



# BHUTAN NATIONAL HUMAN - WILDLIFE CONFLICTS MANAGEMENT STRATEGY



Nature Conservation Division  
Department of Forests  
Ministry of Agriculture



**DEDICATED TO 100 YEARS OF MONARCHY**



**BHUTAN NATIONAL HUMAN -WILDLIFE CONFLICTS  
MANAGEMENT STRATEGY**



**Nature Conservation Division  
Department of Forests  
Ministry of Agriculture**

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**Nature Conservation Division  
Department of Forests  
Ministry of Agriculture  
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## ACRONYMS AND ABBREVIATIONS

|       |  |
|-------|--|
| ABTO  | Association of Bhutanese Tour Operators          |
| APPA  | Appreciative Participatory Planning and Action   |
| BAFRA | Bhutan Agriculture and Food Regulatory Authority |
| BTF   | Bhutan Trust Fund                                |
| CCC   | Community Conservation Committee                 |
| CFO   | Chief Forestry Officer                           |
| CORRB | Council for RNR Research of Bhutan               |
| DAO   | District Agriculture Officer                     |
| DoF   | Department of Forests                            |
| DoL   | Department of Livestock                          |
| FYP   | Five Year Plan                                   |
| GYT   | Geog Yargay Tshochung                            |
| ICDP  | Integrated Conservation and Development Program  |
| JSWNP | Jigme Singye Wangchuck National Park             |
| MoA   | Ministry of Agriculture                          |
| NCD   | Nature Conservation Division                     |
| NPPC  | National Plant Protection Center                 |
| RBA   | Royal Bhutan Army                                |
| RBP   | Royal Bhutan Police                              |
| RGoB  | Royal Government of Bhutan                       |
| RICB  | Royal Insurance Corporation of Bhutan            |
| RNR   | Renewable Natural Resources                      |
| RVL   | Regional Veterinary Laboratory                   |
| SFD   | Social Forestry Division                         |
| SWOT  | Strength Weakness Opportunities Threats          |
| 10FYP | Tenth Five-Year Plan                             |
| TCB   | Tourism Council of Bhutan                        |
| UNDP  | United Nations Development Program               |
| VTMC  | Village Tourism Management Committees            |
| WWF   | World Wildlife Fund                              |



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Department of Forests  
Thimphu  
*"Walking the Extra Mile"*



## PREFACE

It gives me great pleasure to write this preface to the first "Bhutan National Human Wildlife Conflicts Management Strategy". The Department of Forests appreciates the valuable contribution made by all the national and international participants and contributors, who have worked tirelessly towards the formulation of this important national strategy to address human wildlife conflicts in Bhutan.

Bhutan has inherited diverse and rich ecosystems and wildlife due to the enlightened leadership of our Monarchs. Bhutan is increasingly looked upon as a model for conservation by other nations and has gained local and international appreciation for our conservation efforts. But Bhutan's conservation efforts have not come without a price. With the establishment of a network of protected areas and biological corridors in the country, new challenges have surfaced, which have become more robust with time. One such a significant challenge is to balance the needs of rural farmers, who not only live in close proximity to wildlife but also share resources with wildlife. This has inevitably sparked conflicts between people and wildlife, which have gained momentum over the years.

The Department of Forests, as the custodian of nature and wildlife in Bhutan has realized the need to address human-wildlife conflicts in order for conservation to succeed in the long run. Furthermore, the Department was directed by the 2007 RNR conference and the Gross National Happiness Commission to formulate comprehensive strategies to address the issue during the 10 FYP.

The Bhutan National Human Wildlife Conflicts Management Strategy has been formulated in a highly participatory manner involving all relevant stakeholders and partners. The work was coordinated by the Nature Conservation Division under the Department. The process began in July 2007, with the stakeholders meeting to address human-wildlife conflicts, followed by a national strategy development workshop





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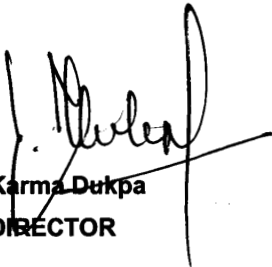
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organized in Paro from 5-9 December 2007. The Paro workshop was attended by 81 national and international participants that are directly or indirectly linked or involved with human-wildlife conflicts. This strategy is the outcome of the national workshop.

Addressing human wildlife conflicts is a top priority for the Department in the 10FYP. As such, we are fully committed to the implementation of the strategy to help address the needs of both humans and wildlife in order to make Bhutan a safer place to live for both. With the support of our donors and partners, we are hopeful and positive that we will be able to implement the strategy within the 10 FYP.



**Karma Drukpa**  
**DIRECTOR**

20 August 2008

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## FOREWORD

The Bhutanese people have derived their livelihoods from natural resources for centuries. As a result people have developed intimate relationship with nature, which is further supported by Buddhist philosophy that advocates respect for all forms of life. These livelihood strategies and religious ethics have shaped an environmentally friendly lifestyle. Such harmonious relationships with nature received a boost when His Majesty the Fourth King Jigme Singye Wangchuck, personally advocated conservation through his statement: “Throughout the centuries the Bhutanese have treasured their natural environment and have looked upon it as the source of all life. This traditional reverence for nature has delivered us into the twentieth century with our environment richly intact. We wish to continue living in harmony with nature and to pass on this rich heritage to our future generations”.

In line with this philosophy, Bhutan has adopted a ‘middle path’ approach to development, supporting the integration of conservation and sustainable development. To continue with the harmonious co-existence between people and nature as well as to live up to the Royal Governments’ developmental philosophy of ‘Gross National Happiness’, the legal framework set in the Forest and Nature Conservation Act of 1995 accommodates farmers to live inside the protected areas.

For the last few decades, Bhutan has achieved unprecedented conservation success. It has been recognized through global awards such the United Nations Champions of the Earth Award and WWF’s Paul Getty Award. However, this success and applause did not come without cost, our farmers continue to suffer increasing damages from wildlife not to mention of the various restrictions on utilization of natural resources. This has sparked conflicts between humans and wildlife, which is gaining momentum both in terms of the intensity of damage as well as the demand on the Royal Government to develop appropriate measures to mitigate such losses. As Bhutan evolves into a new era of democracy, the issue of human-wildlife conflicts will

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gain significant momentum and could seriously jeopardize conservation prospects in the future, if left unchecked.

Thus, I am extremely happy to see that the much needed “Bhutan National Human Wildlife Conflicts Management Strategy” has been formulated by the Department of Forests to be implemented within the 10FYP. The strategies outlined here are expected to reduce human-wildlife conflicts to a manageable level in the country, enhance the livelihoods of our farmers, and offset their losses from wildlife damages.

I wish to congratulate the Nature Conservation Division and the Department of Forests for bringing out this extremely important national strategy to address human-wildlife conflicts in Bhutan. It is my hope that the strategy would be successfully implemented during the 10 FYP. May it bring about positive changes in the livelihoods of our farmers and reduce their losses from wildlife damages. My best wishes for the successful implementation.

Tashi Delek!

**Sherub Gyaltsen**  
**SECRETARY**

**20 August 2008**



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ROYAL GOVERNMENT OF BHUTAN  
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Thimphu: Bhutan



## MESSAGE

This strategy to address human-wildlife conflicts in Bhutan has indeed become the need of the hour. Every year, our farmers are losing significant amounts of crops and livestock to wildlife depredation. In recent times, wild pig and elephants featured regularly in the media for raiding crops and causing much distress among our farmers. Given Bhutan's strong commitment to conservation and its Buddhist faith, there is no easy solution to overcome the problem. Complex as it is, any solution will have to be socially and culturally acceptable besides being practical and effective.

I am pleased that the Nature Conservation Division of the Department of Forests has taken this initiative to prepare and bring out a strategy document. I have noted that the root causes of the problems are carefully analysed and mitigation measures, such as compensation programs to offset immediate losses, insurance programs for crops and livestock as longer-term solutions, and wildlife research programs to better understand problem species, are proposed and presented in a logical manner.

I would like to convey my full support to the adoption and implementation of this strategy. As the Ministry of Agriculture is primarily concerned and committed to alleviating poverty in our rural areas, it is unacceptable that our farmers continue to suffer heavy losses of crops and livestock to wildlife. While conservation is equally important, we must seek an acceptable balance between conservation and livelihood concerns. Peoples' livelihood should not be unduly compromised in our efforts to conserve wildlife. At the same time, we must ensure that people do not take undue advantage of more lenient laws to exploit wildlife resources and threaten their survival.



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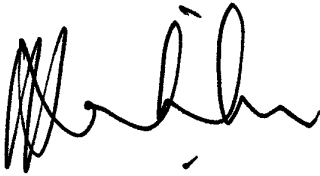
We have acknowledged that the human-wildlife conflict could have been mitigated had we been more judicious in our approach to deal with the problem in the recent past. When we harm nature, we harm ourselves. By now, the story of the wild pig and the wild dog is a well-known precautionary tale. Our farmers still suffer from the actions of our parents who in the late 1970s almost wiped out the wild dog through poisoning. Many believe that the absence of its natural predator as a result, has led to the explosion of the wild pig population.

Equally, the problem of marauding elephants in the south are trans-boundary and essentially human-induced in nature. Years of insurgency, large-scale encroachment and destruction of habitats in Assam and West Bengal have left the elephants with nowhere to go but to resort to cross-border raids of crops belonging to helpless Bhutanese farmers. In December 2007, during the formulation of this strategy in Paro, renowned Indian scientists agreed that the elephant is no longer a viable species for human-dominated landscapes in Assam and West Bengal along our border. Therefore, recommendations in the strategy for the elephants are mitigatory in nature since elephant populations reside largely in India.

In general, the strategy's overall approach is to address human-wildlife conflicts through a comprehensive consideration of social, economical and ecological factors in order to achieve lasting solutions. In order for this strategy to become operation and to succeed, substantial funding is required. Therefore, sustained support and cooperation from our conservation and development partners, including financial assistance, will be required.

In conclusion, I would like to extend my sincere thanks to the donors, including UNDP, WWF, and BTF, who have already shown keen interest through their support during the preparation of this strategy document. I would also like to congratulate the Nature Conservation Division and all the experts involved in the development of this strategy and look forward to its successful implementation.

Tashi Delek!

A handwritten signature in black ink, consisting of several loops and a long horizontal stroke, positioned above the name of the signatory.

**Lyonpo Dr. Pema Gyamtso**  
**MINISTER**

**25 August 2008**

# Chapter 1

## INTRODUCTION



**B**hutan is widely recognized for its unusually high levels of biological diversity, which arise due to its position at the meeting of four bio-geographic divisions and the many different habitats that exist along an enormous elevation gradient. Though small in size, Bhutan is a primary steward of some of the world's most exceptional mega-fauna, many of which are endangered elsewhere in the Hindu Kush-Himalayas. For centuries a strong religious and cultural ethos based on Buddhism has provided a safe refuge for this extraordinary richness. Beginning in 1993, Bhutan has steadily gained international recognition for its organized conservation efforts, including the establishment of an extensive network of protected areas, and interconnecting biological corridors. Indeed, about 40% of the country's total land area of 38,394 km<sup>2</sup> (NSB, 2007) has been set aside for conservation, and 60% of the country is mandated by the Constitution of Bhutan to remain in forest cover for all times. The protection of nature and the environment is central to governmental efforts to promote Gross National Happiness for all Bhutanese and serves as an ideal for governments everywhere.

As an agrarian-based society, almost 80% of Bhutan's population depends directly on crop and/or livestock production for their livelihood. Bhutan's conservation policy allows farmers to remain in parks, protected areas, and corridors, and some of the country's poorest communities can be found within these areas. Hence, the Royal Government of Bhutan is faced with promoting long-term economic and social development programs aimed at poverty alleviation in these rural areas, while simultaneously protecting the natural resources that uniquely characterize this country. Finding a balance is the basis for sustainable development.

The quest to find new paths for conservation and sustainable development is a worldwide issue and presents many obstacles. One major challenge in a country like Bhutan, with large populations of mega-fauna living in close proximity to rural communities, is the conflicts that arise between humans and wildlife. The loss of crops, livestock, and/or human

lives to wildlife represents social and economic costs that jeopardize livelihoods, exacerbate poverty, and may lead to retaliation against conservation programs. Bhutan's recent move to democracy may open a new process for concentrating local resistance to conservation policies, possibly leading to detrimental changes to certain wildlife populations. Clearly, rural livelihoods and conservation are inseparably linked. If conservation efforts are to succeed, then human-wildlife conflicts must be reduced. Hence, there is an urgent need to address the concerns of Bhutanese farmers by designing and implementing a comprehensive plan focused on understanding and managing such conflicts.

The Ministry of Agriculture (MoA) and the Department of Forests (DoF) have been aware of this growing need. Accordingly, the Nature Conservation Division (NCD) took the initiative to develop a plan to address human-wildlife conflicts for the Royal Government's 10<sup>th</sup> Five-Year Plan (10FYP) (2008 – 2013). This document presents such a plan, a National Strategy, the first of its kind for Bhutan and likely any other nation. It has four uniquely defining characteristics. First, it reports an agreed-upon strategy for addressing major issues based on input from all relevant sectors and stakeholders directly or indirectly linked to these issues. Such inter-disciplinary and inter-agency collaboration is crucial given the complexity of human-wildlife conflicts. Second, it recognizes that the 'human dimensions' aspects of human-wildlife conflicts are central to its purpose and that rural livelihoods and conservation are inseparably linked. Third, it is an 'action document' that provides recommendations to quickly mitigate urgent wildlife problems and identifies a comprehensive research agenda to understand and solve human-wildlife conflicts in the long-term. Lastly, the National Strategy is a 'living document' that can be modified and updated as needed, based on the principles of adaptive management.

This chapter introduces the *National Strategy to Resolve Human-Wildlife Conflicts in Bhutan*. First, the context for this strategy will be outlined by highlighting the interdependency between local people, rural livelihoods, and conservation; followed by a review of human-wildlife problems worldwide and in Bhutan; and concludes with a consideration of the challenges hampering progress toward solving these problems. Second will be a discussion of the process promoted by the Nature Conservation Division to develop this National Strategy, including the organizational structure for the chapters.

Finally, concluding comments will provide an optimistic outlook to review and utilize this National Strategy.



