HABITAT ASSESSMENT, CONFLICT EVALUATION AND CONSERVATION AWARENESS OF BLACKBUCK *Antelope cervicapra* IN BLACKBUCK CONSERVATION AREA, BARDIA, NEPAL

A report to

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Blackbuck Conservation Area, Bardiya Nepal

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INTRODUCTION

Understanding and predicting wildlife-habitat relationship and identifying and protecting suitable ecological areas and landscapes to ensure the viability of wild populations is a foundation of wildlife management. The conservation and management of wildlife species is highly reliant on the geographic location of potential habitat (Margules and Pressey 2000) that, in turn, relies on research which clarifies the habitat preferences of the species. Predicting and mapping of potential suitable habitats for endangered and threatened species is crucial for monitoring and restoration of their declining native populations in their natural habitat, artificial introductions, or selecting conservation sites, and conservation and management of their native habitat (Gaston, 1996). Ecological research has continually identified the habitat requirements of many wildlife species using species distribution, abundance, and suitability models (Store and Jokimäki 2003). These habitat requirements vary among species and entail the natural resources and environmental conditions present within a species location. An accurate estimate of the spatial distribution of the intended species is necessary for a conservation plan to be effective (Hernandez et al. 2006). With appropriate data and application at hand these models assist in identifying unknown distribution, determining sites of high candidacy for reintroduction, guiding additional surveys and informing selection and management of protected areas (Graham et al. 2004).

Human-wildlife conflict is one of the major threats to the survival of many wildlife species. Human-Wildlife Conflict (HWC) or negative interaction between the people and wildlife has become the fundamental aspect of wildlife management as it represents the most widespread and complex challenge currently faced by conservationists all over the world (WWF 2007). The conflict usually starts when wild animals consume resources meant for human consumption: crop by herbivore and livestock by carnivores (Kissui 2008). When wildlife loses their natural habitats and reduced their natural food sources, they eat agricultural crops, kill/injure livestock and people, and destroy property (WWF 2008). As the natural habitat gets fragmented, the interface between human and wildlife increases while the animal populations become compressed. Consequently, it leads to greater contact and conflict with human as wild animals seek to fulfill their nutritional, ecological and behavioral needs (Sukumar 1990). The human-wildlife conflict is particularly due to the conversion of forest into large scale

monoculture plantations, shifting cultivation, overgrazing, forest cutting and encroachment in the home range which reduce the availability of natural food to the wild animals (Bajracharya 2009). An increase in human population from hill migrant and gradual forest encroachment for agricultural land have made the situation worse in the lowland and the illegal extraction of forest resources make further escalation for park people conflict in Nepal (Sharma 1991). The local people, who once were enjoying free access to areas henceforth covered by parks and were able to meet their needs from "inside" resources, now no longer, have legal access (Nepal and Weber 1993) which also leads people to bear cost not only indirectly through loss of resources such as firewood, fodder and non- timber forest products, but often by direct losses from crop and livestock raiding by wild animals dispersing from protected areas (Kumar 2012). Conflicts often arise when conservation regulations are imposed roughly to avoid natural resources usage, such as grazing land, firewood collection, fodder, medicinal plants and land for hunting without alternatives being provided (McNeely 1995, Lewis 1997) which become a serious problem for land managers and conservationist because such actions lead to negative human attitude towards wildlife, with potentially negative effects for conservation too (Pittiglio 2006-08). The existence of these sorts of conditions results in the unhealthy relationship between the wildlife, particularly the predator and the local people and people may undertake retaliatory killing in response to the economic loss incurred by livestock depredation resulting the reduction in the population of wildlife (Dhami 2011). If solutions to conflicts are not adequate, local support for conservation declines.

Species introduction

Blackbuck *Antelope cervicapra* (Linneaus 1758) is an elegant gazelle-like antelope regarded as the best-looking member of the family "Bovidae". It is called by the name *Krishnasaar* in Nepal. Blackbuck is taxonomically classified under the sub family "Antilopinae", family "Bovidae" and order "Cetartiodactyla". The scientific name *Antelope* is restricted to Blackbuck only. Mungall (1978) described four species of *Antilope cervicapra* according to the coat, color, length and the shape of the horn with distribution. They are; *Antilope cervicapra cervicapra* (South India), *A. cervicapra centralis* (Central India), *A. cervicapra rupicapra* (North India and Nepal) and *A. cervicapra rajputane* (North-West India and Pakistan).The IUCN Red list has listed this animal as "Near threatened" with stable population trend (IUCN 2015) and is

included in Appendix III of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). In Nepal, Blackbuck is one of the 27 protected mammals under National Park and Wildlife Conservation Act 1973 while National Red List Series of Nepal (2011) has considered this antelope as "Critically Endangered Mammal Species".

It lives in open habitat (Schaller 1967) in open grasslands, dry thorn, bush lands, and scrublands and once was distribution throughout West Pakistan along the foothills of the Himalayas from Punjab (Pakistan) through Uttar Pradesh (India) and Nepal to West Bangal (India) and East Pakistan (Lydekker 1924 cited in Chand 1999). The Blackbuck became extinct from Bangladesh and also from Pakistan in 1970s but 10 animals was re-introduced from Texas, USA in Lal Sunhara National Park of Sindh Provience of Pakistan (Burton and Burton 1987). In Nepal, Blackbucks were once commonly found in eastern and western Terai regions of Kanchanpur, Bardiya and Banke districts in as late as 1960s (Pradhan et al. 1999) but later the population of blackbuck declined and were restricted to Khairapur of Bardiya only. At present, Blackbucks are reintroduced to Hirapur phanta of Shuklaphanta Wildlife Reserve, Kanchanpur (DNPWC 2012). Few are in captive in central zoo, Mahendra Park, Nepalgunj mini zoo and semi-captive enclosures at Mrigasthali forest, Kathmandu (Khanal 2006). At the end of September 2015, the population of blackbuck was estimated to be 241 in Blackbuck Conservation Area, Khairapur, Bardiya (Monthly count, BCA, Bardiya).

Blackbuck is one of the few antelope species that exhibit pronounced sexual dimorphism. Males have black and white pelage and large spiraling horns (Shrestha 2003). The brown areas in the males gradually darken with age finally becoming black (Prater 1965). Females and juveniles are yellowish on their back and head, and are generally without horns. Both sexes have white under parts, as well as a white ring surrounding the eye and a white chin. They have a slender build and short tail. Adult male stands 70-80 cm at shoulder height and weighs 34-45 kg while female weighs 31-39 kg (Ranjitsinh 1989).

A. cervicapra is mainly diurnal, but sometimes nocturnal (Long 2003). They are gregarious (Schaller 1967) and lives in groups (single or mixed sex, numbering anywhere from 15 to several thousand animals) or sometimes as single animals at densities of 0.5–3 per hectare (Long 2003). Diet includes grass and cereal crops, leaves, forbs and browse (Long 2003). In India *A. cervicapra* damages a number of crops, in particular sorghum and millet (Chauhan and Singh 1990). It is reported to nibble mainly the young shoots of various cereal and pulse crops (Chauhan and Singh 1990).

In its native range, mating can occur throughout the year, but tends to be concentrated in two periods—March to May and August to October. During these times, males become territorial and maintain a territory of between 1–100 hactors (Long 2003). Females are sexually mature at approximately 15 months. Gestation is 5–6 months with females able to produce an average of 1.9 offspring per year (only a single offspring is born at a time, rarely two).The young are able to run soon after birth and are weaned at around 2 months. Lifespan can be up to 18 years in the wild (Long 2003).

