Status of Human-Wildlife Conflict and Assessment of Crop Damage by Wild Animals in Gaurishankar Conservation Area, Nepal

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ABSTRACT

This study tries to explore the status of Human-Wildlife Conflict (HWC) within the Gaurishankar Conservation Area (GCA), Nepal. The maximum damage of maize (39%) and potato (30%) crops were reported due to wildlife in the study area. Major wildlife pests were monkey, porcupine, goral, barking deer, jackal and Himalayan black bear. About ninety five percent of respondents reported crop damage problem was increasing in the area after GCA establishment. Fair and quick disbursement of compensation for crop loss and regular monitoring of the wild animal needed to be adopted to reduce human-wildlife conflicts. Change in cropping and crop composition, particularly cultivation of high value medicinal plants were also suggested. The findings suggest participatory approach to manage problematic animal species in GCA.

Keywords: Pest, Human-Wildlife Conflict, Crop damage, Hhunting, Poaching

INTRODUCTION

Protected Areas (PAs) are a key strategy to conserve biodiversity (Allendorf *et al.* 2007, Bajracharya *et al.* 2006). Globally, the number and extent of nationally designated PAs has increased dramatically over the past century. However, these established PAs are not free from conflicts with local people who inhabit the area, either inside the PAs or in the buffer zone (Thapa 2014).

HWC or negative interaction between people and wildlife has recently become one of the fundamental aspects of wildlife management as it represents the most Widespread and complex challenge currently being faced by the conservationist around the World. HWC arises mainly because of the loss, degradation and fragmentation of habitats through human activities such as, logging, animal husbandry, agricultural expansion, and development projects (Fernando *et al.* 2005, Ogra & Badola 2008, Ayadi 2010). Conflict between wildlife and humans is a significant problem in many parts of the world (Wang & MacDonald 2006, Rao *et al.* 2002, Orga 2008). Protected area managers are faced with the challenge of how to resolve people protected area conflicts (Sharma 1991, Heinen 1993, Bajracharya *et al.* 2006). The complex relationship between residents and protected areas continues to be an obstacle to successful conservation of protected areas (Allendorf *et al.* 2007).

The Government of Nepal (GoN) declared GCA in 2010 as notified in its' gazette. Considering geographical, socio-economic structures, ecological richness of GCA as well as taking examples of other PAs of Nepal, there is very high chance of occurrence of HWC in GCA This study was designed with the following two objectives: (a) to identify the status of HWC in GCA and (b) to assess crop damage by wild animals in GCA. This study helps to identify people's attitudes towards the wild animals in the GCA and to recommend suggestion for reducing and mitigating HWC.

MATERIALS AND METHODS

Study Area

GCA covers an area of 2179 km^2 encompassing 22 VDCs of Dolakha, Sindhupalchok, and Ramechap districts. Out of 22 VDCs, this study was carried out in five VDCs (Lamabagar, Khare, Ladhuk, Orang, and Bulung). GCA borders with Sagarmatha National Park to the East, Langtang National Park to the West and Tibetan Autonomous Region of the People's Republic of China to the North.

GCA comprises 18 forest type and 695 types of flora species, 71 species of mammals, 27 species of reptile, 24 species of fishes, 12 species of amphibians, and 252 species of birds are found in GCA (NTNC 2014) is the home to around 66,028 peoples belonging to different ethnic groups. It possesses total 13,792 households (HHs) (CBS 2012).
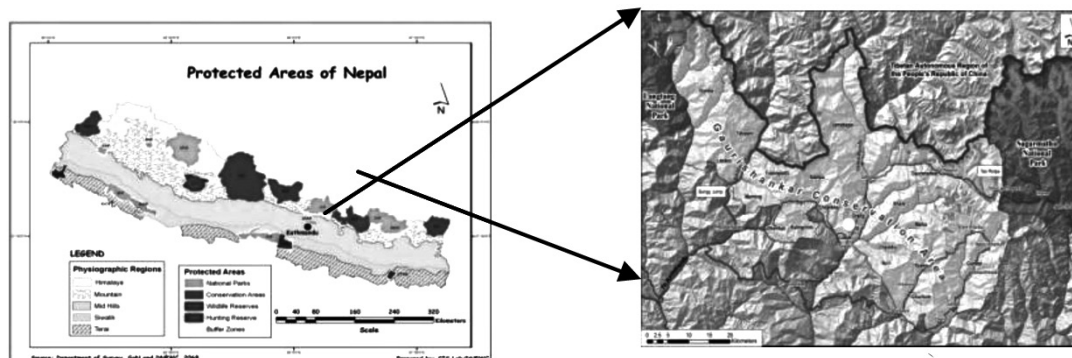
Fig. 1. Map of Nepal showing GCA (Source: GCA, 2014)

The field survey was conducted in June of 2014. Two hundred two out of three thousands ninety HHs were randomly selected for the survey, including 37 (out of 474 HHs) from Lamabagar VDC, 37 (out of 507 HHs) from Khare, 47(out of 977 HHs) from Ladhuk, 35 (out of 527 HHs) from Orang and 46 (out of 605 HHs) from Bulung VDC. Semi-structured questionnaires were used with a view to get data on i) Status of HWC, ii) Extent of crop damage and iii) Livestock depredation. Key informant survey, focal group discussion (FGD), direct observations were also used. Quantitative data on values of crops over the two years were collected through HHs interviews which were validated by cross-checking with neighbours, and key persons, to minimize exaggeration.