## THE CONTEXT

### The Importance of Local People to Conservation

The establishment of Yellowstone National Park in the Western United States in 1872 was the first of its kind in the world. Established by an act of Congress, it created a new concept to protect natural beauty by holding the land in public trust and greatly restricting development and exploitation of its natural resources. This meant the forced exclusion of Native Americans who had used this area for thousands of years, the development of an orientation to public recreation compatible with the natural resource base, and the promotion of a ‘fences-and-fines’ protectionist paradigm to manage national parks. The ‘Yellowstone Model’ not only provided the framework for the expansion of the U.S. National Park System, but it also was adopted for the establishment of parks and protected areas worldwide.

Many of the protected areas that are now key to a worldwide conservation strategy are in developing countries (Terborgh and van Schaik, 2002; Wilshusen *et al.*, 2003; Lockwood, 2006). In contrast to the ‘Yellowstone Model’, however, these areas characteristically have people living within their boundaries, and, thus, must support various forms of land-use, including agriculture, livestock production, and/or the collection of minor forest products. For example, about 85% of South America’s protected areas are inhabited or used by people. As such, rural people in many developing countries are vulnerable to the policies associated with the establishment and management of protected areas, as they depend primarily on locally available resources for their livelihoods and spiritual needs (Gadgil, 1990; Maikhuri *et al.*, 2001; Nepal and Weber, 1995; Saberwal *et al.*, 1994). Unfortunately, the needs and aspirations of rural people living in or adjacent to protected areas have often been overlooked when implementing conservation agendas (Wilshusen *et al.*, 2003; Dowie, 2005). In fact, protecting natural areas from traditional uses by local people often is considered a prerequisite for successful conservation (Zube and Busch, 1990). Policies of exclusion have been promoted and it is estimated that 5 to 10 million people were displaced as protected areas doubled worldwide between 1990 and 2005 (Dowie, 2005).

Despite impressive progress, there remains widespread concern that established parks and protected areas are ineffectively managed and that significant biodiversity lies outside such areas (Maikhuri *et al.*, 2001). Though the debate continues, most conservationists now argue that local people and their socio-economic concerns must be intimate parts of the protection formula owing to their sympatric relationships with critical wildlife

habitats and biodiversity hotspots. From their perspectives, however, the trade-off between livelihood and protection is unacceptable, a problem exacerbated by growing populations facing progressively higher levels of poverty. Hence, many governments and conservation organizations, such as The Nature Conservancy, Conservation International, and the World Wildlife Fund, are now attempting to address the inseparable link between poverty alleviation and conservation. In many areas this linkage is greatly confounded by increasing wildlife-human conflicts (Conover, 2002; Woodroffe *et al.*, 2005).

### Human-Wildlife Conflicts Worldwide

Aside from having to live with restrictions on traditional resource uses that come with the establishment of parks and protected areas, farmers often must also bear heavy losses in terms of property damage by wildlife; crop loss by direct feeding and destruction; the loss of use of arable land due to fear of crop damage; livestock depredation by wildlife; and harassment, injury, or death of local people (Saberwal, *et al.*, 1994; Studsrod and Wegge, 1995; Wang and Macdonald, 2006). Quite directly, crop destruction and livestock predation by wildlife threaten the ability of people to secure sustainable livelihoods (Nepal and Weber, 1995; Studsrod and Wegge, 1995). Guarding property and taking protective measures are also costly owing to the time and money involved (Studsrod and Wegge, 1995).

Conflicts between wildlife and humans are increasing worldwide, especially in and around protected areas (Nepal and Weber, 1995; Woodroffe *et al.*, 2005). Several mitigating methods, such as cash compensation (Yoder, 2002), indirect compensation through integrated conservation and development programs (Western *et al.*, 1994; Wilshusen *et al.*, 2003), and selective sustainable extraction of resources (Saberwal *et al.*, 1994; Studsrod and Wegge, 1995), have been instituted to enhance support for conservation. There are efforts to understand the complex factors associated with livestock depredation, including herd size and kind, guarding and herding patterns, types of predator species, habitat preferences, and effects of human settlements (Linnell *et al.*, 1996; Wang and Macdonald, 2006).

Human-wildlife conflicts are intensified as population growth forces development activities that infringe on wildlife habitats. This leads to fragmentation and declining habitat quality eventually causing competition between humans and various wildlife species for space and resources, with stressed wildlife often turning to crops or livestock for food. This is the situation currently facing Bhutan (Wang, 2004).

## Human-Wildlife Conflicts in Bhutan

Modern conservation in Bhutan started in 1993 with the development of a system of protected areas and, two years later, a legal framework for conservation, the Forest and Nature Conservation Act (RGoB, 1995). Farmers were allowed to remain in these areas, but those accustomed to having free access to natural resources had to change their lifestyles, this because there were now restrictions on traditional resource uses, bans on shifting cultivation and hunting, enforced limitations on extractions of timber and non-timber forest products, and limitations on grazing in community and reserve forests (RGoB, 1995; MoA, 2000). In addition, development projects in protected areas were to include stringent environmental impact assessments and had to be non-commercial (RGoB, 2000; Wang, 2000).

Subsequent increases in wildlife populations resulted in increased threats to humans, crops, and livestock (Choden and Namgay, 1996; NRTI, 1996; Anon., 2002; MoA, 2002; Wang and Macdonald, 2006; Wang, *et al.*, 2006 a; b). However, this inevitably created conflicts among local people, wildlife, and park management officials (Wang and Macdonald, 2006; Wang *et al.*, 2006 b). There is ample evidence to support growing concern that these conflicts have increased over the past two decades.

Annual crop loss ranges from 0.3 to 18% of total household income. On average farmers spend about two months per year guarding their maize and rice from wildlife (Choden and Namgay, 1996). Guarding, which is mostly done at night, costs farmers untold hardships, additional expenses, and possible personal injury (Choden and Namgay, 1996). In the mid-1990s, due to crop damage, 23% of the farmers in Zhemgang district stopped growing rice, while 39% abandoned dry land agriculture and 71% stopped slash and burn agriculture (van Aaken, 1997); whereas in Tomiyangtse (eastern district of Tashi Yangtse), 14% of the work force had emigrated in search of non-farming work (Doe Doe, 1996).

Fortunately, incidences of human injury by wildlife have been rare to date. Two men were killed while chasing wild pigs (*Sus scrofa*), (Choden and Namgay, 1996) and a man died after being mauled by a Himalayan black bear (*Ursus thibetanus*) invading an apple orchard (Anon, 2003 a). Reports of livestock loss to wildlife are more common. For example, one leopard (*Panthera pardus*) killed 40 livestock during one month (Wang, 2001), and during the course of nine months, a pack of dholes (*Cuon alpinus*) killed 24 mules, six cattle, and two yaks in the Jigme Dorji National Park (Anon., 2003 b).

In the early 1980s, heavy livestock depredation by dholes and lack of any reliable intervention by the government led to people eradicating almost the entire population of this key predator through mass poisoning of livestock carcasses. This apparently contributed to a sharp increase in abundances of wild pigs, which are now the species most responsible for crop damage in Bhutan. Programs are now being instigated to increase dhole populations for wild pig control (Wang and Macdonald, 2006; Wang *et al.* 2006 a).

The most complete examination of human-wildlife conflicts to date in Bhutan has been carried out in the Jigme Singye Wangchuck National Park (Wang, 2000, 2001, 2004, 2008; Wang and Macdonald, 2006; Wang, *et al.*, 2006 a; b). Based on a stratified-random sample of 274 farmers living in the park, most had suffered major financial losses annually due to crop damage by wild pigs, barking deer (*Muntiacus muntjak*), macaques (*Macaca mulatta*), and sambars (*Cervus unicolor*) (Wang *et al.*, 2006 a). All respondents reported crop losses to wild animals, with wild pig being the most common cause (97%). Farmers responded by implementing non-lethal methods such as guarding, fencing, and performing religious rituals to protect their crops.

Farmers also reported livestock depredation by wild carnivores including leopard, tiger (*Panthera tigris*), Himalayan black bear, and dhole (Wang and Macdonald, 2006). Over 20% of the households surveyed reported losses to wild predators totaling 2.3% of their domestic animals over the past year. This loss equated to an average annual financial loss equal to 17% (US\$ 45) of their total per-capita cash income. The total reported losses during the year 2000 amounted to US\$ 12,252 of which leopard and tiger kills accounted for 82% (US\$ 10,047). The annual mean livestock loss per household (of those reporting losses) was 1.29 head of stock, the equivalent to more than two-thirds of their annual cash income of US\$ 250. Lax herding, inadequate guarding practices, and overgrazing may have contributed to livestock losses. Approximately 60% of the households lacked proper stables for corralling their livestock at night. Plus, there was a significant correlation between the number of livestock lost and the distance between the household and the grazing pasture.

The same survey also assessed the farmers' perceptions of the influence of park management policies and protection regimes on traditional resource uses, along with their attitudes toward the park and conservation policies set forth in the Forest and Nature Conservation Act of 1995, integrated conservation development programs (ICDPs), and

wildlife conservation, and determined how demographic and socio-economic variables influence these attitudes (Wang *et al.*, 2006 b). Among local farmers, over half disliked the park and the Conservation Act, while almost 68% supported exterminating problem wildlife. Negative attitudes were linked to the loss of resource use rights, livestock depredation and crop damage, lack of compensation strategies, and exclusion of farmers from the park's planning processes. However, over 75% of the respondents appreciated the park's development programs, the positive attitudes associated with an expectation that significant economic benefits would be available from ICDPs sponsored by the park management. Empowerment of local communities associated with monetary benefits from non-timber forest products and compensation for loss of crops and livestock were emphasized by more than 70% of the respondents. These attitudes were related to age and literacy of the respondents, number of livestock owned, and size of land holdings.

### The Challenges

Conservation policies that restrict traditional land uses and/or increase losses of livestock, crops, and human life to wildlife will cause antagonistic feelings in the very people who once were stewards of the land (Mordi, 1991; Mehta and Kellert, 1998; Conover, 2002; Woodroffe *et al.*, 2005), potentially compromising the future of conservation and protected areas (Naughton-Treves, 1998; Bhatnagar, *et al.*, 1999; Straede and Helles, 2000). For example, with livelihoods threatened, local people often retaliate by killing wildlife, and may lose confidence in the conservation efforts being promoted by the government and various non-governmental organizations often leading to further negative impacts on wildlife and their habitats (Woodroffe *et al.*, 2005). Hence, understanding human attitudes and the potential for wildlife conflicts in the context of protected area management is critically important for the design of long-term conservation strategies (Mordi, 1991; Heinen, 1993).

This is certainly the situation now facing the Royal Government of Bhutan, as it grapples with wildlife-human conflicts that were absent two decades ago. Farmers who tolerated wildlife damage in the past have come forward demanding action by the government, while wildlife conflicts are impacting the government's objective of increasing food security and jeopardizing the future of Bhutan's conservation programs (Wang and Macdonald, 2006; Wang *et al.*, 2006 a; b).

Bhutan is not alone in its need to understand and mitigate human-wildlife conflicts. Many countries have found the complexity of these problems to be intractable, escaping comprehensive solutions (Woodroffe *et al.*, 2005). Inherently interdisciplinary, there is a need to understand food web dynamics that involve wildlife and natural vegetation as well as livestock and crops, and socio-economic dynamics that influence the actions of individual farmers and their communities. Many of these relationships are poorly understood, demanding carefully designed and conducted ecological and sociological studies before accurate policy recommendations can be promulgated. Human-wildlife conflicts also occur at the interface between natural and agricultural landscapes, thus are also inter-institutional. This demands collaboration among government agencies that often have contrasting and sometimes conflicting missions; for example, those promoting agriculture, livestock production, forestry, tourism, rural poverty alleviation, wildlife conservation, or parks and protected areas. Human-wildlife conflicts also are typically trans-boundary in nature and can require collaboration between different local jurisdictions and, in some cases, two or more countries.

In 2007, the Nature Conservation Division became the first government agency in Bhutan to take on these arduous challenges to address human-wildlife conflicts in Bhutan by initiating a process to develop a national strategy in a collaborative, realistic, and comprehensive manner. Such a plan based on available knowledge must be developed if human welfare and conservation are to remain compatible into the future in Bhutan. This plan must design and implement short-term strategies to immediately mitigate human-wildlife conflicts, and identify a longer-term research agenda to better understand the complexities of these conflicts. Therefore, it was crucial to initiate work towards an agreed upon strategy concentrated on major issues, involving all relevant sectors and stakeholders directly or indirectly linked to these issues. The next section outlines this process.

## **BUILDING A NATIONAL STRATEGY**

### **Initiation**

The Ministry of Agriculture and the Department of Forests have long realized the growing urgency of human-wildlife conflicts in Bhutan. In fact, they have implemented many individual programs to mitigate specific problems. However, they also recognized that a comprehensive plan based on available knowledge must be designed if conservation is to succeed in the long run. The 2007 Renewable Natural Resource Conference also saw this

as a significant issue and directed the Department of Forests to design a set of concrete, national level strategies to address conflict issues for the Royal Government's 10FYP (2008 – 2013). Accordingly, the Nature Conservation Division took the initiative to draft such a strategy document by August, 2008.

Hence, during the spring of 2007, conversations were initiated within the Nature Conservation Division to design a process to develop this National Strategy. Prior research, as discussed earlier, had identified the urgency to address the growing severity of conflicts involving wildlife and Bhutanese farmers. The goal was direct and deceptively simple: to develop a comprehensive national level strategy to address human-wildlife conflicts, which will simultaneously reduce poverty and facilitate conservation. However, the failure of other nations to successfully halt wildlife damage to rural livelihoods indicated that the problems were in reality very complex and difficult. It was recognized that a comprehensive strategy with short- and long-term goals had to evolve through meaningful involvement of multi-stakeholders with different perspectives on the problems. In the past, conservation and human-wildlife conflict issues were discussed only for protected areas, without considering that similar problems existed outside parks and that forestry professionals responsible for the management of these areas faced the same challenges and could make significant contributions to conservation. Hence, wider involvement was warranted. It also was recognized that this plan would define the conservation agenda for the next five years owing to the severity of the human-wildlife conflicts Bhutan faces.