Blackbuck has important ecological roles in grassland ecosystem. It has genetic, medicinal (horns and skin to cure liver and heart diseases), scientific, aesthetic and re-creational value. In Hinduism and Buddhism, the horns and skin of blackbuck are used in rituals like

'Bratabandha' and in medication by Saints: respectively. In Australia, blackbuck has good meat value.

Rationale of the Study:

The recent population scenario of blackbuck in BCA shows fluctuating trend which is restricted within a small area of core habitat. The population in BCA was 9 in 1975, 164 in 1988, 92 in 1993, 40 in 2000, 264 in 2011 (Annual report, BCA and DNPWC 2012). In this condition, it encourages for immediate habitat assessment and habitat prediction for viable population maintenance and understands resource availability within and around the CA. The area is heavily encroached by indigenous human settlements, agricultural lands and community forests. The small habitat of blackbuck is also fragmented by the busy cart road and other small foot trails. Anthropogenic disturbances and livestock grazing are the other external forces that confine the distribution of Blackbuck to small area and increase Blackbuck-human conflicts. The threat of extinction increases as it is the only surviving population in their natural habitat in Nepal and can easily collapse due to habitat encroachment and fragmentation, disease epidemics and inbreeding. “Men are the greatest destructor and men are the greatest protector too.” keeping this motto in mind, knowledge on ecological valuation of Blackbuck and its beneficial impacts to the local people is must for its conservation. Hence, along with ecological study, community-based approaches are crucial for conservation of this vulnerable animal as well as create positive impression among local people towards its conservation.

OBJECTIVES:

The aim of the study was to document ecological information on suitable habitat of Blackbuck in Nepal. The specific objectives were to:

- Predict suitable habitat of Blackbuck in Tarai Duar Savannah Land of Nepal.
- Evaluate intensity of Blackbuck-people conflict in Blackbuck conservation Area, Nepal.
- Build public support and conservation awareness programs in Blackbuck conservation Area, Nepal.

MATERIALS AND METHODS

Study Area

The Blackbuck Conservation Area (BCA), located between 20°07'54" to 28°17'22" N and 81°16'48" to 81°22'54" E in the western Terai, is the only Conservation Area in lowland of Nepal. It was established in 2009 and covers an area of 16.95 sq. km. of Khairapur and ward number 2, 3, 4 and 5 of Gulariya Municipality. The CA includes the core habitat of 5.27 sq. km. and peripheral area of villages and settlements spreading over 11.68 sq. km. The old Babai riverbed, locally called as *Sarju Nadi* runs along the west, north and south of the conservation area. The area is mostly marginal agricultural land and grazing land bordered on the three sides of the Conservation area by the Babai riverbed and the other side by scrub forest (Lehmkuhl 1979). Topography of the area is more or less plain, sloping towards the south with an elevation of average 146 m (asl). Standing water is found in the old riverbed during most of the year, but dry areas appear in many places during the hot seasons of March to June (Lehmkuhl 1979). The climate is tropical monsoonal receiving monsoon rain coming from the Bay of Bangal. Average annual rainfall is 1155 mm (Ban 2013).

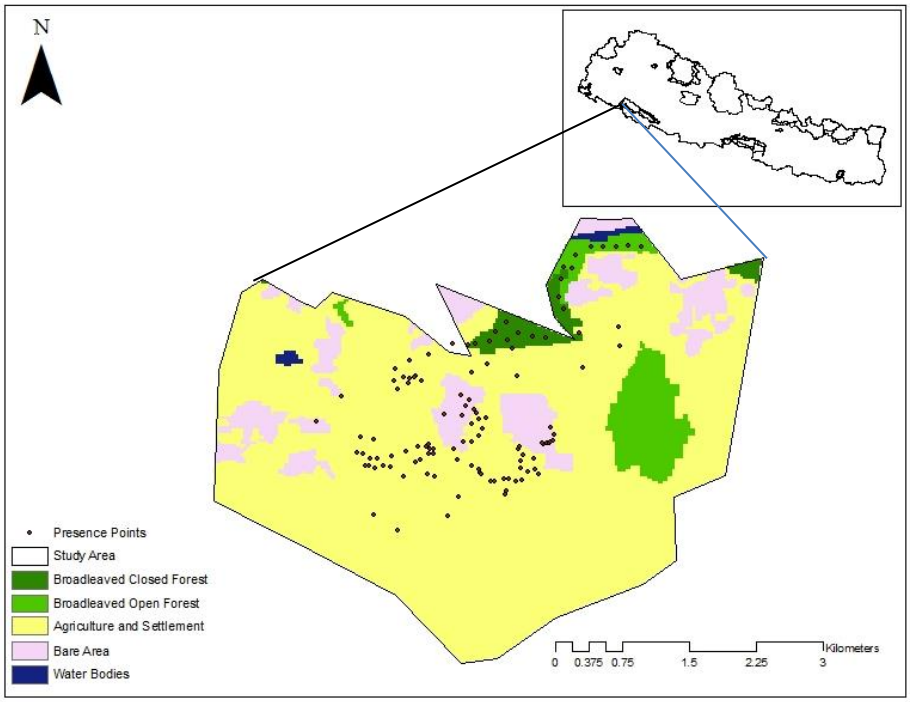


Fig 1: Study Area with presence points of blackbucks

The CA contains mainly open grazing land and few patches of forest land. The forest patches consists of *Acacia catechu, Dalbergia sissoo, Bombax malabaricum* and *Acacia nilotica* with *Glycosmis pentaphylla,Iichnocarpus frutescens, Zizyphus sps, Phyppanthus sps* and *Murraya koenigii.* The open grazing land is *Imperata-Desmodium* dominated. The other plant species consists of *Cynodon dactylon, Cyperus sps, Siteria glauca, Clerodendrum sps, Cassia tora, Rotala sps, Brachiaria sps, Ipomea fistulosa,* etc.

The fauna in the Blackbuck Habitat consists of Blackbuck *Antelope cervicapra*, Common Leopard *Panthera pardus*, Palm Squirrel *Funambulus pennati*, Brown Hare *Lepus nigricollis*, Strippen Hyaena *Hyaena hyaena* Jackal *Canis aureus*, Rhodents, Birds like Black Ibis *Pseudoidis papillosa*, Pond Heron *Ardeola grayii*, White Breasted Kingfisher *Halcyon smyrnensis* Common Peafowl *Pavo cristatus*

METHODS

Reconnaissance Survey

A preliminary visit on October 2014 was done to be familiar with the site. During preliminary survey, interaction with locals and a field reconnaissance was done for recognition of accessibility to the field, species' habitat and their distribution and identify major conflicting areas.

Habitat Suitability Modeling

Many different modeling techniques and algorithms exist for predicting the probability of species occurrences by using environmental variables as limiting factors for species' survival. Maximum Entropy (Maxent) was used to predict the habitat suitability for Blackbuck in Nepal. Maxent uses presence-only data for Habitat suitability modeling.

The presence data of the species were collected through extensive survey in the study area. Altogether 113 geo-referenced presence points were available for the modelling. 26 environmental variables likely to affect distribution of the species were used for modelling. Of these variables 19 bioclimatic variables and altitude were generated from Worldclim (Hijmann et

al., 2005 (www.worldclim.org)), land cover from Globcover-Ionia (ESA, 2008) (http://ionia1.esrin.esa.int/), Aspect and slope were generated using 90 meter DEM from SRTM (USGS, 2004) and Proximity variables (Distance to road, distance to settlements and distance to river) were generated using freely downloadable shape files of road, settlements, river available at Mountain Geo-portal website (www.geoportal.icimod.org). These data were formatted by ArcGIS 10. Program Maxent which uses Maximum Entropy Algorithm for modeling distribution was used for data analysis. Presence points were recorded in file type as required by the software (.csv). Similarly, 26 environmental layers in raster format were also extracted from the country's shape file, resampled whenever necessary and converted to the format required which was finally imported to the software. The model was then run using default auto features (linear and quadratic). Regularization multiplier value was taken as 1.

