer zone management program should primarily focus on fulfilling the local needs than on fulfilling commercial demands. Human casualty will remain a burning issue till local people continue going to the forest even for simple needs,

such as grass, fodder, fuel wood, etc. Further study is needed to better understand the situation of supply and demand regarding the needs such as firewood, fodder, grass, etc. This is the actual objective of buffer zone establishment.

g. Arrangement for School Admission of Victims' children

Detailed information on the children of victims especially those of school going age should be recorded in order to prevent children from being deprived of education. The BZUC and BZMC should collaborate with the government and schools for making arrangement for admission of such children. Moreover, the BZMC and BZUC should work out school building construction in the buffer zone to impart education to children of the victims in particular.

h. Providing Skill Enhancement Training and Creating Job Opportunities

The buffer zone should organize skill-enhancement trainings and explore job opportunities by focusing on the victims and their associates as per their capacity. During the field visit, the victims showed great desire to work somewhere as per their capacity. Some victims were young enough to work but are not working because of poverty and lack of opportunity. For example, Mr. Ganesh B Nepali, a young man of the age 21 years, can be given training for betterment of his life. He has been staying in his maternal uncle's home with his mother since his father married for a second time. Unfortunately, he has suffered serious damage on his face in a bear attack. He feels that he is a great burden to the family now. So, the buffer zone program should assess more opportunities and possibilities to cater to such a needy group.

5.5. Research and Documentation

Detailed information on wildlife-inflicted human casualties covering the name and gender/sex of victim, date and place of incident, problem animal, compensation receiver, date of compensation, activity that the victim was performing during attack, reasons for incident, etc. should be recorded in a sound database system. Moreover, regular census of problem animals is

required in order to check the local people's perception that the increase in animal population has created problems for them. This would supply necessary information for developing a feasible mechanism for better protected area management and wildlife conservation and would offer an opportunity to join forces in steering the process of promotion and development of human-wildlife harmony for all interested stakeholders. Moreover, this will meet one of the recommendations of the IUCN World Park Congress (2003) to establish an international forum acting as a global network for sharing information and expertise in addressing HWC (Distefano, E., 2005).

6. CONCLUSION

Wildlife-induced human casualty is a growing concern across the buffer zone of CNP as elsewhere in the globe where rapid expansion of population and agricultural activities are taking place. Rhino, tiger and bear were found relatively more dangerous to human beings leading to death and injury compared to other animals such as boar, elephant, leopard etc. in and around the CNP.

The park management authority has been implementing both preventive and curative measures to compensate for the loss of property and life of the people. The park management authority of CNP had provisioned some compensation in the form of money and taking care of dependants, especially schooling victim's children as a direct and curative strategy. Progressive amounts from NRs. 25,000.00 to NRs. 50000.00 were given for death cases and NRs. 10,000.00 to NRs. 20,000.00 given in cases of injury in the ten-year period from 1997 to 2007. Besides, an indirect and preventive strategy was adopted by offering subsidy to set up electric and solar fences, Machan and promote alternative energy sources such as biogas plants in order to prevent encounters with wild animals. However, villagers blamed the conservation authority whom they accused of not doing enough to prevent wild animals from straying outside the park causing damage to property and life. The respondents strongly raised their

voice against the low rate of reimbursement for their irreparable loss and demanded development of a sustainable mechanism to cope with this issue.

Recently, the Government has approved a new guideline – Wildlife Damage Relief Guideline, 2066. The guideline has made provisions for monetary relief of NRs. 150,000.00 for death, a maximum of NRs. 50,000.00 for serious injury, and NRs. 5,000 for simple injury of people by wild animals. So, it can be hoped that the local people may find the above mentioned amounts sufficient to cover their medical bills and funeral expenses and will be satisfied to some extent. The new guideline has not mentioned any other measure except for monetary compensation. However, the findings of this study showed that the local people are seeking for long-term measures as the one-time monetary compensation did not help them much after occurrence of the incident. Moreover, monetary compensation is not a sustainable solution as it is subject to change over time and also depends on the individuals concerned. Thus, there is a need for finding better, pragmatic and sustainable solutions. Also, in the present situation of implementation of the new guideline, it is urgent to think upon the best use of the previous provision of relief under which 50% of the revenue from the PA was used. Human death and accidental insurance, regular allowance for the victims and victims' families, subsidy for growing palatable grass and fodder/forage in the own and waste lands, stall feeding, subsidy for alternative energy, growing bio-deterrents around the fields and settlements, setting barriers around the fields and settlements, etc. are some of the recommended approaches to tackle the issue of wildlife-induced human casualty.

Annex I

Type of problem animals in various sectors

Type of animal	Amaltari			Sauraha			Madi			Kasara		
	K	I	T	K	I	T	K	I	T	K	I	T
Rhino	11	36	47	6	11	17	3	9	12	12	46	58
Tiger	7	0	7	6	8	14	23	6	29	6	14	20
Elephant	0	0	0	1	3	4	2	2	4	1	5	6
Bear	0	15	15	0	5	5	5	62	67	0	6	6
Boar	1	5	6	0	1	1	0	3	3	1	2	3
Crocodile	0	1	1	0	0	0	0	1	1	0	1	1
Gaur	0	0	0	0	0	0	0	0	0	0	1	1
Leopard	0	5	5	0	25	25	0	0	0	0	0	0
Deer	0	0	0	0	1	1	0	0	0	0	0	0
Unknown	3	10	13	3	11	14	3	13	16	4	18	22
Total	22	72	94	16	65	81	36	96	132	24	93	117

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