### **Stakeholder Planning Workshop**

In order to work towards these objectives in a collaborative manner, a *Stakeholder Meeting on Addressing Human-Wildlife Conflicts* was organized by the Nature Conservation Division and held on 10-11 July 2007 in Thimphu. The meeting, funded by World Wildlife Fund (WWF) Bhutan, brought together forestry professionals from districts and protected areas throughout the country, along with other stakeholders from agriculture, livestock, and research sectors to meet on a common platform to better understand and deliberate issues and challenges facing conservation vis-à-vis human-wildlife conflicts in Bhutan.

On day one, 66 participants attended the meeting and 45 people took part on day two. Participants included Forest Officers from the 20 Dzongkhags; Chief Forest Officers from the Divisional Forest Offices, Protected Areas, and Functional Divisions under the

Department of Forests; representatives from the Department of Agriculture, Department of Livestock, Council of Renewable Natural Resources (RNR) Research; non-governmental organizations; and donor organizations.

The meeting accomplished three major objectives critical to the eventual design of a successful strategy to resolve human-wildlife conflicts in Bhutan. (1) For the first time, it brought together all stakeholders to discuss these conflicts and to build a common appreciation for the scope of the problems involved. (2) It provided an opportunity to share experiences on conservation inside protected areas, discuss the potential for conservation outside protected areas, and develop a common understanding of the Forest and Nature Conservation Rules 2006 and their implementation. (3) A well-experienced Core Planning Group of professionals was formed and took charge of working for the National Strategy Development Workshop for December 2007, focused on designing a conservation strategy to address human-wildlife conflicts to be part of the Department of Forests' 10FYP (2008 – 2013).

The proceedings from the July 2007 *Stakeholder Meeting* can be viewed at: <http://www.moa.gov.bt/moa/downloads/downloads.php> under Department of Forest.

### **National Strategy Workshop**

During the fall of 2007, the Core Planning Group met three times to organize an international workshop to provide an integrated and comprehensive examination of Bhutan's human-wildlife conflicts. Approximately 80 national and international experts (for list of participants refer to Annex 1) joined to exchange points of views and strategic ideas to identify practical ways for resolving these issues at the *National Strategy Development Workshop to Address Human-Wildlife Conflicts in Bhutan*, organized by Nature Conservation Division from 5 – 9 December 2007 in Paro. In a joint effort, a network of forestry professionals from the central and field offices throughout Bhutan, together with other stakeholders from agriculture, livestock, research, policy, and planning sectors; financial institutions; civil society organizations; and other departments and ministries came together to develop a comprehensive national strategy to address human-wildlife conflicts. Significantly, workshop participants also included farmers and community leaders who experience wildlife conflicts firsthand. WWF Bhutan, Bhutan Trust Fund for Environmental Conservation, and the United Nations Development Programme Bhutan provided financial assistance for the workshop.



During the first two days, many participants made brief presentations on problem species to share issues, concerns, and lessons learned. The remaining three days were dedicated to focal group discussions, followed by plenary sessions where all participants contributed to initial ideas arising from the focal groups. Participants were divided into three main human-wildlife Conflict Groups according to their expertise and interest and then split into the seven Sub-Groups to examine Focal Species: (1) Human-Carnivore Group (Focal Species: large cats, bears, dholes), (2) Human-Ungulate and Primate Group (Focal Species: wild pigs, deer, primates), and (3) Human-Elephant Group (Focal Species: elephants).

Situation analyses were conducted for each Focal Group. Each included (1) a Conflict Analysis, where the following questions were addressed: What kinds of problems exist? What causes these problems? (2) Conflict Resolution discussions were carried out resolving: How to address the problems? (i.e., solutions were elaborated within Focal Species Sub-Groups) (3) Situation analyses were used to examine strengths, weaknesses, opportunities, and threats (SWOT) (Mind Tools, 2008) for each Focal Group. For each Focal Species, this information was then used to design specific goals, objectives, strategies, and action plans for the next five years (2008 – 2013).



Photo: Elizabeth Fox

Participants at the National Strategy Development workshop in Paro

Some issues needing to be addressed were not species-dependent. In order to examine such cross-cutting issues strategies and action plans were developed to (1) protect crops and livestock, (2) compensate losses, (3) develop crop/livestock insurance schemes, (4) offer suggestions for alternative livelihoods to offset losses, and (5) to educate and create awareness programs for wildlife conservation and human-wildlife conflicts.

### **National Strategy Document**

The workshop results and outcomes have been compiled into proceedings and developed into this *Bhutan National Human-Wildlife Conflicts Management Strategy* for inclusion into the Royal Government's 10<sup>th</sup> Five-Year Plan (2008 - 2013). This strategy document is organized into seven chapters. Chapter 2 presents crosscutting themes that involve all Focal Species with the human dimension aspect to address the issues of crop damage and livestock depredation by all Focal Species. These cross-cutting themes have been grouped into three components; integrated conservation and development programs, environmental education and ecotourism. And for each component, specific goals, objectives and strategies with detailed action plans have been presented.

The next five chapters present findings from the workshop as organized around the seven Focal Species: Chapter 3: Resolving Human-Carnivore Conflicts (includes large cats, bears, and dholes); Chapter 4: Resolving Human-Wild Pig Conflicts; Chapter 5: Resolving Human-Ungulate Conflicts; Chapter 6: Resolving Human-Elephant Conflicts; and Chapter 7: Resolving Human-Primate Conflicts. For each, first a situation analysis is presented followed by SWOT analysis. Then actions plans with goals, objectives, and strategies to address specific issues have been developed. Detailed action plans for each strategy has been presented providing recommendations to immediately mitigate certain problems and to conduct priority research to better understand problems and their solutions over the long-term. The last chapter (Chapter 8) provides guiding mechanisms to implement the strategy.

### **The Future**

This National Strategy is a 'living document' since the dynamic nature of human-wildlife conflicts demands over-sight, assessment, and flexibility. During the next five years it is fully expected that new conflicts will arise and new insights into the problems will develop. Following principles of adaptive management (Berkes *et al.*, 1991; Lee, 1999), the Ministry of Agriculture provides annual reviews and reassessments of priorities. A multiple

stakeholder advisory committee will be established to assist the Department of Forests' Nature Conservation Division to carry out and modify as necessary the action plans identified in this document.

## CONCLUSION

This is an ambitious and unprecedented document, *Bhutan National Human-Wildlife Conflicts Management Strategy* that is focused on human welfare and poverty alleviation. Unfortunately, many conservation initiatives worldwide have been at the cost of rural livelihoods, a pattern that must be changed if people and nature ever hope to exist in harmony. The Royal Government of Bhutan accepted this challenge and has designed a comprehensive plan building on His Majesty's vision for the people of Bhutan and the country's rich natural heritage. Through a critical examination involving multiple stakeholders, a concrete strategy to understand and mitigate human-wildlife conflicts in Bhutan was developed. This provides not only a critical guide for action by managers, researchers, and communities in Bhutan, but also serves as a model for action to the worldwide conservation community. It also sets the conservation research and development agenda for Bhutan making assistance from outside researchers and funding organizations easier to prioritize. This National Strategy will most certainly work towards alleviating poverty and improving livelihoods for rural Bhutanese while protecting the mega-fauna that characterize this Kingdom. Moreover, it should provide inspiration and a model to design comprehensive strategies to resolve human-wildlife conflicts elsewhere, thereby further enhance Bhutan's leadership role in conservation worldwide (Roder, 2002).

# Chapter 2

## CROSS-CUTTING THEMES FOR ALL HUMAN-WILDLIFE CONFLICT SPECIES

ENHANCING PEOPLE'S LIVELIHOODS THROUGH LINKING CONSERVATION WITH POVERTY ALLEVIATION



Photos: ICS, MoA, Dr. Sangay Wangchuk, S. Choden

## A. SITUATIONAL ANALYSIS

Although the primary mandate of protected areas is nature conservation, government policy in Bhutan permits local communities living in the protected areas to continue to live there (NCD 2003). The local communities have rights to use the natural resources in protected areas in line with the Forest and Nature Conservation Act and Rules. The majority of the people living in and around the protected areas are farmers and their main sources of livelihood are from agriculture and livestock (Wang, 2004). They depend both directly and indirectly on natural resources in the protected areas for food (non-wood forest products), livestock grazing, fodder, timber, firewood, medicine, and several other purposes (Wang, 2004).

Therefore, there is a need to balance conservation with sustainable resource use and economic development of the local communities (NCD 2003). It is important to integrate conservation with the needs of the people through participatory approaches and programs. This will help address conservation threats and issues, including human-wildlife conflicts in a holistic manner and contribute towards enhancement of local livelihoods. One of the strategic principles for protected areas management in Bhutan is to integrate conservation with development (NCD 2003).

Using this type of approach is also important for addressing human-wildlife conflicts such as damage to crops and properties by wild herbivores and livestock depredation by carnivores. Based on the outcomes of the *National Human-Wildlife Conflict Strategy Development Workshop* organized by NCD in December 2007, this chapter outlines an integrated strategic approach to address human-wildlife conflicts in the country by linking conservation with development.

## B. ACTION PLANS

The integrated strategic approaches to address human-wildlife conflicts have been grouped under three components:

- 1) Integrated Conservation and Development Programs (ICDP)
- 2) Environmental Education
- 3) Ecotourism

## COMPONENT 1: INTEGRATED CONSERVATION AND DEVELOPMENT PROGRAM (ICDP)

ICDPs attempt to integrate the conservation of natural eco-systems with the socio-economic development of local communities. This can be achieved by improving the livelihood opportunities of local communities through better access to basic facilities and services such as health, education, or through RNR Extension and allowing sustainable use of natural resources (NCD 2003). There are potential areas for conflict within these objectives, whereby development interventions that change the way natural resources are used may lead to negative impacts on biodiversity. Livestock intensification, for instance, could result in overgrazing, loss of plant species diversity, and deterioration of wildlife habitat. Thus, ICDP projects should be designed to manage or avoid conflict situations before they arise.

The ICDP strategies here are designed to assist the local communities to empower themselves to be self sufficient in the long-term, while at the same time to offset some of the losses occurred through crop and livestock damages by wildlife.

**Goal:** *To achieve biodiversity conservation through integration of sustainable natural resource use and providing socio-economic benefits to the dependent communities.*

### **Objective 1: Reduce and mitigate crop damage by wild animals**

**Strategy:** Enhance crop protection measures through fencing, alternative crop cultivation, use of audio-visual deterrents, and planting of buffer species.

#### **Methods:**

- 1) Pilot live fencing at low elevations (*Agaves* and *Cactus spp.*) and at high elevations (*Rosa* and *Berberna spp.*).
- 2) Use solar and electric fencing in high damage areas.
- 3) Support and subsidize fencing materials.
- 4) Carry out fencing with trenching wherever possible. Fencing could be live fencing, stonewall (where there are more stones), and barbed wire fencing.
- 5) Alternate crop cultivation using different crops.
- 6) Planting of buffer species or prevent monoculture plantation at the buffer of the agriculture fields to ward off primates.
- 7) Pilot mechanized devices to deter wild animals-use of techniques such as ultrasonic

noise, lights, dummies, and predator scents.

- 8) Develop forest enrichment plantations to provide food sources for wildlife and deter them from coming to villages/settlements.

**Expected results:** Reduction of crop depredation by wildlife.

**Indicator:**

- 1) Fenced areas within the pilot areas,
- 2) non-palatable species planted in the buffer areas,
- 3) mechanized devices piloted and
- 4) forest enrichment plantations developed.

**Implementers:** NCD, DoF, Dzongkhag Administration, and local communities.

**Time frame:** Years 1-5

**Objective 2: Reduce crop damage through agriculture intensification**

**Strategy:** Intensify the present agricultural land through enhanced production and improvement of agricultural practices in conflict hotspots.

**Methods:**

- 1) Supply improved cereal seeds such as maize, paddy, wheat etc.
- 2) Supply improved high value vegetable seeds such as asparagus, carrots, garlic, onion etc.
- 3) Promote organic farming and marketing to sell farm products.
- 4) Swap land where possible to avoid habitat fragmentation and provide arable lands near the settlements instead of in remote areas.
- 5) Consolidate production areas of particular crops.
- 6) Construction and/or renovation of irrigation channel(s).
- 7) Supply tractors at subsidized rates where feasible.

**Expected results:** Agriculture intensified; increase in forest cover in the abandoned fields in distant locations; and improved access to irrigated water.

**Indicator:** Optimum use of agriculture land in and around the villages/settlements.

**Implementers:** NCD/DoF, Dzongkhags, and local communities.

**Time frame:** Years 1-5

**Objective 3: Reduce predation by large carnivores through livestock intensification to reduce local cattle population and control resource competition between domestic cattle and wild ungulates in the forests**

**Strategy:** Intensify livestock productions in human-carnivore conflict hotspot areas through improved livestock breed and management.

**Methods:**

- 1) Supply of Jersey and Brown-Swiss breeding bull in exchange for unproductive local cattle breeds.
- 2) Encourage rearing improved breeds of cattle through training and education.
- 3) Support improved pasture development with fodder management.
- 4) Promote construction of proper sheds for livestock.
- 5) Improve herding practices to reduce livestock predation.
- 6) Provide cattle exchange programs.
- 7) Provide loans to buy improved breeds.

**Expected results:** Reduce local cattle breed numbers and discontinue cattle migration into the forests and increase the number of wild prey for large carnivores.

**Indicator:** An increase in additional young calves of improved cattle breed, construction of cattle sheds, utilization of improved pastures, and a reduction in livestock lost to large carnivores.

**Implementers:** NCD, DoF and communities

**Time frame:** Years 1-5

**Objective 4: To promote alternative income generating activities to offset losses from crop and livestock damaged by wildlife**

**Strategy:** Enable local communities to explore alternative revenue generating opportunities through better marketing of farm produce in conflict hot spot areas.

**Methods:**

- 1) Promote high value horticultural and vegetable crops.
- 2) Promote livestock backyard farming such as piggery, poultry, aquaculture, apiary.
- 3) Market the various farm products through provision of marketing vans to sell their produce, set up selling sheds along highways, and form co-operatives.