ROC Curve was applied for validation of the model. Output was classified into five habitat suitability categories according to probability of suitability given by the model (Solhjouy-fard et al. 2013). Areas for these parameters were calculated using Arc GIS 10.

Conflict Evaluation

Questionnaire survey

Two sets of questionnaire were prepared, one for local people and the other for park officials. These questionnaires contained both close and open ended questions. Altogether, 146 Households (HHs) were interviewed using systematic random sampling method in October-November 2014. Households whose croplands are inside and/or within 500m from the CA boundary were interviewed. Preliminary survey showed that Blackbuck did not go far away (approx. 500m) from the CA boundary to raid the crops as enough crops are grown inside and around the CA. Respondents were interviewed to ascertain the distribution, intensity and type of damage, major problematic pest species, causes of conflict, and the protective measures adopted against the pests species.

Crop Loss estimation

The information obtained from the questionnaire was introduced into the statistical tool to assess the crop loss. The following formula was used.

Total Crop Loss (kg) = Expected yield before crop raid – Actual yield after crop raid

$$\textbf{Crop Loss per Household (kg)} = \frac{\text{Total crop loss (kg)}}{\text{Total no. of Households Cultivating that crop}}$$

Total Economic Loss (Rs.) = Price of crop (Rs.) × Total Crop Loss (kg).

The losses of crops were estimated in local scale "Bori" which was converted into kilogram. Rate of different crops were obtained from the department of agriculture.

RESULTS AND DISCUSSION

Habitat Suitability

Potential habitat suitability distribution for the species was predicted for the species with available data and Eco-geographical Variables (EGVs). Model validation performed on basis of continuous AUC under ROC showed close agreement with the output models. The graph plotted against specific threshold and omission (Fig. 2) showed a closed agreement with expected value for any threshold explaining the model fit.

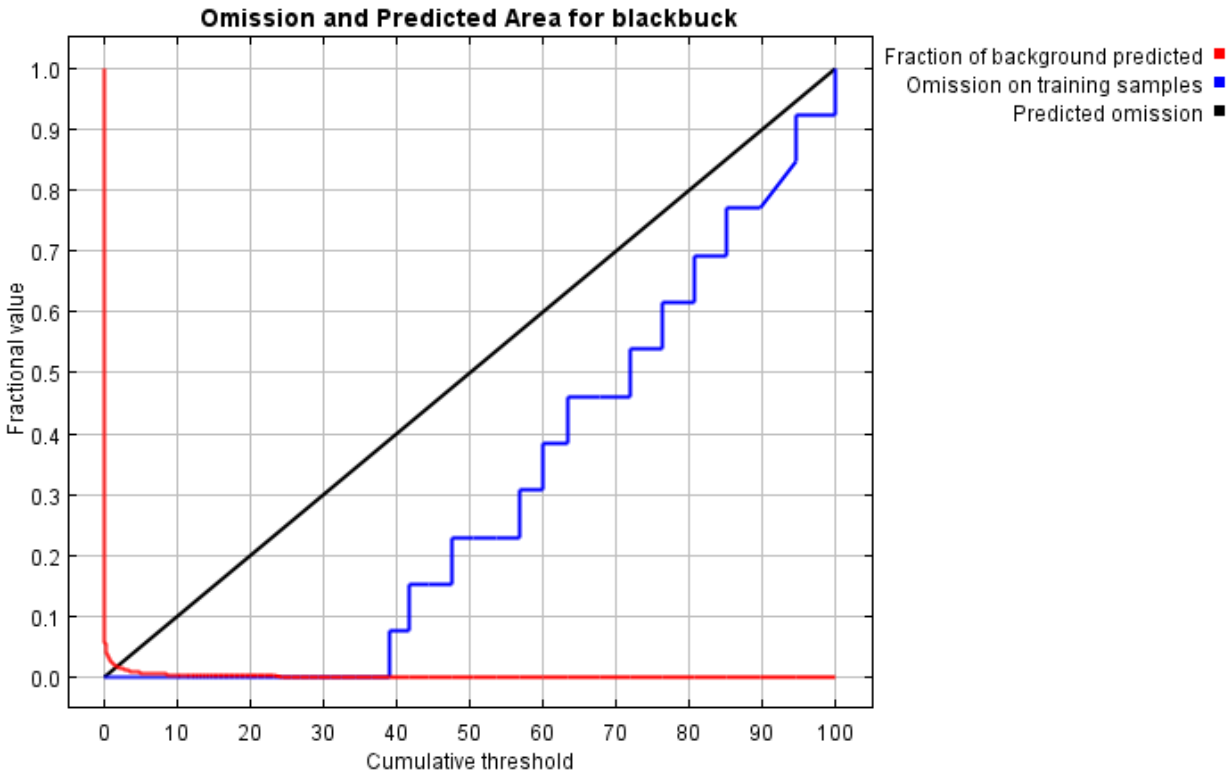


Fig. 2: Graph for omission against threshold values.

For Area Under Curve (AUC) under Receiver Operating Characteristics (ROC), sensitivity and 1 -specificity were plotted against each other to assess the omission rate to predicted fractional area which (Fig. 3) reported model fit (AUC=0.999).