Group discussions were organized with the Conservation Area Management Committee (CAMC) and Community Forest Users' Groups (CFUGs). Interviews were conducted with 5 key informants in each VDC, representing elderly people, school teachers, and local leaders. The respondents' attitudes toward wild animals were also collected. Data were analyzed and interpreted by the use of statistical techniques.

RESULTS

Status of HWC in GCA

Respondents included male (91%) and female (9%) including Janjati (61%), Kshetry (28 %), Dalit (8%) and Brahmin (3%). Twenty nine out of 202 HHs showed a recent (preceding 3 days) crop damage and livestock depredation incidents, in which showed crop damages (23 HHs) and livestock damage (6 HHs) including 3 goats (1 lost and 2 wounded) and 10 poultry (8 lost and 2 wounded) within very short period of time.

About 89 percent of respondents reported that the number of different wild animals was increasing after GCA establishment. Poaching showed that 71 percent agreed with the existence of poaching/killing wild animals before establishment of GCA for food, trade, protection of crop and protection of livestock from their attack whereas 97 percent disagreed with the existence of poaching/killing of wild animals and 0.4 percent respondents were against it.

The study revealed that 67 percent respondents said the habitat of wild animal was undisturbed, 32 percent agreed with the disturb of the habitat of wild animal. Of them 40 percent respondents related it to construction works inside the GCA, 28 percent to habitat loss because of deforestation and human population increase, 26 percent to housing caused disturbance while five percent to degradation and 1 percent to killing.

Resource collected by Local People from GCA: The most of the respondents depended upon the GCA for their daily livelihood activities such as timber, fuel wood, and grass (Table 1).

Table 1. Resource use patterns

Resource collection from	Timber (N=190)	Fuel wood (N=202)	Grass (N=190)
GCA forest	69.5 %	71.3%	57.4%
Own land	26.3%	26.7%	40.0%
Other forests	4.2%	2.0%	2.6%
Total	100	100.0	100

Problem caused by Wildlife: About 84 percent respondents were experienced problems from animals, 54 percent livestock depredation and 81 percent crop damage problem including 4 persons injured (Table 2).

Table 2. Responses regarding cattle loss and crop damage from wild animals

	Problem from CA animal	Cattle loss (n=202)	Crop damage (n=202)	Human casualties
Yes	84.2%	53.5%	80.7%	4 person was injuries due to Himalayan Black Bear attack
No	15.8%	46.5%	19.3%	

The study revealed that 47 percent of respondents declared HWC as a high problem. The level of conflict was high inside CA as reported by 89 percent of respondents while only 2 percent of respondents expressed that the conflict was more in boarder of GCA.

Assessment of Crop Damage by Wild Animals in GCA: The incidence of crop losses appeared varied considerably among studied villages. Maize, potato,

millet, barley and paddy rice were the key crops damaged by wildlife which were the main crops grown in GCA. Monkey was the major pest animal followed by porcupine, goral and deer (Table 3).

Ladhuk VDC had highest loss per HH of different crops (334.9 kg per annum) but Orang had lowest loss of 200.6 kg per annum (Fig.1).

Table 3. Incidence of crop damage by wild animals

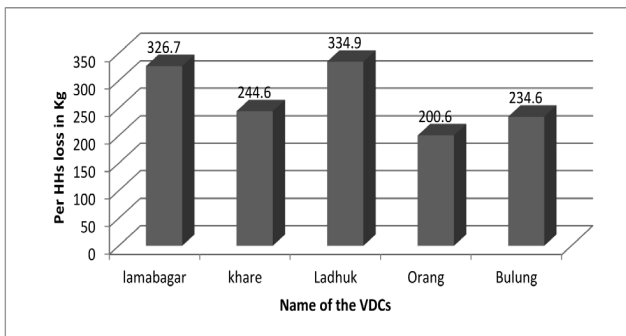| Name of the animal	Maize N=159	Potato N=126	Millets N=120	Wheat N=43	Barley N=14	Paddy N=14	Pulses N=2	Others N=39	Total cases
Monkey	148	24	33	4	2	-	1	1	213
Porcupine	19	115	1	-	-	-	-	18	153
Goral	-	-	66	31	1	5	-	-	103
Deer	-	-	58	20	10	2	-	-	90
Jackal	11	-	-	-	-	-	-	1	12
Bear	8	-	-	-	-	-	-	-	8
Mouse and others	6	-	3	3	1	8	1	23	45
Total									624

Fig. 1. Average crops loss in (Kg) different VDCs of the Study area.