**Expected results:** Higher rate of income generation.

**Indicator:** Sale of agricultural and dairy products.

**Implementers:** NCD/DoF, Dzongkhags, and communities.

**Time frame:** Years 1-5



### **Objective 5: Initiate crop and livestock insurance scheme to protect crops and livestock from wildlife damages**

**Strategy:** Crop and livestock insurance schemes could be developed involving financial contributions from the Royal Government, local communities and external agencies, ultimately aimed at community self sufficiency over a period of time.

**Methods:**

- 1) Initiate dialogue with relevant financial institutions such as RICB, BDFC, and the Ministry of Finance about the need to develop crop and livestock insurance schemes.
- 2) Form a team (consisting of relevant sectors from MoA and financial institutions).
- 3) Draw terms of reference for the team and prepare a draft insurance proposal based on existing insurance schemes offered by RICBL and BDFC and similar schemes in other countries such as India, Africa, and others.
- 4) Draw up guidelines to verify insurance claims (simple, realistic, and serviceable by local community).
- 5) Allow contributions from local as well as external sources.
- 6) Present the insurance proposal to the stakeholders and donors.
- 7) Seek government endorsement and approval.
- 8) Introduce the new schemes to coincide with important events and disseminate through media (television, radio, internet, newspapers, Dzongkhag, and field offices).
- 9) Implement the schemes.
- 10) Monitor and evaluate the success and failures.

**Expected results:** Crop and Livestock insurance scheme developed

**Indicator:** Communities compensated for wildlife damages to crops and livestock.

**Implementers:** Financial Institutions, MoA (Forestry, Livestock and Agriculture), and local communities.

**Time frame:** Years 1-5

### **Objective 6: Sustainable utilization of Non-Wood Forest Products to enhance local livelihoods**

**Strategy:** Enable communities to reap the benefits from sustainable utilization and management of Non-Wood Forest Products (NWFP) in their areas.

**Methods:**

- 1) Conduct inventory and feasibility study on the sustainable harvesting of non-wood forest products (mushrooms and other edible wild plants).

- 2) Develop sustainable harvesting and management techniques for selected NWFP.
- 3) Develop guidelines and disseminate technologies and train local communities.
- 4) Promote cane and bamboo management.
- 5) Integrate sustainable utilization and management of NWFP with Community Forestry.

**Expected results:** Report on non-wood forest products.

**Indicator:** Data collected through field surveys.

**Implementers:** DoF, CoRRB, Dzongkhags, and local communities.

**Time frame:** Years 1-5

### **Objective 7: To control human-wildlife conflicts and poaching of wildlife through formation of patrol guards**

**Strategy:** Identify human-wildlife conflict hotspots and poaching hotspot areas for patrolling and anti-poaching purposes involving local communities.

**Methods:**

- 1) Identify human-wildlife conflict and poaching hot spot areas.
- 2) Identify rich habitat sites.
- 3) Identify corridors where wild animal enter and cause damages.
- 4) Form anti-poaching squads involving community communities and organize regular patrols.

**Expected results:** Patrol teams formed

**Indicator:** Number of patrol teams formed and involvement of team to identify hotspot areas.

**Implementers:** DoF and local communities

**Time frame:** Years 1-5

### **Objective 8: Conduct detailed socio-economic surveys related to human-wildlife conflicts to be used as baseline data**

**Strategy:** Select sites of specific human-wildlife conflicts. Undertake detailed socio-economic surveys with particular reference to specific problem species and document results to use as future baseline data.

**Methods:**

- 1) Design questions involving other agencies (livestock, agriculture, etc.).
- 2) Form multidisciplinary teams.
- 3) Initiate data collection in the villages.

4) Document results and share findings with other relevant agencies.

**Expected results:** Socio-economic survey undertaken

**Indicator:** Report produced

**Implementers:** DoF (NCD, Parks, and Territorial Division)

**Time frame:** Years 1-5

## COMPONENT 2: ENVIRONMENTAL EDUCATION

Environmental education forms an important component of protected areas management in Bhutan. In order to address human-wildlife conflicts, environmental education is a significant link bridging the gap needed to understand the issues and implement solutions. Environmental education needs to be integrated into all programs and projects designed to address human-wildlife conflicts. In order to address human-wildlife conflicts, Bhutanese people should first understand the importance of wildlife conservation, the role of predators and prey in ecosystems, and the causes for human-wildlife conflicts. Only then can a holistic approach be found to address the problems. Environmental education plays a key role in finding a balance between the needs of humans and wildlife.

**Goal:** *To educate Bhutanese people at all levels about the importance for wildlife conservation to maintain the ecological balance and ways to reduce human-wildlife conflicts.*

**Objective 1:** Educate local communities about Bhutan’s wildlife heritage and the nature of human-wildlife conflicts, the ways in which such conflicts can be prevented or lessened, and the necessity to develop conservation programs for the unique wildlife heritage of Bhutan

**Strategy 1:** Educate students and local communities on wildlife heritage and human-wildlife conflicts.

**Methods:**

- 1) Organize education and awareness programs for the local communities.
- 2) Develop public education protocols to impart knowledge about problem species.
- 3) Initiate intense education and awareness programs in model sites and in the human-wildlife conflict areas.
- 4) Educate local communities and the public about the Government’s rules and regulations for wildlife conservation and illegal poaching.

**Expected results:** Increased levels of awareness and knowledge to reduce human-wildlife

conflicts.

**Indicator:** People's participation in awareness programs.

**Implementers:** NCD, Park, Territorial division

**Time frame:** Years 1-5

**Strategy 2:** Develop educational resources on human-wildlife conflicts.

**Methods:**

- 1) Develop educational material about problem species for distribution to local people.
- 2) Develop a toolbox of low cost human-wildlife conflict mitigation methods in the form of guide book and/or handbook to be utilized by the affected farmers.
- 3) Issue alert notifications during wildlife migration, mating, and hibernation seasons so to reduce attacks on humans.

**Expected results:** Development of educational materials

**Indicator:** Educational materials are being processed

**Implementers:** NCD and Park

**Time frame:** Years 1-5

**Strategy 3:** Develop capacity of staff and stakeholders on the use of education resources and human-wildlife conflicts mitigation methods.

**Methods:**

- 1) Train field staff and local communities by demonstrating the use of mitigation methods and tools at the pilot sites.
- 2) Organize a training program for field staff and stakeholders on the management of human-wildlife conflicts and mitigation measures as well as on the use of educational resources.
- 3) Organize exchange programs between field staff and local communities from different parts of the country who face issues related to human-wildlife conflicts in order to share knowledge, information, and experiences about dealing with conflicts.
- 4) Organize field trips and study tours both within and outside Bhutan to visit successful human-wildlife conflict management sites to learn about the strategies and mitigation measures used.

**Expected results:** Training (in and out of country) conducted for field staff on the use of educational awareness materials.

**Indicator:** Participation in the training by staff from park and territorial divisions.

**Implementers:** NCD, Park, and Territorial division

**Time frame:** Years 1-2

**Strategy 4:** Conduct research on public attitudes towards wildlife and human-wildlife conflicts.

**Methods:**

- 1) Document human-wildlife conflict mitigation initiatives in Bhutan and assess what was successful and what failed and how can these be improved.
- 2) Conduct a literature review of human-wildlife conflict mitigation initiatives in the region, lessons learned, and recommendations for Bhutan.
- 3) Study public attitudes towards human-wildlife conflict species in order to understand peoples' perceptions, attitudes, beliefs, and values of communities affected by human-wildlife conflicts.
- 4) Monitor and evaluate the education and awareness programs initiated and mitigation measures adopted at the pilot sites and/or conflict areas.

**Expected results:** Study report in place for public attitude towards human-wildlife conflicts.

**Indicator:** Field data collection in progress

**Implementers:** NCD, Park, and Territorial division

**Time frame:** Years 1-5

### COMPONENT 3: ECOTOURISM

Bhutan's unique location in the Eastern Himalayas has blessed the country with rich biological resources. Bhutan's biological wealth consists of more than 7,000 species of vascular plants, 200 species of mammals, 770 species of birds, 50 species of butterflies, 46 species of rhododendrons, 300 species of medicinal and aromatic plants, and many other species, which remain undocumented (MoA, 2002, Nature Conservation Division 2003, Wangchuk *et al.*, 2004).

The rich biological wealth and unique culture of the Bhutanese people makes Bhutan an ideal destination for tourists. However, at the moment the majority of tourists who visit Bhutan are cultural tourists, while only a few visit for trekking. In 2007, out of the 21,094 tourists who visited Bhutan, 20,191 (96%) were cultural tourists and only 843.76 (4%) were trekkers (Tourism Council of Bhutan, 2008). A huge potential for ecotourism

exists in Bhutan, but, to date, it has not been realized. Therefore, there is a need to promote ecotourism especially in protected areas so that local communities could benefit directly from conservation. Promoting ecotourism in the areas prone to human-wildlife conflicts would also help to offset the losses incurred by local communities as a result of crop and livestock damages by wildlife. The promotion of ecotourism as alternative sources of income in conflict areas would assist in gaining support for wildlife conservation, while also reducing human-wildlife conflicts.

**Goal:** *To enhance the livelihoods of local communities in the human-wildlife conflict areas through ecotourism as an alternative source income to compensate for crop and livestock loss to wildlife.*

**Objectives 1: Identify human-wildlife conflict hotspot areas and to develop ecotourism programs to enhance livelihoods of local communities in these areas**

**Strategy 1:** Conduct feasibility study on new tourism ventures in the pilot project sites to enhance rural livelihoods.

**Methods:**

- 1) Map human-wildlife conflicts hotspot areas.
- 2) Consultative meetings with the communities and determination of their perceptions.
- 3) Collection of tourism attributes including cultural, social, and natural aspects.
- 4) Participatory appraisal and prioritization of income generating options.
- 5) Participatory community-based planning with detailed action plans to adopt APPA exercises.

**Expected results:** A feasibility study report with detailed implementation plan.

**Indicator:** Data collection in the field

**Implementers:** NCD, Park, Territorial division, TCB, ABTO, and communities.

**Time frame:** Years 1-2

**Strategy 2:** Promotion of ecotourism in human-wildlife conflict hotspot areas to enhance rural livelihoods.

**Methods:**

- 1) Consultative meetings with communities to implement tourism strategies.
- 2) Form Village Tourism Management Committee (VTMC), Village Development Fund (VDF) entrusted with responsibilities based on the implementation plan.

- 3) Impart trainings for cooks, local guides, and accountants as well as for garbage/waste disposal personnel.
- 4) Establish activities such as basic campsite amenities, trail improvements, signage, information/education booths, waste and garbage handling facilities, and other infrastructure as identified.
- 5) Monitoring and evaluation of project sites by collaborative project partners.

**Expected results:** Establish campsites and basic amenities for tourists.

**Indicator:** Local people involved in project development and implementation.

**Implementers:** NCD, Park, Territorial division, TCB, ABTO, and communities.

**Time frame:** Years 1-4

**Strategy 3.** On a pilot basis, promote ecotourism in areas abundant with wild pigs by initiating regulated hunting by tourists to control wild pig population.

**Methods:**

- 1) Identify three pilot sites experiencing major wild pig damage and abundance.
- 2) Conduct feasibility studies and participatory planning sessions with local communities to develop ecotourism packages in collaboration with the Tourism Council of Bhutan (TCB) and Association of Bhutanese Tour Operators (ABTO).
- 3) Develop guidelines and modalities on regulated wild pig hunting (permit fees, number of tourists permissible per season in a given area, hunting weapons, maximum allowed numbers of wild pigs to be hunted, price for wild pig meat, and other issues as identified).
- 4) Develop guidelines and modalities for ecotourism packages and protocols for sharing benefits among local communities, tour operators, and the Government.
- 5) Market and implement the program.
- 6) Close supervision and monitoring of the program.
- 7) Assess lessons learned, modify guidelines as needed, and scale-up as appropriate.

**Expected results:** Identify feasible hunting spots for wild pigs as a new tourism enterprise.

**Indicator:** Engagement of the community in this activity and its use by tourists.

**Implementers:** NCD, Park, Territorial division, TCB, ABTO, and pilot communities.

**Time frame:** Years 1-3

**Objective 2: Capacity development for the community and other stakeholders**

**Strategy:** Capacity building for the field staff and the communities of the project area.

**Methods:**

- 1) Organize exchange programs between field staff and local communities from different parts of the country to share knowledge, information, and experiences in the management of community-based tourism.
- 2) Develop a formal mechanism to carry out learning exchanges with countries and partners in the region to share experiences and lessons learned.

**Expected results:** Participants have attended study visits and have attained adequate knowledge.

**Indicator:** Participants being processed to undergo the study visits.

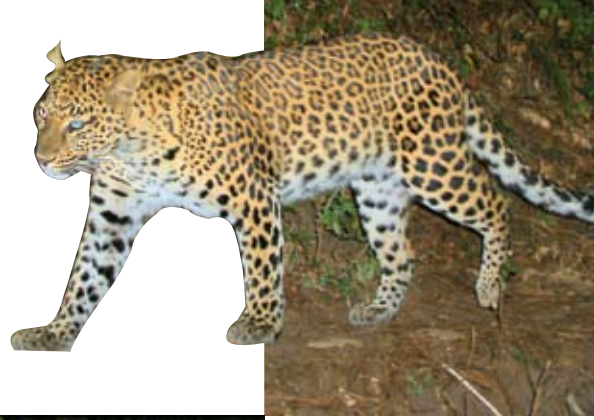
**Implementers:** NCD, Park, Territorial division, TCB, ABTO, and communities.

**Time frame:** Years 1-3



# Chapter 3

## RESOLVING HUMAN-CARNIVORE CONFLICTS



RESOLVING HUMAN  
CARNIVORE

Photos: Dr. S. Wangyel Wang

## A. SITUATION ANALYSIS

### *Conflict Situation*

This chapter addresses mitigation measures for human-carnivore conflicts for the following species of carnivores in Bhutan: tiger (*Panthera tigris*), leopard (*Panthera pardus*), snow leopard (*Uncia uncia*), wild dog (*Cuon alpinus*), bears (*Ursus spp.*), and wolf (*Canis lupus*). These carnivores come in conflict with humans mainly through predation of livestock. Carnivore attacks on humans are almost unheard of in Bhutan. Occasionally, however, a bear mauling has been reported (Anon, 2003 a).