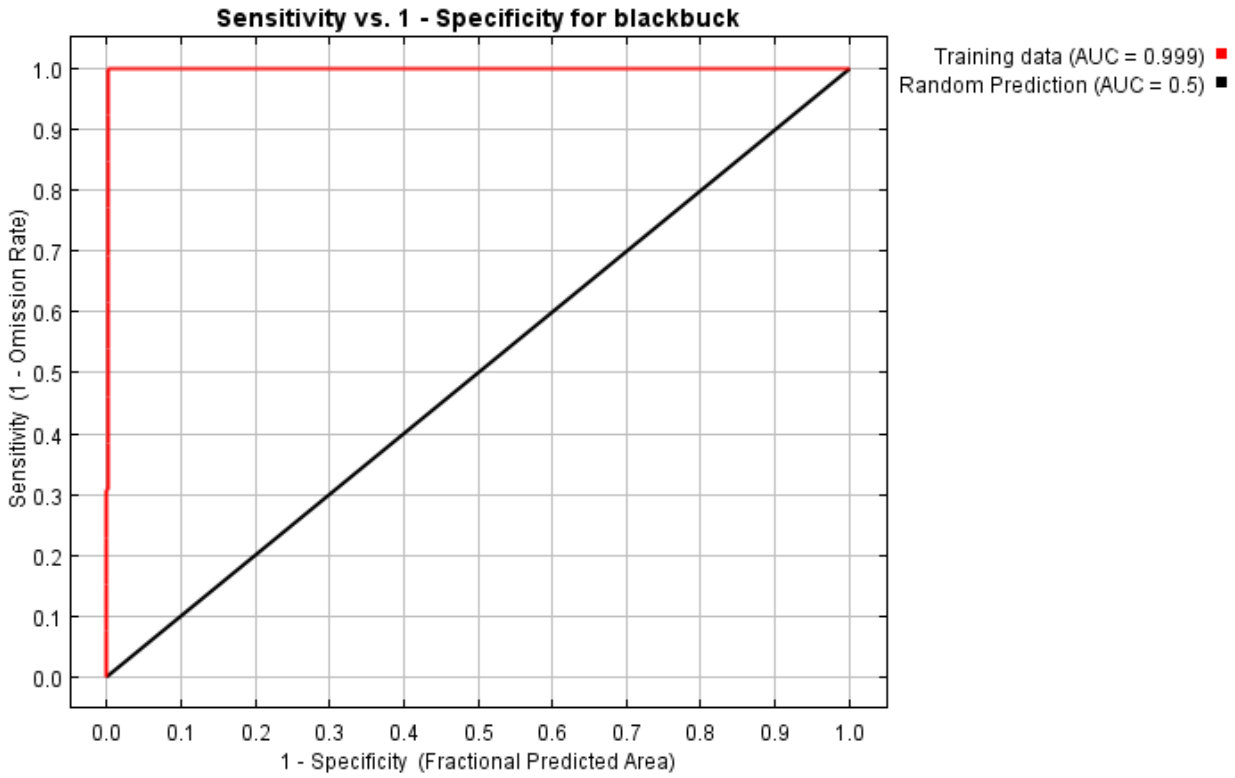


Fig. 3: AUC value for test and training data

Distribution modeling indicated very few suitable habitats for the species. The distribution of the species was discontinuous and only in the Tarai of Nepal (Fig. 4). Most of the suitable habitats occurred outside the protected areas. Suitable habitat mostly occurred in and around Blackbuck Conservation Area, Bardia and also outside the network of protected areas. Suitable habitats are in Bardiya and Banke districts of Mid-western Development Region and Kanchanpur districts of Far Western-Development Region. Areas around Bansgadi of Bardiya and south of it towards border of India are predicted to be most suitable habitat for this species. Furthermore, areas around Gulariya Municipality, Gangapur Jamun, Shivanagar and Mainapokhar to Khairi are highly suitable habitats. In Kanchanpur, grassland between Rani taal and Chaudhara river inside Shuklaphanta Wildlife Reserve and Chandani Dodhara VDCs on the other side of Mahakali river towards border of India are moderately favourable. Our analysis did not predict Hirapur phanta, where Blackbucks are translocated by the Government, to be suitable for Blackbuck. In Banke district, Khajura, Bhoj Bhagwanpur and floodplains of Rapti at the south of the district are predicted to be suitable for the species.

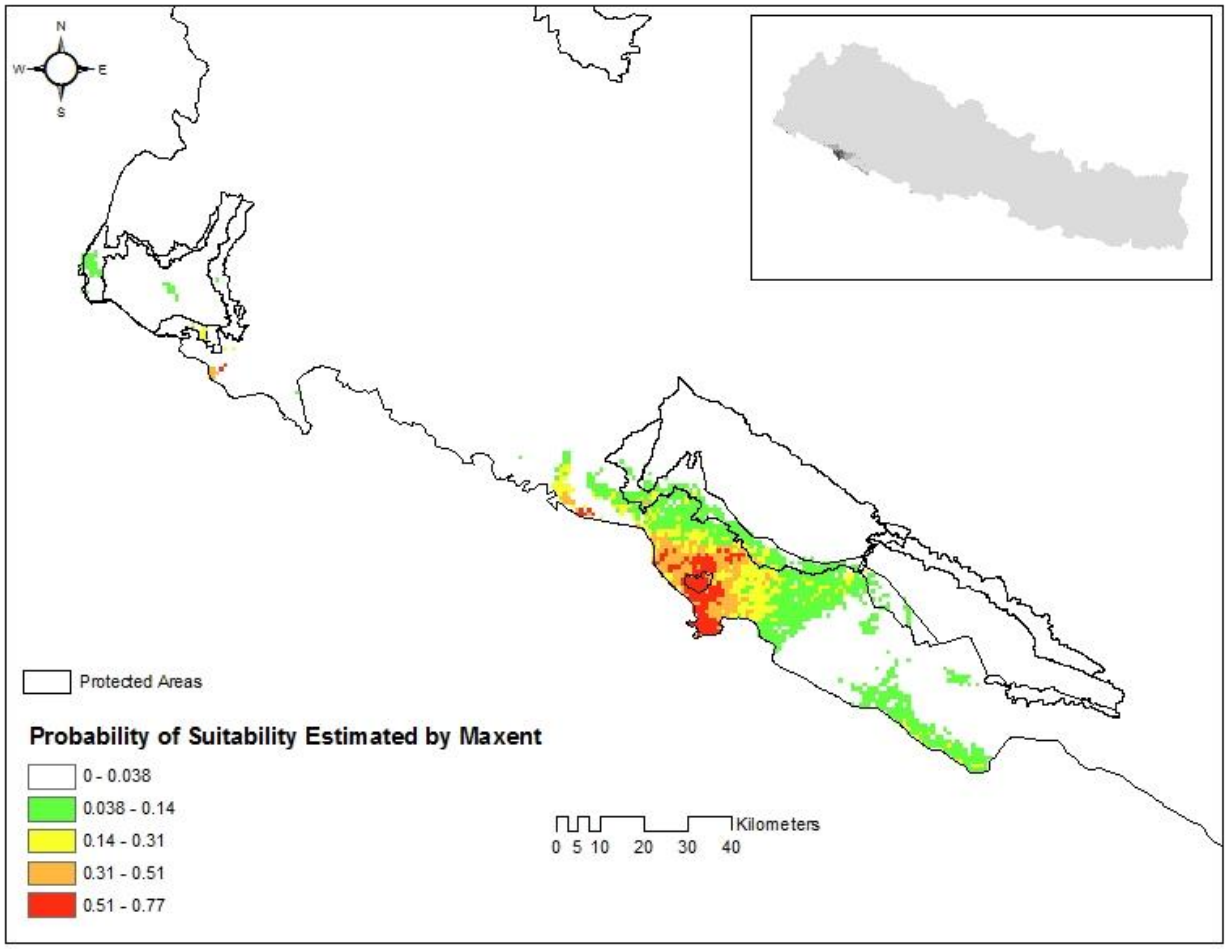


Fig. 4: Distribution of suitable habitats for Blackbuck in Nepal Tarai.

Warmer colors show greater suitability for the species. The highly suitable to poorly suitable areas were estimated approximately 109.03 km^2 (0.51-0.77), 145.13 km^2 (0.31-0.51), 223.3 km^2 (0.14-0.31) and 657.961 km^2 (0.038-0.14).

Table 1: Percent Contribution of Environmental Variables in Habitat Suitability Modeling.

Variable	Percent contribution
bio10 (Annual Mean temperature)	19
Landcover	16.6
bio4 (Temperature Seasonality)	10.8
bio3 (Isothermality)	10.7
bio7 (Temperature Annual Range)	6.7
bio18 (Precipitation of Warmest Quarter)	6.3
bio19 (Precipitation of Coldest Quarter)	5.5
bio16 (Precipitation of Wettest Quarter)	3.4
bio15 (Precipitation Seasonality)	2.6
bio5 (Max. Temperature of Warmest Month)	2.5
bio13 (Precipitation of Wettest Month)	2.4
Slope	2
bio14 (Precipitation of Wettest Month)	1.6
bio8 (Mean Temperature of Wettest Quarter)	1.5
Distance to Settlement	1.2
bio17 (Precipitation of Wettest Quarter)	1.2
bio2 (Mean Diurnal Range)	1.2
bio9 (Mean Temperature of Driest Quarter)	1
Altitude	0.8
bio12 (Annual Precipitation)	0.8
bio1 (Annual Mean Temperature)	0.7
Distance to River	0.6
bio11 (Mean Temperature Of Coldest Quarter)	0.6
bio6 (Min. Temperature of Coldest Month)	0.2
Distance to Road	0
Aspect	0

The Maxent model's internal jackknife test of variable importance showed that annual mean temperature,landcover, temperature seasanaliy and temperature annual range to be the major environmental variables to describe the occurrence of the species (Table 1; Fig.5). The gain for the model without any variable was slight but the model showed high training gain when maximum temperature of warmest month and mean annual temperature were used singly (Fig 5).