Table 4. Average Crop damage in kg and monetary value of damage per year

Name of the Crop	Damage Kg	Damage (1US$= Rs. 97)	% of crop damage
Maize	22036.20	7982.70	38.90
Potato	16743.75	5542.60	29.60
Millet	10556.90	4867.90	18.60
Wheat	3777.22	1742.00	6.70
Paddy	2116.00	708.40	3.80
Barley	723.63	228.90	1.33
Pulses	118.00	170.90	0.23
Buckwheat & Sweet potato	444.00	179.00	0.83
Total	56515.7	21422.5	100

Crop Damage in Different VDCs: The maximum annual loss of maize was found to be 39 percent followed by potato (29.6%), millet (18.6%), wheat (6.7%), paddy (3.8%) (Table 4).

Preventive Measures Adopted by Local People: Protective measures used were guarding, making loud sound, threatening, use of scare-crow against Himalayan black bear, porcupine, monkey, barking deer and and Himalayan goral. About 31 percent people guarded their crops day-night, 24 percent used stone, 6 percent making loud noise, 23 percent used scare-crow (Mukunda) and 18 percent have not adopted any preventive measures.

DISCUSSION

Based on information obtained from respondent that the number of wild animals had been increasing after establishment of GCA which was found to be consistent with other studies (Bajracharya *et al.* 2006, Pokharel & Shah 2008). The respondents reported that poaching and killing of wild animals were common practices before GCA establishment and is corroborated with Kunjo VDC of Mustang District where Leopards were killed before the area was included in ACAP (Ghimirey 2006).

Overall 84 percent HHs around GCA reported experiencing some kind of conflict incidents with wildlife which was in accordance with the study in Nepal and India (Pokharel & Shah 2008, Karanth *et al.* 2012, Bajracharya *et al.* 2006) which was comparatively higher than other places in the world (Dickman 2010). Naturally the local people have high dependency on the community

forest as prime habitat for wildlife in the GCA for their daily needs, as study reported that community forest is prone to conflict (Sharma 1991, Karanth *et al.* 2012).

Respondents reported HWC inside the GCA was high. The identification of prime conflict zone has given advantages for any conservation program to be more effective (Karanth *et al.* 2012). The reason behind Monkey as a major pest animals are supported by various past studies, such as Monkey has been seen as prominent crop raider throughout Asia (Regmi *et al.* 2013).

Substantial economic losses due to crop damage by wildlife observed in the present study were also reported previously (Heinen 1993, Studsrod & Wegge 1995, Naughton-Traves 1998, Rao *et al.* 2002, Bajhracharya *et al.* 2006, Pokhrel & Shah 2008, Aryal & Chalise 2013). The Monkey and Porcupine were the main pest animals for crop damage (Rao *et al.* 2002, Bajracharya *et al.* 2006, Regmi *et al.* 2013, Riley 2007).

The extent and incidence intensity of crop damage may vary, depending on the cropping patterns (Rao *et al.* 2002). As stated earlier, among different crops damaged by wild animals, maize has become the prominent crop in five different VDCs of the study area, as compared to other studies (Pokharel & Shah 2008, Aryal & Chalise 2013). Previous studies showed that rice was less raided by Monkeys (Nijman & Nekaris 2010).

It was found that earlier people used different traditional methods such as hunting, day night guarding, making wooden platforms "chhapro" and scare-crow (Mukunda) in the crop field, and producing loud noise 'Ho-Ho, Ho-Ho' etc. (Rao *et al.* 2002, Aryal & Chalise 2013). But all of these traditional methods of crop protections seemed to be ineffective on the study area because of increasing population of wild animals and the legal prohibitions from killing of crop damaging wild animals. Local people were expecting effective mechanism against HWC and crop damage and at the same time, they were also seeking the on time compensation from GCA authority.

Local people also strongly demanded that GCA authority should give the permission to kill the crop damaging wild animals to them, specially the monkey. Other studies have also shown a similar pattern of response from local communities (Mehta & Heinen 2001, Bajracharya *et al.* 2006). Some respondents expressed antagonistic views towards the GCA management authority against their inability of managing the issue effectively. Indeed, previous studies have shown that crop damage by wildlife was one of the main reasons for a negative attitude among local communities towards conservation even though they received benefits from conservation area (Heinen 1993, Studsrod & Wegge 1995, Bajracharya

et al. 2006, Bhattari & Basnet 2004). These conflicts need to be resolved urgently as the delay in conflict resolution might antagonize the people to the detriment of the conservation goals set for the PAs (Madden, 2004, Bajhracharya *et al.* 2006). In brief, the local people demanded that job opportunity should be given to them and take full responsibility of their livelihood activities. On the contrary, the GCA authority claimed the loss was negligible but the claim of the local people was too much high. If GCA authority made to aware local people about benefit of GCA and implement different livelihood improvement activities, this would definitely help in HWC mitigation.

CONCLUSION

The HWC was major problem in GCA causing crop damage and livestock depredation. Eighty-four percent respondents informed the existence of wildlife problem in GCA but rest said no problems from wild animals. Most of the respondents answered that the number of wild animals were increased after establishing GCA. The problem of crop damage and livestock depredation reported to be increased. Monkey is one of main crop raiders and its control was adviced by the people. The attitude of the people towards wild animals was negative because they lost their livestock and crop damage. There is an urgent need for public participarition to manage human-wildlife conflict.

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