In Bhutan's subsistence agricultural systems, livestock are an important source of draught power, food, and supplemental cash income as well as means of transportation. Livestock are highly valued and expensive to purchase. The loss of a yak, cow, or mule to carnivore predation could be a devastating blow to a family (Wang and Macdonald, 2006). Retaliation killing of predators emerges as a major issue. For instance, wild dogs (dholes), prolific hunters of livestock, were almost eliminated from Bhutan due to retaliatory killings using poison in the late 1970s and early 1980s. Wolves are found in Bhutan, but only in the higher alpine areas, yet they are still not able to establish stable populations. Yak herders may tolerate snow leopards, but even transient wolf packs coming in over the passes from the Tibetan Plateau are either chased back or killed.

Poisoning of predators is indiscriminate and, although anecdotal evidence exists of tigers and leopards falling victim to poisoning, hard evidence is lacking. Still, the low density of tigers of 1/200 km<sup>2</sup> (Wang, 2008) is a cause for concern. Carnivore population viability is intricately linked to the herbivore prey density (including livestock). Free-range grazing of livestock in the forests may be displacing wild herbivores as natural prey for carnivores. A study by Wang (2008) concluded that natural prey density is low in tiger habitats, which are crowded with livestock. On the other hand, Wang (2008) reported that natural prey species clustered around human settlements, enter into direct conflict with humans through crop damage. Also, through carnivores, predators have an indirect impact on crop loss to herbivores. Healthy and balanced populations of predators and prey also result in lower depredation of livestock and crops by wildlife (Wang, 2008). There is an urgent need for management interventions targeted to enhance this natural balance.

### *Conflict Analysis*

- Livestock depredation impacts the people's livelihoods, resulting in retaliatory killing of carnivores. Livestock depredation also damages people's attitude towards conservation.
- Low wild prey density results in increased depredation of livestock and reduced food for carnivores.
- Spatial distribution of prey is higher near human settlements and results in bringing prey closer to settlements, thereby increases attacks on livestock.
- Potential threats to human life could result in fear and retaliatory killing of carnivores.
- Poaching for illegal trade maybe occurring in isolated areas.
- Population of predators is possibly too low for long-term viability.

### *Conflict Causes*

- Unattended free-ranging cattle without herders (especially for tiger depredation).
- Low wild prey densities and attack prey in the forests.
- Wild prey is out competed and displaced by livestock.
- Poor habitat quality.
- Predator avoidance: one reason villagers think prey is in and around villages is because prey avoids predators, which avoid villages.
- Illegal harvest of the prey.
- Bears compete with tigers and leopards for kills and they also damage habitats.
- Forest fires: burning results in fresh lemon grass, yielding more income. This is one reason that large areas are burnt; hence an imbalance exists.
- Habitat loss and fragmentation due to industrialization.
- A prevalence of wounded animals (e.g., from snares) could increase threat to human life.
- Many houses are being built close to the forests. This is possibly a reason why more cats predate on livestock.
- With the population growing, there are more people now than ever before, hence more cases of depredation.
- People's capacity of income generation increased more than ever, so there are now more livestock.

- Possible increase in the number of carnivores could be one of the reasons for increasing number of depredation cases.
- Number of livestock could have increased, resulting in increased cases of depredation.
- Numerous wild prey are found near settlements, therefore a selection of livestock by predators occurs in the forests because there is a dearth of wild prey in the forests.
- Migrating herders are also part of the problem.

### *Problems for humans*

- Livestock loss to carnivores causes food shortages and insecurity.
- Cattle and mostly horses are killed (horses are important for transport and other sources of income).
- Loans are taken from the Government to buy livestock. Mules cost Nu 40,000 - 50,000 per mule. There are problems if mules are killed within three years, causing owners to suffer huge losses.
- Domestic dogs (costing about Nu 1000) could be killed. They are resourceful for the protection of livestock from wildlife.
- Leopards are a threat to humans as they usually come close to settlements.
- Snow leopards can kill up to four to five calves in one attack.
- Depredation by other animals, such as wild dogs, is not considered under the compensation scheme.
- Cash compensation is not a long-term solution. Programs similar to ICDPs need to be implemented.

**Table 1:** SWOT for Mitigation of Human-Carnivore Conflicts

| Solution   | Strengths   | Weaknesses   | Opportunities   | Threats  |
|--|---|--|---|--|
| Herdsman watch livestock   | Reduced depredation levels  | - Increased cost/workload to owner<br>- May not reduce leopard depredation                       |   | Overall prey availability decreases if wild prey does not increase and will result in raids on villages by big cats. |
| Livestock corralled at night   | Reduced depredation levels  | Increased cost/workload to owner   |   | Overall prey availability decreases if wild prey do not increase   |
| Livestock use of forest restricted   | Reduced depredation levels  | - Decreased forage available to livestock<br>- May not reduce leopard depredation                |   | Overall prey availability decreased if wild prey do not increase   |
| Continue compensation scheme (include leopards and snow leopards).                               | Livestock owners compensated for losses and more tolerant of depredations       | - Program unsustainably expensive<br>- Can make livestock owners complacent about good husbandry | Link to education programs and provide incentives for good husbandry                        |  |
| Develop hazing techniques and preventative measures (e.g., electric fence around corrals)        | - To reduce depredation<br>- To Empower livestock owners to protect their stock | Expected success low to moderate   | Work with stock owners to develop simple, low-tech techniques that fit their specific needs |  |
| Develop insurance program  | Livestock owners compensated for losses and more tolerant of depredations       | Could make livestock owners complacent about good husbandry                                      | Link to education programs and provide incentives for good husbandry                        |  |
| Determine why prey densities are low (poor habitat, competition with livestock, illegal harvest) |   |  |   |  |
| Develop educational materials about how people should behave around big cats.                    | People learn how to protect themselves  |  |   |  |

|  |   |  |  |  |
|--|---|--|--|--|
| Conduct research to determine extent of poaching |   |  |  |  |
| Make tractors more available                     | <ul style="list-style-type: none"> <li>- Reduce number of bulls</li> <li>- Less manpower needed and more efficient</li> </ul> | <ul style="list-style-type: none"> <li>- Cannot be used in all terrain</li> <li>- Expensive</li> </ul>   | <ul style="list-style-type: none"> <li>- Increase subsidies</li> <li>- Increase income</li> </ul>  | Negative impact on native cattle species |
| Discourage predator poisoning                    | Increase carnivores quantity, especially wild dog (reduce pest species)   | Weak enforcement   | <ul style="list-style-type: none"> <li>- Education and awareness programs</li> <li>- Create rodent specific poison</li> </ul>                        | Increase livestock predation             |
| Improved cattle breeds                           | Reduce predation  | <ul style="list-style-type: none"> <li>- Expensive</li> <li>- Not hardy; vulnerable to accidents, diseases, etc.</li> </ul>                    | <ul style="list-style-type: none"> <li>- Need less manpower</li> <li>- Can be insured with RICB</li> </ul>   | Negative impact on native cattle species |
| Improved pasture management by villages          | Reduce grazing in deep forest   | <ul style="list-style-type: none"> <li>- Limited land holdings</li> <li>- Can support only few cattle</li> </ul>                               | <ul style="list-style-type: none"> <li>- Education</li> <li>- Technical backstopping</li> </ul>  | Agriculture land lost to pastures        |
| Expand compensation scheme                       | Protect farmer's income   | <ul style="list-style-type: none"> <li>- Discourages better livestock management</li> <li>- Not sustainable</li> <li>- False claims</li> </ul> | <ul style="list-style-type: none"> <li>- Education to encourage better livestock mgt.</li> <li>- Convert to insurance scheme in long term</li> </ul> | Dependency                               |
| Research on predator-prey dynamics               | Design better strategies to reduce conflicts  | <ul style="list-style-type: none"> <li>- No immediate results</li> <li>- Expensive</li> </ul>  | Help conservation of wild dogs (only 2,500 left in world)  | Does not address immediate problems      |
| Research on wild dog census and distribution     | Identify hotspots for conflicts or conservation   | <ul style="list-style-type: none"> <li>- No immediate results</li> <li>- Expensive</li> </ul>  | <ul style="list-style-type: none"> <li>- Knowledge of wild dog numbers in Bhutan</li> <li>- Identify good sites for programs and research</li> </ul> | Does not address immediate problems      |

## B. ACTION PLANS

**Goal:** *To maintain viable populations of large felids (tigers, leopards and snow leopards), canids (wild dog and wolves), and ursids (black bears) while minimizing conflicts with humans to alleviate human poverty.*

### **Objective 1: Reduce depredation levels in selected model sites by half within the next five years through appropriate management tools**

**Strategy 1:** Improve herd management to reduce vulnerability of livestock for predatory kills.

**Methods:** Meet with herders and farmers to discuss the extent and magnitude of kills and identify predation hotspots; persuade farmers to herd their livestock and avoid stray grazing especially deep within forests and in predation hotspots; implement better anti-predatory husbandry practices including predator-proof pens for livestock.

**Expected outcome:** An increase in the number of herders attending to grazing livestock; reduced presence of stray livestock deep in forests and predation hotspots.

**Indicator:** Reduced number of reported predatory kills

**Implementers:** NCD, DoL, and Dzongkhag

**Time Frame:** Years 1-5

**Strategy 2:** Implement phased reduction program for unproductive livestock.

**Methods:** Reduce the number of unproductive livestock either through direct purchase from farmers or in exchange for improved breeds; couple such initiatives with pasture development, fodder management, and the processing and marketing of dairy products to increase production and income.

**Expected outcome:** Population of unproductive livestock reduced and/or replaced by more productive breeds; increased pasture developed and number of farmers trained on pasture and fodder management, and increased dairy products with concurrent increases in income.

**Indicator:** Population of unproductive livestock reduced, well-managed pastures developed with fodder; increased dairy production and sale will lead to increased income.

**Implementers:** NCD, DoL and Dzogkhag

**Time Frame:** Years 1-5

## Objective 2: Develop sustainable mechanisms to offset depredation losses

**Strategy 1:** Secure funds to reactivate the currently stalled compensation program and pay compensation for livestock predation by tigers, leopards, and snow leopards.

### Methods:

*Secure funds:* NCD, DoF, and MoA must obtain funds either from international donors or from Bhutan Trust Fund for Environmental Conservation to activate and expand the present compensation program. While this is not the best method, we need to keep it going in the short-term.

*Protocol for the Assessment of Claims:* A rigorous verification mechanism was established by NCD and it will be used to identify and verify kills. The current protocol requires three types of evidence before a claim can be processed.

- 1) The community leader (Gup) or his/her representative must support the veracity of the claim. The first step also requires the collection of information about livestock holding facilities and the stock rearing systems.
- 2) A veterinarian confirms, by a post mortem examination to the carcass, that a predator killed the animal, as opposed to a natural death or scavenging after death.
- 3) A local forest or park staff member confirms the range of the predator claimed to have made the kill and cross checks the information against the known presence of the predator locally through various types of indirect evidence, such as scat tracks and other signs.

Once these three forms of documentary evidence are complete, a claim will be forwarded to the Divisional Forest Officer or Park Manager. This form of compensation has not received good support in most parts of the world due to the time required to process and pay compensations.

**Strategy 2:** Devolve the management of the current, centrally run compensation program to the communities themselves and introduce an insurance program.

**Methods:** Transfer the management of the current, centrally run compensation program onto communities, which are likely to be more effective than distant officials in the implementation. Then, to make the program sustainable it is proposed to gradually transform the community-based compensation programs into community-based insurance programs. This would be coupled with education to improve livestock management in order to reduce losses, as lax herding and inadequate guarding practices make livestock more vulnerable to



predation. This initiative will be carried out based on the following procedures:

- A community conservation committee (CCC) will be elected by the community and will be composed of a president, a treasurer, and a few members (number decided by the community).
- An official from either the territorial division or park will be an observing member of the CCC.
- The CCC, in collaboration with the conservation authority, will open and operate a bank account in the name of the community to serve as a repository for all available compensation grants. The account will be available for annual auditing.
- The CCC will work out herd valuation and herd registration system.
- The CCC will decide which losses are genuine and deserve compensation.
- The CCC will reward households with no losses as an example to others, but should not compensate for losses associated with poor herd management.
- Revenues generated from community-based conservation programs, such as eco-tourism and sale of non-timber forest products, will be deposited into the CCC bank account.

Once the community learns the mechanics to manage the compensation program, the following steps will be taken to work towards an insurance program:

- Invite farmers to insure their livestock with the CCC for a small premium (perhaps 10% of the value of livestock). The CCC will pay the remaining 90% of the premium from the compensation program funds. If no money is left in the compensation program, then the government and/or conservation agencies must match funds.
- The CCC will make an effort to increase the farmer's contribution of the premium from 5 to 10% annually and, similarly, decrease the CCC contribution.
- Ultimately, farmer contributions should reach maximum based on their paying capacity. The grant contribution at this point could be withdrawn, thus evolving the compensation program into a self-sustaining and potentially income-generating insurance program for the community.
- At this point, if the community is in favor, a commercial insurance company could be invited to take over the insurance program.

Subsequently, funds from grant sources (and any income generated by the insurance scheme) could be invested into conservation-related development programs in the community, such as the promotion of solar energy, education and training, and farmer study tours.

Carefully implemented, rigorously monitored, and adaptively managed, this plan may significantly increase rural support for wildlife conservation and protected areas in Bhutan, enabling conservation programs to succeed in maintaining Bhutan's rich biodiversity, including increasing tiger numbers in this critical landscape. If successful, it can serve as a model to implement in other situations where human-wildlife conflicts threaten to negate many gains being made in wildlife conservation.

**Objective 3: Determine and address the issues of illegal killing of carnivores, especially stop the poisoning of carnivore species to maintain and enhance their populations**

**Strategy:** To reduce illegal poaching and retaliatory killing of predators.

**Methods:** Intelligence gathering at country and trans-boundary levels about poaching, illegal trade routes, and markets; revise the penalties for killing of large cats and wild prey; develop an awareness program for various law-enforcing agencies to check poaching and illegal trade. Intensify anti-poaching vigilance and protection measures at the model sites and promote greater enforcement of the existing laws regarding poisoning.