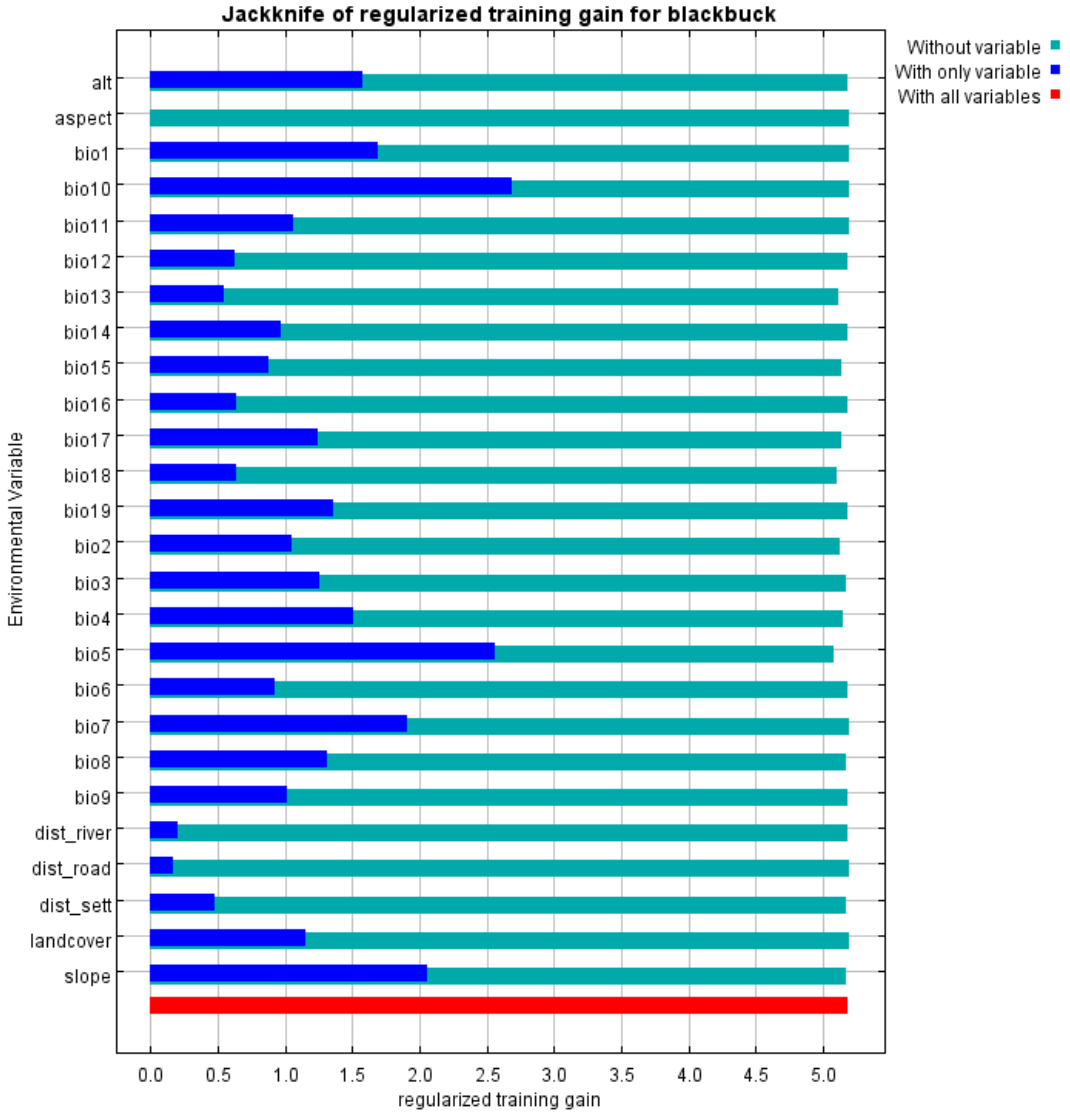


Fig. 5: Relative importance of predictor variables for *Blackbuck* determined by Maxent model (Jackknife Evaluation).

Conflict Evaluation

Among the 146 households, agriculture was the only source of livelihood for 16.75 % households whereas 67.12 % households were dependent on agriculture and livestock for their living. The 12.64 % households were serving in other sectors in nearby industrial towns or district headquarters. The landless households (5.47% of the monitored households) were either involved in agriculture on a land taken on lease from other or in livestock rearing or working as daily wage labors in agricultural fields.

Distribution and Intensity of damage by wildlife

Blackbuck raided on almost all the croplands inside the CA and to some extent to those that surround the CA boundary. Villages inside the Conservation area; Pachaskhalla, Pataha and Turantpur were most affected by the activities of Blackbucks. While outside the CA, Bhagartaal and Nimkothia were most raided villages by this species.

Humans, on the other hand illegally graze livestock, collect firewood, grass and other forest products, and use the habitat of Blackbuck as road and ride bicycles and motorcycles as means of transportation inside the CA to reach to their residents.

Crop damage by Blackbuck

Most of the people in CA are engaged in agriculture. The major crops grown are wheat, rice, mustard, maize, pulses and vegetables. In BCA, wheat was planted in 791.5 kattha (N=131 respondents), paddy in 956 kattha (N=134 respondents), maize in 364 kattha (N=66), pulses in 254 kattha (N=65), mustard in 171 kattha (N=43) and vegetable in 78 kattha (N=25).

There was a total crop loss of 58883 kg by weight and a total economic loss of Rs. 2046779 per annum.

Table 2. Quantity of crop and economic loss due to wildlife in Blackbuck Conservation Area

Name of crop	Land cover (Kattha)*	Total loss (Kg)	Total Loss (NRs)	Rate
Wheat	792	27577	882464	Nrs 32/Kg
Paddy	956	9200	165600	Nrs 18/Kg
Maize	364	9877	246925	Nrs 25/Kg
Pulses	254	5785	451230	Nrs 78/Kg
Mustard	171	1532	153200	Nrs 100/Kg
Vegetables	78	4912	147360	Nrs 30/Kg
Total	**2615**	**58883**	**2046779**	

*1 kattha= 338 sq. meter

Till now, No compensation is provided to the people suffering from crop loss due to any wild animals. The settlement and cultivation inside the CA is illegal so they are not provided any compensation.

Major causes of conflicts

There were several causes of conflict. Most of the respondents (>89%) believed that increased number of blackbucks in small habitat and food shortage (> 81 % respondents) inside the CA were the main cause for the blackbucks to visit crop land. Furthermore, scarcity of drinking water, search for palatable food, inadequate fencing at some boundaries, fodder harvest and domestic animal grazing by local people are other causes of conflict in the CA.