**Expected outcome:** Intelligence network established to detect poaching and reduce retaliatory killings.

**Indicator:** Illegal killing of predators reduced

**Implementers:** NCD, Park, Territorial Divisions, RBA, RBP, and BAFRA

**Time Frame:** Years 1-5

**Objective 4: Understand the ecology of large carnivores (felids, canids, and ursids), their prey species and livestock, and monitor their abundances across biologically important areas and conflict hotspots**

**Strategy 1:** Understand the predator prey dynamics of carnivores, especially in reference to the wild and domestic prey.

**Methods:** Use occupancy surveys to account prey abundances; collection, identification, and analysis of fecal material; GPS collaring study to profile individual predator's behavior; conduct use versus availability analyses of carnivore diets for consumption of domestic versus wild prey; and monitor changes in diet profiles with changes in relative abundance of wild and domestic prey.

**Expected outcome:** Obtain diet profiles of large carnivores and quantify their dependence on livestock; understand the basic biology and resource use and requirements for large carnivores, as well as their relationships with wild prey and livestock.

**Indicator:** Scientific report detailing diet and niche partitioning

**Implementers:** NCD, Parks, Territorial Divisions, and DoL

**Time Frame:** Years 1-5

**Strategy 2:** Estimate population density, movement patterns, habitats, and spaces used by large cats, canids, and bears, which are also related to human and livestock distribution activities.

**Methods:** Implement camera trap study, GPS collaring study to monitor seasonal and annual movements, habitats, and spaces used by large carnivores; develop detailed GIS maps of habitats, large carnivores, wild prey, livestock, and human space use.

**Expected outcome:** Determine population densities and home ranges of large carnivores in Bhutan; assess impacts of large carnivore movements in relation to anthropogenic factors.

**Indicator:** Produce habitat preference maps for large carnivores; knowledge of home range sizes for large carnivores.

**Implementers:** NCD and DoF

**Time Frame:** Years 1-5

#### **Objective 5: Develop better understanding of the extent and spatial-temporal distribution of conflicts with carnivores in Bhutan**

**Strategy:** To understand human-carnivore conflicts on a spatial-temporal scale.

**Methods:** Document all conflict cases from the field with GPS coordinates, map these incidences and identify predation hotspots to understand predation dynamics on a spatial-temporal scale.

**Expected outcome:** Predation dynamics on a spatial-temporal scale understood to help reduce vulnerability predation on livestock.

**Indicator:** Predation dynamics at spatial-temporal scale

**Implementers:** NCD and DoF

**Time Frame:** Years 1-5

#### **Objective 6: Develop Conservation Programs for carnivore species to ensure their long-term survival**

**Strategy:** Develop conservation programs for tigers, leopards, dholes, and bears.

**Methods:** Based on available knowledge about carnivores and their interactions with humans, and knowledge gained from implementation of this strategy.

**Expected outcome:** Conservation programs developed.

**Indicator:** Conservation programs for carnivores

**Implementers:** NCD and DoF

**Time Frame:** Years 1-2

# Chapter 4

## RESOLVING HUMAN-WILD PIG CONFLICTS



RESOLVING HUMAN-  
WILD PIG

Photos: S. Choden, Dr. S. Wangyel Wang, Royal Manas National Park

## A. SITUATION ANALYSIS

### *Conflict Situation*

In Bhutan, the wild pig (*Sus scrofa*) is often described as farmer's "enemy number one." An entire chapter has been devoted to human-wild pig conflict management due to its significance to farming in Bhutan. Farmers all over Bhutan lose crops to wild pigs, some as high as 18% or more of their annual staple crops, thereby causing huge impacts on food security. A survey in 2007 revealed crop loss to wildlife was cited as the second highest reason for farmers to face food shortages during the year.

In some areas of Bhutan, due to crop loss to wild pigs, farmers have given up agriculture altogether and moved to urban areas in search of alternative livelihoods. Farming in Bhutan is carried out at a small scale, subsistence level, so there is little margin for error, and wild pigs can greatly compromise this already difficult production system. For instance the guarding of field crops can require 14 to 59 nights per year (NRTI, 1996), impacting farmers lifestyles, livelihoods, and productivity.

The wild pigs emerged as a problem in the early 1980s and this has been an important issue from the start of the 5<sup>th</sup> Five-Year Plan period (1982 - 1987). While several reasons explain the wild pig population explosion, the most scientifically rigorous explanation is the loss of predators, especially the wild dog (*Cuon alpinus*). Poisoning in the late 1970s and early 1980s, after rat poison was distributed to farmers, decimated wild dog populations. Field studies show that wild dogs have a significant impact on the presence of wild pigs (Wangchuk, 2004). In large enough packs, wild dogs are effective hunters of wild pigs, and their populations are now slowly coming back as farmers become more aware of this relationship. However, a certain threshold in pack size (between 10 to 15) is required before they can have any significant impact on wild pig populations.

### *Conflict Analysis*

- The wild pig is a national problem, but specific population distributions and abundances are not known.
- Problems are severe, especially in areas where potato, maize, and paddy are grown.
- Crop damages by wild pigs occur more severely during the years when food availability in the forest is limited.
- Wild pigs also attack humans.

### *Conflict Causes*

- Lack of predators (e.g., wild dogs and tigers).
- Restriction of forest fires around agricultural fields.
- Limited food available in the forests, especially nuts and root crops.
- Competition with humans for edible wild and forest food.
- Local hunters are becoming less popular or not available.
- Ecology or habitat disturbance due to competition with livestock grazing.
- Short breeding cycle and high fecundity.
- Strict forest rules (e.g., prohibition on hunting, killing, and trapping) and loss of people's skilled practices to cull pigs by traditional methods.
- Loss of manpower required to guard crops.
- Ordinary fences are not effective, so more costly protection measures are needed.

### *How to address the conflict*

- Allow wild pigs to return to the forest (i.e., reduce competition with livestock; medium to long-term research needed).
- Population control (e.g., culling in hot spot areas, contraceptive control, etc.).
- Create clean buffer zones between the forest and agriculture fields.
- Allow free culling within farm lands and consider 'kill-zones' up to a distance of 500 m.
- Provide subsidy for fencing materials.
- Compensate total loss of crops (e.g. with food grains, seeds, etc.).
- Provide technical assistance for culling and other treatments.
- Establish community volunteers to monitor fields at critical periods during the growing seasons.
- Allow interested people to hunt under licenses and permission.
- Promote predators numbers especially wild dogs.
- Awareness and training for farmers.
- Create a Wild Pig Response Team.
- On farm adaptive research.

**Table 2:** SWOT for Mitigation of Human-Wild Pig Conflicts

| Solution  | Strengths                                | Weaknesses  | Opportunities                                     | Threats                                |
|---|--|---|---|--|
| Compensate total loss of crops (e.g., food grains, seeds, etc.)         | Farmers food security guaranteed         | - May not be sustainable financially<br>- May make farmers idle | Increased food security for the poorest           | Creates precedence for other subsidies |
| Provide technical assistance for culling, trapping, and snaring         | Enhance farmers knowledge                | Increase expectation  | Enable farmers to manage human-wildlife conflicts | Financial sustainability and manpower  |
| Wild Pig Response Team  | Strengthen management practices          | Effective communication facilities                              | Reduce conflict                                   | None                                   |
| Awareness and training farmers on improved snaring and trapping methods | Better management of conflict            | Slow, time consuming, and costly                                | Capacity building with new ideas                  | None                                   |
| On farm adaptive research   | Improved methodology of wild pig control | Time consuming and costly                                       | Better understanding of wild pig ecology          | None                                   |

## B. ACTION PLANS

**Goal:** *To manage wild pig populations below economic injury levels, so that wild pigs and Bhutanese farmers co-exist in harmony.*

**Objective 1 (immediate):** Reduce crop losses from wild pigs and lessen socio-economic burdens on farmers.

**Strategy 1:** Develop a wild pig response team in the geog with members from the RNR sector, GYT, and the community.

**Methods:** As soon as the wild pig report is received, the team should immediately visit the affected area to assess the situation, and provide feedback and information to the relevant authorities for further action. The team needs to have access to appropriate equipment (e.g., guns).

**Expected outcome:** Reduced wild pig damage and affected farmers assisted with appropriate

measure.

**Indicator:** Farmers pleased with the Government's support and reductions in the frequency of complaints.

**Implementers:** Led by geog response team in collaboration with the Forestry sector of affected geog.

**Time Frame:** Years 1-5

**Strategy 2:** Allow trees and forest undergrowth to be cleared around agricultural fields.

**Methods:** Cut bushes and forest cover manually as far as possible; avoid using fire

**Expected outcome:** Reduced wild pig habitats around agricultural fields and reduced frequency of wild pig damage to crops.

**Indicator:** Wild pig habitats around agricultural fields should be reduced by 50%.

**Implementers:** Local community collaborating with GYT members.

**Time Frame:** Years 1-5

**Estimated cost:** No budget implication

**Strategy 3:** Permit local licensed hunters to control wild pig populations and legalize the sale of wild pig meat.

**Methods:** Issue restricted permits and licenses and determine the price for culled meat; determine the allowable numbers of pigs to be killed per season.

**Expected outcome:** A reduction in the wild pig population and an increase in farmers' income.

**Indicator:** Reduced complaints of wild pig damages; frequency of wild pig appearance to be reduced by 50%.

**Implementers:** Local licensed hunters under supervision of local Forestry officials.

**Time Frame:** Years 1-5

**Strategy 4:**

1) Pilot wild pig repellent trials in conflict areas.

2) Provide improved fencing and trapping materials and train farmers on these methods.

**Methods:** Source funds, design appropriate repellents and pilot in few areas. Procure fencing materials and distribute through appropriate authorities; initially conduct this in one pilot site in each region (the site should have a history of wild pig damage).

**Expected outcome:** Reduced crop damages and reduce crop guarding time and frequency.



**Indicator:** The frequency of wild pigs entering agricultural fields to be reduced by 50%.

**Implementers:** Communities assisted by relevant central and Dzongkhag authorities.

**Time Frame:** Years 1-5

**Strategy 5:** Develop community capacity to use improved traps and snares.

**Methods:** Develop training materials and information, organize community training, and demonstrate use of traps and snares.

**Expected outcome:** Increase in farmers' knowledge of trapping and snaring with improved methods and materials.

**Indicator:** Train 30% of farmers during the 10FYP

**Implementers:** Led by NCD, DAO and Dzongkhag authorities in collaboration with community and GYT members.

**Time Frame:** Years 1-5

**Objective 2 (medium to long-term): Conduct adaptive research to better understand wild pig ecology in order to refine management and policy measures.**

**Strategy 1:** Study wild pig food preferences.

**Methods:** Analyze gut contents and/or feces.

**Expected outcome:** Document wild pigs' menu items.

**Indicator:** Study to be completed by the end of the 10FYP.

**Implementers:** NCD and NPPC

**Time Frame:** Years 1-5

**Strategy 2:** Study the population structure of wild pigs.

**Methods:** Through trappings, markings, and releases.

**Expected outcome:** A clear understanding of the wild pig population structure as well as obtain data on litter sizes, movements, etc.

**Indicator:** Study to be completed by end of the 10FYP

**Implementers:** NCD and NPPC

**Time Frame:** Years 1-5

**Strategy 3:** Study occurrences and the frequency of cross breeding between wild and domestic pigs.

**Methods:** Through dentations and DNA finger printing from blood, hair, or fecal samples.

**Expected outcome:** Information generated with regards to occurrence and frequency of cross breeding.

**Indicator:** Study to be completed by end of the 10FYP.

**Implementers:** NCD and NPPC

**Time Frame:** Years 1-5

**Strategy 4:** Study wild pig transmission of zoonotic diseases.

**Methods:** Through fecal materials and blood samples, documentation of incidence of diseases in wild pigs.

**Expected outcome:** Information generated with regards to the occurrence of zoonotic diseases.

**Indicator:** Study to be completed by end of the 10FYP

**Implementers:** NCD, NPPC, and RVL

**Time Frame:** Years 1-5

# Chapter 5

## RESOLVING HUMAN-UNGULATE CONFLICTS



RESOLVING HUMAN-  
UNGULATE

Photos: Dr. S. Wangyel Wang

## A. SITUATION ANALYSIS

### *Conflict Situation*

Bhutan has about thirteen species of ungulates: sambar (*Cervus unicolor*), barking deer (*Muntiacus muntjac*), musk deer (*Moschus chrysogaster*), takin (*Budorcas taxicolor whitei*), swamp deer (*Cervus duvauceli*), hog deer (*Axis porcinus*), chital (*Axis axis*), gaur (*Bos gaurus*), water buffalo (*Bubalus arnee*), goral (*Naemorhedus goral*), serow (*Capricornis sumatraensis*), wild boar (*Sus scrofa*), and pygmy hog (*Sus salvinus*) (McDougal and Tshering 1998; Wangchuk *et al.*, 2004). They form an important prey-base for predators such as the tiger (*Panthera tigris*), common leopard (*Panthera pardus*), clouded leopard (*Neofelis nebulosa*), snow leopard (*Uncia uncia*), dhole (*Cuon alpinus*), and Himalayan black bear (*Ursus thibetanus*) (Wangchuk *et al.*, 2004).

Wang (2008) found that most ungulate populations are concentrated near settlements, whereas the domestic cattle are found deep within jungles. Due to a majority of the rural settlements being situated in close proximity to forested areas, evidence of crop raiding by muntjak and sambar has been reported across the country.

The poaching of musk deer and the illegal hunting of sambar, muntjak, hog deer, and gaur, both within the country and across the international borders is reported. The removal of ungulate populations results in a reduced prey base for the predators, which in turn leads to livestock depredation by the predators. Over the last few decades, it has also been reported that blue sheep compete with yaks over forage in the higher elevations.

Although, the presence and absence of the ungulates and their crop damage are known, the paucity of information about their ecology and behavior has been a handicap for the Government when making science-based decisions about their population management and the mitigation of crop damage. There is also a need to study competition between domestic cattle and wild ungulates for fodder.

Considering the issues and gaps about the management of ungulates, NCD will layout research projects and field investigations in order to understand the root causes for crop damage and field encroachment by wild ungulates. The findings of these activities will guide the framing of appropriate management interventions.

### *Conflict Analysis*

- Free-range grazing and the lax herding of livestock results in mass inter-species competition for food amongst wild ungulates.
- Wild ungulates are problematic to farmers, but their abundances, distribution patterns, and population dynamics are not known.
- Species-specific crop damage is not known (which ungulate species damage what kind of crops?).
- Spatially, crop damage patterns in various places by the wild ungulates are not yet understood.
- The severity of crop damage has been not documented and the actual quantification of crop damage in terms of per capita losses needs to be determined.

### *Conflict Causes*

- Inadequate food in mature forests (less quantity of undergrowth plants).
- Controlled forest fires restrict the growth of fresh vegetation (e.g., young grass and shoots) in the forestlands.
- Competition for fodder with other wild ungulate species and domestic cattle.
- The Forest and Nature Conservation Act prohibits the hunting of wild animals.
- Low density of wild predators.

### *Problems for humans*

- Agricultural crop losses.
- Manpower requirement to guard crops.
- Expensive crop protection measures (ordinary wooden fencings are not effective).

**Table 3: SWOT for the Mitigation of Human-Ungulate Conflicts**

| Solutions  | Strengths   | Weaknesses   | Opportunities  | Threats  |
|--|---|--|--|--|
| Education and awareness program on the ecological roles of deer and wild ungulates | <ul style="list-style-type: none"> <li>- Better management of conflict</li> <li>- Lasting (sustainable) impacts</li> </ul>                        | <p>Slow adoption, time consuming, and expensive</p> <ul style="list-style-type: none"> <li>- Expensive</li> <li>- Time consuming</li> <li>- Slow implementation</li> </ul> | <ul style="list-style-type: none"> <li>- Capacity building with new ideas</li> <li>- Can be incorporated with the ongoing environmental education programs and pro-conservation policies</li> </ul>                                      | None   |
| Alternative livelihoods through small-scale enterprise development                 | <ul style="list-style-type: none"> <li>- Reduce farmers economic burden;</li> <li>- Strong support by community</li> </ul>                        | <ul style="list-style-type: none"> <li>- Not sustainable</li> <li>- Waste of resources money, time, and labor</li> </ul>   | <ul style="list-style-type: none"> <li>- Source of household income generation and means of self-sufficiency</li> <li>- Knowledge and experiences for local people</li> </ul>  | Farmers may become more dependent on the government  |
| Enhanced protection of deer through regular patrolling                             | Immediate results   |  | Overgrowth in the deer and wild ungulate population  | Create animosity   |
| Alternate crops that are not preferred by wild ungulates                           | High value low volume crops, such as ginger and cardamom  | <ul style="list-style-type: none"> <li>- Slow adoption by the farmers</li> <li>- Waste of resources</li> </ul>   | <ul style="list-style-type: none"> <li>- Source of household income generation and means of self-sufficiency</li> <li>- New knowledge and experiences for local people</li> <li>- Can be incorporated into the existing ICDPs</li> </ul> | <ul style="list-style-type: none"> <li>- Monoculture</li> <li>- Unbalanced diet</li> <li>- May invite other pests</li> </ul> |
| Improved crop protection measures (especially electric fencing)                    | Effective and immediate impact  | <ul style="list-style-type: none"> <li>- Not sustainable</li> <li>- Expensive</li> </ul>   | <ul style="list-style-type: none"> <li>- Optimum harvest of crop</li> <li>- Food grain sufficiency/minimal loss of crops to wild ungulates</li> </ul>  | Injury and death to animals  |
| Guard dogs   | Cheap, effective, and saves labor   | Scares away, but may kill ungulates  | Productive use of stray dogs   | <ul style="list-style-type: none"> <li>-Disease transmission</li> <li>-Attracts wild predators</li> </ul>                    |
| Research to understand the ecology of deer and other wild ungulates                | <ul style="list-style-type: none"> <li>- Literatures available for adopting best research methodology</li> <li>- Researchers available</li> </ul> | <ul style="list-style-type: none"> <li>- Time consuming</li> <li>- Expensive</li> </ul>  | Science-based recommendations for addressing human-ungulate conflict   | None   |

## B. ACTION PLANS

**Goal:** *To conserve desirable populations of deer and other ungulates through community support to maintain an adequate prey base for the predators and to achieve reduced crop losses by ungulates.*

**Objective 1: Understand the population ecology and behavior of deer and other wild ungulates for proper ungulate population management.**

**Strategy 1:** Identify problem species of wild ungulates.

**Methods:** Interview farmers, agricultural crop damage visits, reports by geog RNR sectors, and track and sign survey.

**Expected outcome:** Identify problem species of ungulate(s).

**Indicator:** Field survey reports and reports from the geog RNR sectors.

**Implementers:** Geog RNR sectors, NCD (DoF), and NPPC (DoA)

**Time Frame:** Years 1-5

**Strategy 2:** Collect information on the populations, density, distribution, and abundance of problem species.

**Methods:** Design population census, density, and distribution studies; study behavioral aspects of problem species related to their encroachments into agricultural fields and adaptations near the human settlements.

**Expected outcome:** Studies and documentation of population status, abundance, and density of the problem species; identify and map distribution patterns for the problem species; and identify appropriate population management strategy.

**Indicator:** Field survey reports and reports from the geog RNR sectors

**Implementers:** NCD (DoF)

**Time Frame:** Years 1-5

**Strategy 3:** Assess predation of ungulates through the study of scat and kills (to understand what kinds of predators are dependent on particular species).

**Methods:** Collect scats of different predators and determine what proportion of the predator diets are composed of the problem species.

**Expected outcome:** The predators' diet composition will be understood in terms of the proportion of the diet comprised by the problem species.

**Indicator:** Field survey reports and laboratory analysis reports

**Implementers:** NCD (DoF)

**Time Frame:** Years 1-5

**Strategy 4:** Cull the population of problem species if deemed to be overabundant; to be determined based on the findings of Strategies 2 and 3 of this Objective.

**Methods:** Controlled and/or supervised hunting of problem species, either by local licensed hunters or licensed trophy hunters (tourists) based on the annual allowable harvest rate, which will be determined after population studies.

**Expected outcome:** The number of problem species reduced to a desirable level.

**Indicator:** Number of hunter licenses issued; number of trophies; and kilograms or number of individual animals hunted.

**Implementers:** NCD, tour companies (ABTO), and villagers (licensed hunters).

**Time Frame:** Years 3-5

## **Objective 2: Understand the scale and intensity of competition for fodder between wild ungulates and domestic cattle.**

**Strategy 1:** Determine and assess the resource use, selection patterns, and the availability of livestock and problem species.

**Methods:** Transect surveys for vegetation; survey the tracts and signs of the problem species and livestock; spatial analysis of the relative locations for problem species and livestock; and gut or rumen content analysis of problem species.

**Expected outcome:** A clear understandings of diet overlap and the fodder species commonly consumed by the problem species and domestic cattle; knowledge of the scale and extent of competition for fodder and space between the two target species.

**Indicator:** Field survey reports; statistical indices for diet and overlapping spaces; and produce maps of resources used.

**Implementers:** NCD (DoF)

**Time Frame:** Years 1-5

**Strategy 2:** Evaluate livestock population, migratory patterns and herding practices in the problem areas.

**Methods:** Household surveys; interview herders, and visit herd sites; physical counting of individuals in a herd; and consult geog livestock census records.

**Expected outcome:** Record the total number of livestock by species, breeds, and productivity;



and understand migratory and herding practices.

**Indicator:** Household surveys and herder interviews reported

**Implementers:** NCD in collaboration with the Geog Livestock Extension agents (DoL)

**Time Frame:** Years 1-5

**Strategy 3:** Habitat improvement through enriched planting of the most preferred food for ungulates in the wild. This activity will succeed the Strategy 1 under Objective 2.

**Methods:** Enrich the plantation of trees, herbs, and grasses and principal foods preferred by the problem species; and relocation of cattle from the areas of diet and habitats overlapping with the problem species.

**Expected outcome:** Enrich the natural habitats of problem species; and reduce crop damage and encroachments into agricultural fields by the problem species by 50%.

**Indicator:** New recruits and lush vegetation in the enrichment plantation areas; lessen the number of problem species that intrude into agricultural fields.

**Implementers:** NCD in collaboration with the SFD (DoF).

**Time Frame:** Years 2-5

**Objective 3: To understand the dynamics and intensity of crop damage and develop appropriate crop protection mechanisms, and to assess and compare their efficacies.**

**Strategy 1:** Identify species-specific crop damages by ungulates.

**Methods:** Visit to the crop damage areas; survey the signs and tracks.

**Expected outcome:** Species-specific crop damage understood; and species-specific crop protection mechanism identified.

**Implementers:** NCD in collaboration with the geog RNR agents.

**Time Frame:** Years 1-5

**Strategy 2:** To understand the scale and intensity of crop damage by the problem species so that appropriate compensations could be made to the afflicted farmers.

**Methods:** Visit to the crop damage areas; assess and validate the damage areas; and quantify the damages in physical quantity, quality, and monetary terms.

**Expected outcome:** Quantify the scale and intensity of crop losses.

**Implementers:** NCD in collaboration with geog Agriculture Extension Agents.

**Time Frame:** Years 1-5

**Strategy 3:** Develop, implement, and compare different crop protection methods, such as electric fencing, barbed wire fencing, and aversive conditioning of the problem species.

**Methods:** Develop, establish, and compare the efficacies of different fencings and aversive conditioning strategies.

**Expected outcome:** Identify the best fencings and aversive conditioning methods.

**Implementers:** NCD in collaboration with NPPC.

**Time Frame:** Years 1-5

# Chapter 6

## RESOLVING HUMAN-ELEPHANT CONFLICTS



Photos: Passang Wangchen, WWF Bhutan

RESOLVING HUMAN-  
ELEPHANT

## A. SITUATION ANALYSIS

### *Conflict Situation*

Conflicts between humans and elephants are a growing area of concern across the southern Dzongkhags. In fact, each year the people's representatives raise this issue during the National Assembly. Currently, the major issue concerning elephant conservation is the severity of damages to crops and properties by elephants. Crops damaged by elephants include maize, paddy, millet, banana, and nut trees.

There is a dearth of information on virtually all aspects of elephants in the country, because, until 2005, no surveys were ever conducted. While we do have an idea on the possible areas where the species may be sighted or the various habitats they could inhabit, little is known about their distribution, abundance, or dispersal patterns. Each year, the Government receives a number of complaints from villagers regarding property and crop damage caused by elephants. However, the Government is unable to provide any form of assistance to farmers due to a lack of proper means needed to make verifications and a lack of funds for compensations.

### *Conflict Analysis*

- Human-Elephant conflicts are major problems in the southern Dzongkhag, yet very little is known about distribution, abundance, or dispersal patterns.
- Problems are severe especially in resettlement areas.
- Habitual crop raiders have different entrances, which makes guiding difficult.
- Most elephants are migratory.

### *Conflict Causes*

- Loss of habitats
- Habitat fragmentation
- Resettlement
- Habitat disturbance due to competition with livestock grazing
- Strict forest rules (prohibition of hunting, killing, trapping, etc)

### *Problems for humans*

- Crop losses
- Manpower requirement for guarding
- Costly protection measures; e.g., ordinary fencings are not effective
- Attack humans

**Table 4.** SWOT for Mitigation of Human-Elephant Conflict

| <b>Solutions</b>      | <b>Strengths</b>   | <b>Weaknesses</b>  | <b>Opportunities</b>  | <b>Threats</b>  |
|-----------------------|--|--|---|---|
| Electric fence        | Effective to keep away elephant from the field                             | <ul style="list-style-type: none"> <li>- Expensive and dangerous to human and livestock</li> <li>- Solar dependent, so may not work during bad weather</li> </ul>                                  | Reduce farmers time in guarding crop and increase in crop yield   | Electrocution of the animal and may not work effectively in all the places                                |
| Crop insurance scheme | Farmers will recover their crop loss                                       | <ul style="list-style-type: none"> <li>- All farmers may not agree to the scheme</li> <li>- Difficult to assess the crop damage</li> <li>- Some farmers may not be able to pay premiums</li> </ul> | Every loss of crop will be recovered from the insurance   | Bias assessment of crop damaged by the staff  |
| Crop compensation     | Farmers food security guaranteed   | <ul style="list-style-type: none"> <li>- Might not be sustainable</li> <li>- Difficult to assess the crop damage</li> </ul>  | Increase food security  | Create precedence for other free subsidies  |
| Relocation of Tsamdro | Will greatly reduce the negative impact of Tsamdro on the elephant habitat | <ul style="list-style-type: none"> <li>- Conflict between Tsamdro owners and Dept. of Forest will arise</li> <li>- Difficult to find alternative land for Tsamdro.</li> </ul>                      | <ul style="list-style-type: none"> <li>- Expansion of elephant habitat - Reduce use of forest resources by the cattle herders</li> <li>- Long-term survival of the isolated population secured</li> </ul> | Unhappy herders may poison the elephants since they know very well about the salticks and waterhole areas |

- Scattered settlements such as isolated households are more prone to attacks

## B. ACTION PLANS

**Goal:** *To contribute to the conservation of viable populations of elephants in their natural habitats.*

**Objective 1: Assess the past and present distribution of elephants, their status, abundance, habitat use, and migration patterns.**

**Strategy:** Find out the status of elephants, their habitat use and migration patterns.

**Methods:** Conduct field surveys by using the dung count method and interview farmers.

**Expected outcome:** Determine the status of the elephant in the country; study habitat use and migration patterns.

**Indicator:** Report an estimate of the elephant population; produce an elephant habitat map.

**Implementers:** NCD, Parks, Territorial Division, all Southern Dzongkhags, Dungkhangs

**Time Frame:** Years 1-5

**Objective 2: Assess the extent of human-elephant conflicts in Bhutan.**

**Strategy:** Study and assess the extent of human-elephant conflicts in the country.

**Methods:** Conduct interviews with farmers in all affected areas by randomly choosing households.

**Expected outcome:** Identify human-elephant conflict hotspots and produce maps.

**Indicator:** Mitigation measures begin in the affected areas.

**Implementers:** NCD, Parks, Territorial Divisions, all Southern Dzongkhags, Dungkhangs

**Time Frame:** Years 1-3

**Objective 3: Implement interventions to reduce crop damages by elephants.**

**Strategy 1:** Provide immediate mitigation measures to minimize crop damages by elephants.

**Methods:** Installation of electric fences; build trenches and provide powerful searchlights and other mechanized devices to deter elephants; plant buffer crops that elephants do not prefer.