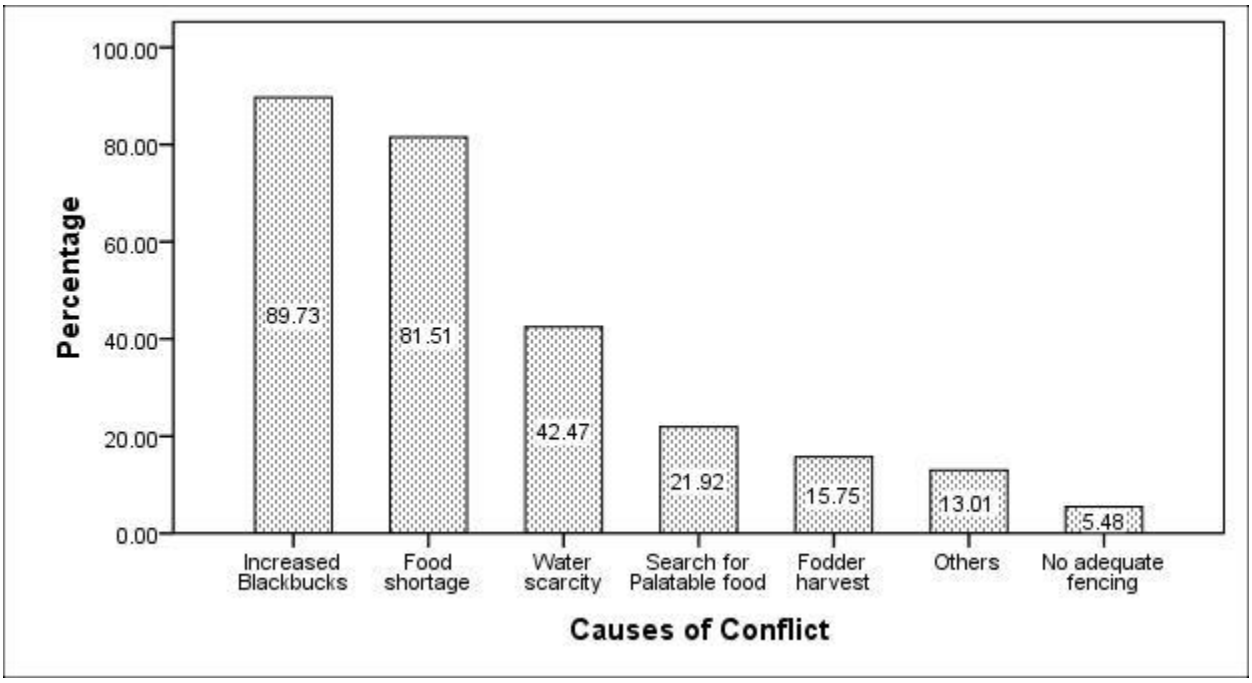


Figure 6. Causes of conflict in Blackbuck Conservation Area

Farming is done inside the CA since people moved to the area from other places. Blackbucks are habituated to feed on agricultural fields since then and so is the conflict.

Valuation of damage

Pachaskhalla, Pataha and Turantpur were most damaged areas by the activities of Blackbucks. While outside the CA, Bhagartaal and Nimkothia were most raided villages by this species. Blackbucks are habituated to raid the crops because of the easy access and availability of palatable crops in and around the CA boundary. The affected people estimated a total loss of Nrs 2046779. No compensation is provided to the victims so far by the Conservation Area. Since their settlements and farming is illegal, so they are not provided with compensation. Domestic cattle and human beings had also caused higher value of damage towards the reserve.

Time of crop raid by Blackbuck

Questionnaire survey showed that most of the respondents encountered with the wild animals several times. Blackbuck was the most encountered wildlife in the field that caused most of the

damage to the crops while Rabbits, Monkeys, and Parrots caused damage in negligible quantities. Most of the farmers (66.67%) encountered with the Blackbucks in the fields during nights, some (9.42%) during day time and other (23.91%) did specify that Blackbucks raided their fields at any time of the day (Figure 7). Crop raiding is habituated behavior of the Blackbuck as crops are easily available inside their habitat. Furthermore, by the beginning of winter (November-February), the food plants available in the fields dry up and become less nutritive to fulfill their nutritional needs. So, blackbucks switch their feeding to easily available and palatable crops.

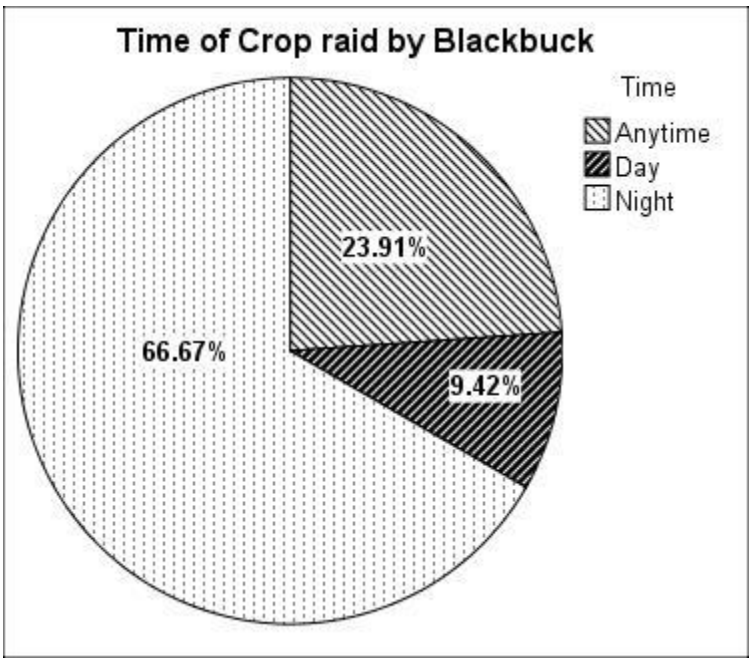


Figure 7. Time of visit of Blackbucks in the fields in Blackbuck Conservation Area

Protective Measures

People used a number of protective measures against raiding Blackbucks. Some commonly used methods were shouting and using noise making tools as clappers and drums, scaring device like scarecrow, guarding during nights, using fire, kerosene lamps and electric lights in the fields and throwing stones, etc (Figure 8).