**Expected outcome:** Reduce crop damage incidences.

**Indicator:** Farmers cultivate more crops and harvest higher yields.

**Implementers:** NCD, Parks, Territorial Divisions, all Southern Dzongkhags, Dungkhangs

**Time Frame:** Years 1-2

**Strategy 2:** Resettle farmers from elephant hotspots to areas not inhabited by elephants.

**Methods:** Work with local governments and other government agencies to relocate settlements to less elephant prone areas and process land swapping.

**Expected outcome:** Reduce human-elephant conflicts

**Indicator:** Less reports of elephant damage to crops

**Implementers:** NCD, Parks, Territorial Divisions, all Southern Dzongkhags, Dungkhangs

**Time Frame:** Years 1-2

**Objective 4: Train both field staff and local people to deal with elephant problems.**

**Strategy:** Enhance capacity building of field staff, strengthen partnerships, and forge collaborations with local communities for elephant conservation.

**Methods:** Familiarize both field staff and farmers with elephant conservation and behavior, expose them to areas prone to elephant damage in neighboring countries, and instruct them about how to deal with problems.

**Expected outcome:** Field staff and local farmers have more understanding of elephant ecology and behavior.

**Indicator:** More people understand elephants and how to avoid damages.

**Implementers:** NCD, Parks, Territorial Divisions, all Southern Dzongkhags, Dungkhangs

**Time Frame:** Years 1-4

**Objective 5: Management of Elephant habitats in Gedu.**

**Strategy 1:** Management and/or restoration of elephant habitats in Gedu in order to ensure long-term survival of the elephants trapped in Gedu.

**Strategy 2:** Map and demarcation of habitat, maintain water holes and salt licks, and enrich existing plantations; relocate Tsamdro; maintain continuous monitoring.

**Methods:** Field survey using GPS, maintain previous water holes, saltlicks, and plantations; conduct meetings with the Tsamdro owners and deal as per the Act and Rules of the Department.

**Expected outcome:** Demarcate area with a detailed habitat map; maintain water holes, salt licks, and plantations; relocate Tsamdro.

**Indicator:** Field staff utilizes the habitat map to carryout field activities; elephants using water holes and saltlicks; elephants graze inside Tsamdro.

**Implementers:** NCD and Gedu Division

**Time Frame:** Years 1-5

# Chapter 7

## RESOLVING HUMAN-PRIMATE CONFLICTS



Photos: Nawang Norbu, Sherub, S. Choden



## A. SITUATION ANALYSIS

### *Conflict Situation*

In Bhutan, primates are represented by macaques; Western Assamese macaque [*Macaca assamensis pelops*], Indian rhesus macaque [*M. mulatta mulatta*], Arunachal macaque [*M. munzala*]-, langurs (Golden langur [*Trachypithecus geei*], capped langur [*Trachypithecus pileatus*], and common or gray langur [*Semnopithecus entellus*]), and loris (Slow Loris [*Nycticebus bengalensis*]). The problems these primate groups inflict or will inflict depend entirely on their behavioral aspects, distribution, density, and abundance across their spatial distribution in the country. The distribution, population size, and troop composition are largely unavailable for macaques and loris, while some information is available for langurs.

The findings from the RNR Census in 2005 documented that primates (most likely only macaques) affected households in 19 of the 20 districts, ranging in degree from 0.1% (Bumthang) to 40% (Samtse). The degree of disturbances by primates was second only to wild pigs and is comparable to or perhaps even higher than disturbances caused across the country by deer. The exact nature of these disturbances are not immediately known or documented. The 2005 RNR Census identified primate problems to be serious in the southwestern and eastern regions of the country. The RNR Census findings correlate to the macaque's suitable, natural habitats, as well as to human settlements in such habitats. The macaque species are vastly distributed across the country, whereas natural barriers limit langur species distributions although langurs are of less a nuance to humans.

The presence of large troops of any langur species in parts of Bhutan has not been a problem to farmers. The rise in conflicts by macaque is due to several reasons, which need to be studied in order to be fully understood. Farmers spend hectic days guarding their crops from macaques. Therefore, the 10FYP should consider macaque issues, before they become larger political issues or before it is too late to address. It has been recognized that crop plundering by macaques are problems in many parts of the country.

This human-primate conflict strategy is designed for the first three years in order to understand the realities on the ground. Once the problems faced by humans and the ecological requirements of primates are fully understood, then primate population management activities could be recommended. Furthermore, currently the gravity of human-primate problem is not yet comparable to those caused by wild pigs and elephants.

### *Conflict Analysis*

Some existing and possible problems (not necessarily listed in the order of importance) between primates and humans in Bhutan are: crop-damage, damage to fruit orchards and horticulture gardens, raiding of kitchen gardens, raiding of homes, nuisance value, attacks and injuries to people, and the possible transmission of zoonotic diseases. These problems exist or will emerge further because primate species in Bhutan are widely distributed.

### *Conflict Causes*

#### *Biological Causes*

- 1) There is a natural propensity for macaques to leave their natural habitats and move towards human habitations.
- 2) Crops, fruits, and foods of human origin are more nutritious for primates.
- 3) An increase in populations of primates (possibly triggered by initial crop raiding and/or localized releases from predation pressure due to low carnivore densities).

#### *Ecological Causes*

- 1) Loss of habitats, particularly agricultural land and forest boundaries; logging, shifting cultivation, local establishment of monoculture plantations, resource use competition between primates and humans.
- 2) Change in land use patterns such as local conversion of forests to farmlands and changes in cropping patterns.
- 3) Incidental provisioning of macaques at garbage dumps; possible deliberate feeding of monkeys

**Table 5.** SWOT analysis for human-primate conflicts

| Activity | Strengths   | Weaknesses  | Opportunities   | Threats      |
|----------|---|---|---|--------------|
| Primate  | <ul style="list-style-type: none"> <li>- Research will provide all the baseline information required on the status of Bhutanese primates with an emphasis on conflict situations.</li> <li>- Research also will obtain valuable information on the socio-economic status of the people and the losses they face due to conflict with primates.</li> </ul> | <ul style="list-style-type: none"> <li>- Lack of funding</li> <li>- Low prioritization</li> </ul> | <ul style="list-style-type: none"> <li>- If properly planned, these studies can be carried out at the country-level by involving not only forest department personnel, but also educational institutions (including schools), NGOs, INGOs, and the general public;</li> <li>- Studies may also allow for linkages to be developed between different institutions within and outside the country;</li> <li>- Studies can also be supported by alternative, non-governmental sources of funding.</li> </ul> | Unidentified |

## B. ACTION PLANS

**Goal:** *To ensure the survival and conservation of representative populations of the different primate species in Bhutan while minimizing human-primate conflicts caused by these species.*

**Objectives 1:** Increase the knowledge base about different species of primates, their populations, habitats, and food sources across the country.

**Strategy 1:** Identify high human-primate conflict sites across Bhutan by carrying out a rapid assessment of the socio-economic status for local communities, the nature, and the extent of conflicts, economic losses sustained, and people’s perception to primates.

**Methods:**

1) Collect secondary information from various forestry and district officials as well as the local people in each Dzongkhag about possible sites of high human-primate conflict; data from the 2002 and 2005 RNR Censuses should be used to select potential high conflict sites (Ministry of Agriculture 2002, 2005).

2) Conduct evaluation questionnaire surveys initially through random group interviews in selected villages and/ or stratified (on the basis of land holdings and cropping patterns, alternative income sources, and overall wealth). Randomly choose households to evaluate their socio-economic status, the nature and extent of human-primate conflicts, and economic losses sustained; the villages could be selected by considering: (i) adequate coverage of different altitudinal zones, (ii) inclusion of high-conflict villages based on the initial rapid surveys, and (iii) logistic feasibility.

3) Conduct perception questionnaire surveys through random group interviews to evaluate the perceptions of the local community towards the human-primate conflict as well as the conservation status of the primate populations involved.

**Expected outcome:** High human-primate conflict sites within the country will be obtained; vital information on the nature and extent of conflicts in economic terms will be determined, and knowledge of people's perceptions towards primates. These details will determine model sites for the subsequent implementation of possible mitigation measures and also evaluate the nature of the measures that should be adopted; knowledge of people's perceptions towards primates in these areas will be obtained, which can help facilitate adoption of conservation strategies for these populations, if required.

**Indicators:** Rapid and proper identification of high human-primate conflict sites and their characterization in terms of the human-primate conflict for future action.

**Implementers:** Relevant officers of the Ministry of Agriculture, coordinated by the Nature Conservation Division.

**Time frame:** Years 1-5

**Strategy 2:** Conduct demographic, ecological, and behavioral studies on selected populations of different primate species in high human-primate conflict sites.

**Methods:**

1) Identify the different primate species populations involved in conflicts in different high human-primate conflict sites.

2) Conduct periodic demographic surveys of chosen populations to regularly monitor population parameters, including troop number, troop size, and composition, birth, and disappearance rates, and inter-birth intervals.

3) Conduct ecological and behavioral studies of chosen troops and identified individuals (if possible), using standard methodologies such as instantaneous scan sampling and focal animal sampling (Altmann 1974), to monitor habitat use, feeding patterns, reproductive,

and social behavior, and behavioral interactions with humans displayed by these troops.

4) Conduct observational studies to monitor the nature of human-primate interactions, particularly during conflict situations.

5) Conduct spatial and temporal studies on the structure and floristic composition of the natural habitats used by the primate populations by using standard methodologies and also agricultural fields and cropping patterns involved in human-primate conflicts.

**Expected outcome:** Identification of the ecological and behavioral characteristics of different primate populations involved in conflicts with local communities; knowledge of habitat characteristics of these populations, which may predispose them towards conflict situations; information collected on the growth patterns and troop dynamics of these populations; this information, together with data on the nature of human-primate interactions, will be used not only to design mitigation measures to reduce levels of conflict, but also to plan for conservation and management strategies of these populations if and when required.

**Indicators:** Accumulation of ecological and behavioral information of the primate populations involved in conflict with humans, and the development of management plans designed to minimize conflict and promote, if necessary, the conservation of these populations.

**Implementers:** Selected officers of the Ministry of Agriculture, coordinated by the Nature Conservation Division

**Time frame:** Years 1-5

**Strategy 3:** Conduct a survey of all primate species in Bhutan with particular emphasis on the conservation status and conflict potential of different populations of these species.

**Methods:**

1) Review the existing literature on the distribution and habitat use of the different primate species of Bhutan in order to prioritize the primate species and the geographical areas that would be covered in the survey; considerable information already exists on the golden langur and, to a lesser extent, on the capped and the common langurs (Wangchuk 2004; Wangchuk *et al.*, 2001, 2007).

2) Collect secondary information from various forestry and district officials as well as the local people in each Dzongkhag on the possible distribution and population size of the different primate species; good quality photographs may be used for this purpose.

3) Conduct stratified random sampling of different primate populations on the basis of the secondary information obtained and review from the literature; vehicular surveys can be

conducted by stopping to regularly scan for primates at selected vantage points; surveys should also be made by foot, covering existing trails and paths in the area; at each sighting spot identify and collect information on species: troop size and composition, morphological characteristics, altitude, GPS location, and various habitat features.

4) Conduct questionnaire surveys by group interviews and/or by randomly choosing informants in selected villages to evaluate the nature of relationship between the observed primates and the local community; this survey will identify potential human-primate conflict situations, which exist in the area and also evaluate the conservation status and threats facing these primate populations.

**Expected outcome:** Obtain information on the distribution, population size, and the habitat characteristics of the different species of Bhutanese primates across the country; critical information on the conservation status and human-primate conflict potential of these populations also will be obtained.

**Indicators:** Extent to which information is acquired on the different species across Bhutan.

**Implementers:** Relevant officers of the Ministry of Agriculture, coordinated by the Nature Conservation Division.

**Time frame:** Years 1-5

# Chapter 8

## MACHANISMS TO IMPLEMENT THE STRATEGY

The Bhutan National Human-Wildlife Conflicts Management Strategy will be implemented within the 10FYP in line with government rules and regulations. Specific proposals will be developed based on this strategy document and submitted to the relevant donors such as World Bank, UNDP Bhutan, Bhutan Trust Fund and WWF Bhutan for funding.

To implement the strategies, in principle, nine model sites will be selected spanning the country. These areas will consist of three model sites from outside the present protected area systems and six from the protected areas comprising of two national parks, one wildlife sanctuary, and three biological corridors.

Most of the mitigation activities will be implemented by communities, geogs, local governments and/or field offices. While technical backstopping will be provided by NCD, DoF, NPPC, DOL, DoA, and CORRB.

The existing core team will carry out monitoring and evaluation. This core team consists of members from DoA, DoL, DoF/NCD, CORRB, NPPC, and Dzongkhags. Successful projects from this strategy will be scaled up to cover the entire country.

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### THE NATIONAL PARKS AND WILDLIFE SERVICE LOGO DESCRIPTION

Associated with myth and legend, and the iconic lama Drukpa Kuenley, the Takin being the national animal of Bhutan represents all of Bhutan's unique biodiversity and their importance for the nation's ecological, economic and social well being. As one of the most charismatic, the Takin represents and showcases Bhutan's biological and socio-cultural uniqueness. The Takin's confident pose and gaze symbolizes the confidence of all species in Bhutan, as they stay secure in the belief that they and their habitats are forever protected and secured.

The Takin is framed within a green circle. The green represents Bhutan's pristine environment, while the circle symbolizes the interconnectedness of all life and life forms and thereby their sacredness. Behind the Takin, the yellow and orange of our national flag signifies and highlights the commitment and resolve of the king and the people to protect Bhutan's rich biodiversity for all times to come.

The white letters on the green circle indicate purity, strength and purpose. It calls upon all responsible for protecting Bhutan's unique biological and environmental heritage to act with commitment and courage.

**Bhutan  
Trust  
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