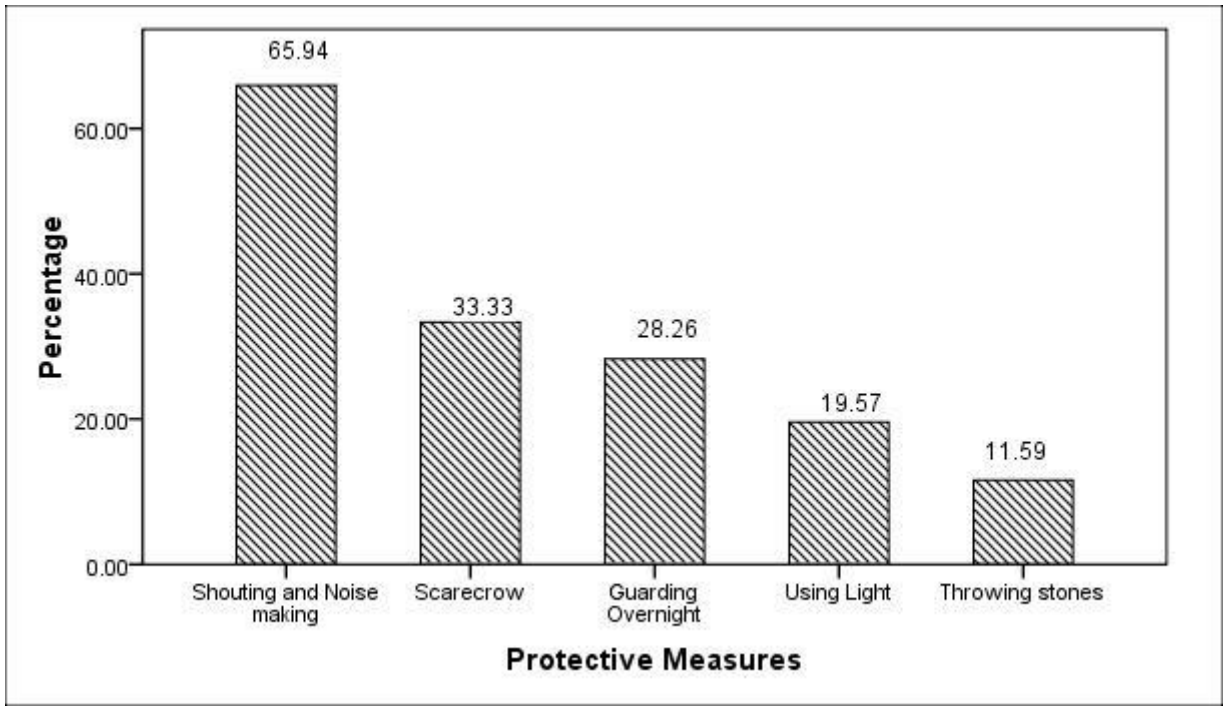


Figure 8. Major measures undertaken to mitigate conflict

BLACKBUCK CONSERVATION AWARENESS ACTIVITIES IN BLACKBUCK CONSERVATION AREA, BARDIYA, NEPAL

Blackbuck is one of the critically endangered mammalian species of Nepal; hence public involvement in conservation is crucial. So, several activities were performed at local level to make people aware. Following Activities were conducted for raising awareness and motivating locals in conserving this species.

Posters, Brochures and leaflets Publication and distribution

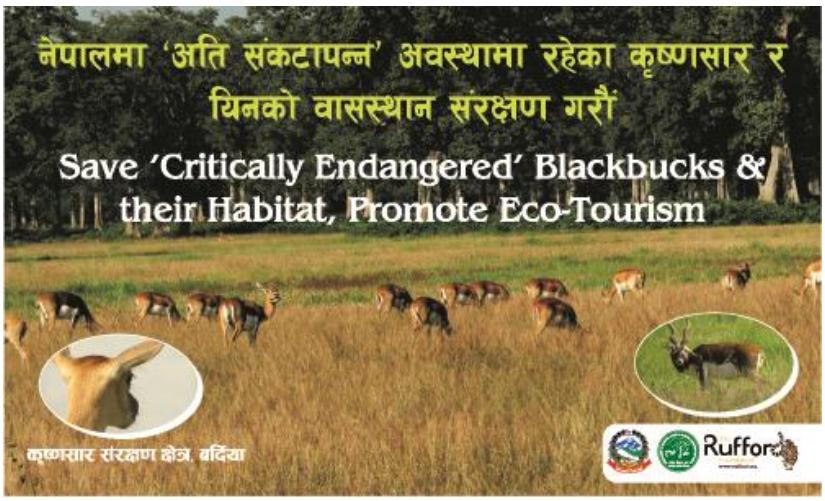
A total of 1000 Posters with catchword "*Blackbucks are critically endangered in Nepal, Lets unite to conserve them and their Habitats*" and 2000 Brochures and leaflets with catchword "Save Critically Endangered Blackbucks and Their Habitats, Save Biodiversity" were published and distributed to the Government and Non-government offices, Civil servants, Nepal Army, Nepal police, and local people of Gulariya Municipality. 400 copies were provided to Department of National Parks and Wildlife Conservation (DNPWC), Nepal. 200 copies were distributed among the students of Central Department of Zoology, Tribhuvan University, Nepal. 500 Copies were left to Conservation Area, Bardiya for future distribution. Also Flex Prints with slogans "Save Critically Endangered Blackbucks and their Habitats, Promote Ecotourism" were installed at several places.

Figure: Poster with information about Why Conservation and How to conserve the species

Figure: Brochures with information about Blackbuck, its Habitat, food, conservation status, conservation methods and challenges of conservation.

Figure:

Flex Prints that were installed at several places in Gulariya Municipality.



Browsers, leaflets and posters distribution activities:

Member of the House of Representatives, Government officials, police staffs and local concerned people reading the leaflets and receiving posters with interest**.**

Sixth Blackbuck Festival 2015 *Chhaithau Krishnasaar Mahotsav 2072*

Blackbuck Conservation Area, Bardiya and Ruffords Foundation jointly conducted "Sixth Blackbuck Festival 2015" in Blackbuck Conservation Area premises on 17 March, 2015. On the occasion, Member of Constituent Assembly, Chief District Officer, District Development Officer, D.S.P of Police, Army Officers, Staffs of major Government and Non-government offices, Journalists, members of Local Forest User groups, concerned persons, Teachers, students and local people attended the program.

Brochures and leaflets were distributed to all participants in the program. Member of Constituent Assembly inaugurated the program. Member of Constituent Assembly, Chief District Officer and District Development Officer spoke on the value and importance of Blackbuck in Nepal and duties and role of Government of Nepal in protection and conservation of Blackbuck and its natural Habitats. Head of the Blackbuck Conservation Area Management Council Mr. Tank Prasad Adhikari spoke on the history of Blackbucks in present habitats, problems faced to protect this species so far, it's ecological and tourism value and future challenges in conserving this animal. Many of the guest speakers delivered their speech focusing on how to conserve this species and what shall be future policies and plans for BCA, the roles of government and Non-government agencies and local people.

On the very Occasion, Guest speakers delivered their speech on Nature, Biodiversity, Ecosystem and ecosystem services, Forest and Forest resources, What Blackbuck is, its importance, relationship between humans and Blackbuck, Blackbuck conservation initiatives and success in Blackbuck Conservation Area, what can be role in its conservation, etc.

Staffs of the Blackbuck Conservation Area, Army officials, local concerned people and youths were awarded with "Letter Of Appreciation" from the hands of Member of Constituent Assembly in respect to their crucial work in conservation of Blackbuck and other Flora and Fauna of Blackbuck Conservation Area.



SIXTH BLACKBUCK FESTIVAL 2015

Participients, Enaguration and speech by Member of Constituent Assembly and speech by Chief district Officer and president of BCA Management Council.

Inter-School Art, Quiz and Essay competition

Different events of Art, Quiz and Essay competition were conducted among the nine schools of Bardiya on the occasion of 20th WILDLIFE WEEK 2015 (Wildlife week is celebrated every first week of the first month (*Baisakh 1-7*) of Nepali Calendar).

Inter-School Arts competition was conducted among the students of Primary level (Class 1-5). Altogether 45 students from five schools; Bhanudaya Lower secondary school Bachaipur, Nepal Rastriya Primary School Tejipur, Swarswati Primary School Panditpur, Nepal Rastriya Shambhusaran Higher Secondary School Khairapur and Sakatu Tulasi Primary School Jainpur participated in the arts competition. The theme of the art was "We, Nature and Biodiversity." Arts were ranked by Staffs of Conservation Area and Teachers of different schools on the basis of Attractiveness, association with theme and color combination into four categories: "First", "Second", "Third" and "Consolation."

Out of 45 drawings, top 5 drawings were declared winners. The winners of the Arts competition were:

1. First Prize: Vivek Yadav - Nepal Rastriya Primary School, Tejipur

2. Second Prize: Ashmita Sarki - Swarswati Primary School, Panditpur

3. Third Prize: Ashish Chaudhary - Bhanudaya Lower Secondary School, Bachaipur

4. Consolation Prize: Madhuri Khauraha- Nepal Rastriya Shambhusaran Higher Secondary School Khairapur

5. Consolation Prize: Shyamadheera Godiya- Sakatu Tulasi Primary School, Jainpur

Inter-school Quiz Competition was conducted among the students of Lower-secondary level (Class 6-8). Altogether 21 students (3 in each group) from seven schools participated in the competition. Each school was assigned with different Group name into *Bagh* (Tiger) Group, *Krishnasaar* (Blackbuck) Group, *Gaida* (Rhino) Group, *Chetuwa* (Leopard) Group, *Bandar*

(Monkey) Group and *Nilgai* (Bluebull) Group. Questions for the competition were prepared by Conservation Officer Mr. Pashupati Adhikari and he conducted the programme too. The competition was conducted in office compound of Blackbuck Conservation Area, Bardiya. Altogether 70 questions each carrying a weight of 10 marks was asked.

Different events of Inter-School Quiz Competition

The winners of Inter-school quiz competition were:

1. First Prize: Shree Dhruba Higher Secondary School, Tulsipur

    a. Ashok Raj Poudel (Class 8)

    b. Sushanta Poudel (Class 7)

    c. Sandhya Sapkota (Class 7)

2. Second Prize: Nepal Rastriya Shambhusaran Higher Secondary School Khairapur

    a. Niraj Yadav (Class 7)

    b. Bishnu Timilsena (Class 8)

c. Barna Prasad Jaisi (Class 7)

3. Third Prize: Shree Deepjyoti Lower secondary School, Chhedapur

a. Rohit Rana (Class 5)

b. Suman Chaudhary (Class 4)

c. Pawan Karki (Class 5)

4. Consolation Prize: Shree Bhanodaya Lower secondary School, Khairapur

a. Samikchhya Buda (Class 8)

b. Surendra Sunar (Class 7)

c. Samana Buda (Class 7)

Inter-school Essay Competition was conducted among the students of secondary level (Class 9-10) of Gulariya Municipality. Unfortunately, due to approaching School Leaving Certificate (SLC) Examination of Class 10 and Final Terminal examination of Class 9, only one school (Shree Nepal Rastriya Shambhusaran Higher Secondary School) participated in the competition. Since competitions were scheduled for 20th Wildlife week 2015 and notices were delivered earlier, the competition was conducted among the students present on that day. The topic for the Essay competition was proposed by the Chief Warden Mr. Narayan Rupakheti too be "Role of students in Biodiversity Conservation." The essays were marked individually by three observers; Chief Warden Mr. Narayan Rupakheti, Conservation Officer Mr. Pashupati Adhikari and RSG Grants Grantee Mr. Amar Kunwar. Each mark was added and the highest scorer was declared as "First" followed by "Second", "Third" and "Consolation."

The winners of the Essay competition were:

1. First Prize: Hemandra Nath Sharma

2. Second Prize: Chhaya Timilsena

3. Third Prize: Suwas Yadav

4. Consolation Prize: Roshan Prasad Dhakal

Participants of Essay Competition with participants of Quiz competition, BCA staffs and teachers.

Prize Distribution Ceremony was conducted on the 7th day of wildlife week 2015 in the BCA office compound. Winner students were awarded with educational materials and certificates. Program was announcement by Mr. Uttam Chaudhary. The chief Guest of the ceremony was the President of BCA Management council Mr. Tanka Prasad Adhikari and the program President was Chief Warden of BCA Mr. Narayan Rupakheti. Other guests were school teacher from participant schools, BCA staffs and members of BCA Management Council, students and local leaders. Chief warden Mr. Narayan Rupakheti, Conservation officer Mr. Pashupati Adhikari and teachers delivered their important speech to the students about their duty and role in Blackbuck and biodiversity conservation. The program ended with the closing speech by President of BCA management council Mr. Tanka Prasad Adhikari.

Awareness camp for local people

a. Local leaders, Herder, women and youths were gathered at BCA office and information classes and discussion were done about Blackbuck, their status, importance and our role in its conservation. Group discussions were conducted with the key persons and local knowledged people, journalists and Staffs.

b.Youth Conservation Group (YCGs) and Blackbuck Conservation Specialist Group Discussion

There were already formed YCGs in Schools but passive. So discussions were conducted with leaders and members of the Groups and planned the future strategies for the Groups to actively involve in Biodiversity conservation in the CA. The CA is supporting the YCGs in several ways.

Discussion with Senior citizens and women were conducted to express their experiences, their understandings and roles in biodiversity conservation.

c. Hoarding Board and Banners:

Eight Hoarding Boards and six Banners were prepared to install them in and around the Conservation area. The Hoarding boards contain information about Ecology of Blackbuck, Our Role in Biodiversity Conservation, Conservation Status of Blackbuck, Rules on What to do and what not to do inside Conservation area, Information on Carrot Grass *Parthenium hysterophorus* Plant and Complications due to its invasion in Habitat of Blackbuck.

Hoarding Boards and Banners prepared before installation in the study area

d. Radio Programme *Krishnasaar Samrakchhan Aawaj* Blackbuck Conservation Voice**:**

With target to convey the knowledge about the facts and importance of Critically threatened Blackbucks and other biodiversity, sustainable use of natural resources, role of public in conservation, value of this species in upgrading livelihood and quality of life, etc to the general public, students, policy makers and researchers, etc a contract for 24 episodes for the programe entitled "Blackbuck Conservation Voice *Krishnasaar Samrakchhan Aawaj*" was signed on March 16, 2015 between Mr. Deepak Sharma, Station Manager, Radio Phoolbari Fm 100.6 MHz and Mr. Amar Kunwar, RSG Grantee. The contract included 24 episodes of each 30 minutes broadcasted every Friday 8:15-8:45 hours from April 17, 2015 to September 25, 2015. Each episode included Conservation News, an Expert interaction, information about Blackbuck and

Quiz. Advertisements were done before broadcasting the program. The program was successfully completed.

CONCLUSION:

The distribution probability of the species was predicted very few suitable habitats, discontinuous and only in the Tarai of Nepal. Most of the suitable habitats occurred outside the protected areas. Suitable habitat mostly occurred in and around Blackbuck Conservation Area, around Bansgadi of Bardiya and south of it towards border of India. Areas around Gulariya Municipality, Gangapur Jamun, Shivanagar and Mainapokhar to Khairi are predicted as highly suitable habitats. In Kanchanpur, grassland between Rani taal and Chaudhara river inside Shuklaphanta Wildlife Reserve and Chandani Dodhara VDCs on the other side of Mahakali river towards border of India are moderately favourable. Our analysis did not predict Hirapur phanta to be suitable for Blackbuck, where Blackbucks are translocated by the Government to be suitable for Blackbuck. In Banke district, Khajura, Bhoj Bhagwanpur and floodplains of Rapti at the south of the district are predicted to be suitable for the species. Blackbucks raid almost all the croplands inside the Conservation Area and to some extent around the CA boundary.Pachaskhalla, Pataha and Turantpur were most affected by the activities of Blackbucks. While outside the CA, Bhagartaal and Nimkothia were most raided villages by this species.Humans, on the other hand illegally graze livestock, collect firewood, grass and other forest products, and use the habitat of Blackbuck as road and ride bicycles and motorcycles as means of transportation inside the CA. There was a total crop loss of 58883 kg by weight and a total economic loss of Rs. 2046779 per annum. The government has not provided any compensation for the victim till date. Increased number of blackbucks, food and water scarcity, search of palatable food by the blackbucks and fodder harvest by humans are the major causes of conflicts. Blackbucks mostly raid during the nights. Shouting and using noise making tools as clappers and drums, scaring device like scarecrow, guarding during nights, using fire, kerosene lamps and electric lights in the fields and throwing stones are mostly used techniques by the people to minimize crop raid.

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SOME PHOTOGRAPHS:

Some clips of disturbances created by humans inside Blackbuck Habitat in Blackbuck Conservation Area, Bardiya, Nepal

a-c: Interview with Warden, former warden &gamescout respectively, d-f: Data collection in the field, g-n: Questionnaire survey