

Population Status and Distribution of Lesser Florican (*Sypheotides indica*) in the Royal Bardia National Park, Nepal

With report on Bengal Florican



Timilsina et al. (2000)



Report Submitted to
WWF Nepal Program
2000

Cover:

Source: Rahmani *et al.*, 1990

Photo: Male Bengal Florican & Male Lesser Florican by Ravi Sankaran

Female Bengal Florican by Goutam Narayan & Female Lesser Florican by Ravi Sankaran

**POPULATION STATUS AND DISTRIBUTION OF LESSER FLORICAN
(*Sypheotides indica*) IN THE ROYAL BARDIA NATIONAL PARK, NEPAL**
WITH REPORT ON BENGAL FLORICAN

Report submitted to
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LIST OF ABBREVIATIONS & ACRONYMS

IUCN	- World Conservation Union
HMG	- His Majesty the Government
RCNP	- Royal Chitwan National Park
RBNP	- Royal Bardia National Park
CITES	- Convention on International Trade of Endangered Species
RBWR	- Royal Bardia Wildlife Reserve
ICBP	- International Council for Bird Preservation
KMTNC	- King Mahendra Trust for Nature Conservation
Sq. Km.	- Square Kilometer
°C	- Degree Celsius
mm.	- Millimeter
cm.	- Centimeter
ha.	- Hectare
gms.	- Grams

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ABSTRACT

Lesser Florican (Sypheotides indica), one of the bird included under the endangered species list of IUCN Red Data Book and the protected bird of HMG Conservation Act, Nepal was studied. Survey was done for 11 days with the help of 10x50 binocular. Discussions and interviews were held with the park staff, local people and naturalists. Three main grasslands of Bardia viz. Bagaura, Lamakuli and Khauraha were the prime concern of the study. Though the past records suggested the presence of Lesser Florican, this study was unable to record a single one. Different limitations of the study are discussed. Condition of the habitat and different conservation problems and threats were assessed and necessary solutions recommended.

In the mean time, a brief survey on Bengal Florican (*Houbaropsis bengalensis*) was also done. A total of five floricans (3 males/2 females) were counted. Sub-adults were not recorded. All the males had distinct territories. Though there was the presence of ideal florican habitat, the population seemed to be declining. To provide additional habitat for floricans, maintenance of grasslands other than Bagaura and Lamkauli was recommended.

Part I:

Lesser Florican

1. INTRODUCTION

1.1 Status and distribution

The Lesser Florican (*Sypheotides indica*) is an endangered bustard endemic to Indian sub-continent (Sankaran *et al.*, 1992). Ali and Ripley (1969) summarized its distribution as a resident irregular migrant and nomadic in the rainy season. In Nepal, it is found in the grasslands of lowland, terai. It is recorded from Royal Chitwan National Park (RCNP) and Royal Bardia National Park (RBNP).

Lesser Florican is included under the endangered species list of IUCN Red Data Book, Appendix I of CITES and one of the nine protected birds under National Park and Wildlife Conservation Act 1973 of His Majesty the Government of Nepal.

Not much work on Lesser Florican has been done in Nepal. Literatures, on this species of bird, are rare. But, we can find the mentioning of this bird, on some of the previously done works. Inskipp and Inskipp (1983) has included information about this bird, in their report on Bengal Florican.

About the presence of Lesser Florican in Nepal, at least 2 specimens of Lesser Floricans were obtained in Nepal by Hodgson in the early part of the last century. The birds were taken from the Kathmandu valley on 23rd May and 26th June. The other known record from the Kathmandu is of a specimen taken between March 29 and April 4, 1962 (Diesselhorst, 1968; cited in Inskipp and Inskipp, 1983). Lesser Florican has been recorded in the southeast part of Patan and Kathmandu valley during monsoon (Fleming *et al.*, 1979).

Inskipp and Inskipp (1983) mentioned about a male seen by a Gaida Wildlife Camp naturalist at Kachwani in RCNP and a male observed by R. Bista at upper Bagaura of RBNP. In their status survey on Bengal Florican, Inskipp and Inskipp (1983) has recorded a Lesser Florican on May 17th and 19th, 1982 at Lamkauli Phanta of RBNP and described it as an adult in partial breeding plumage in short grass height of about 0.5 m. The underparts were not completely black but the head tassels were present.

1.2 Ecology

External Features

The Lesser Florican is a small bird with a horizontally carried body on longish legs. The length of males is about 46 cms. while the females are slightly larger at about 51 cms. While standing they are about the size of village fowl (Sankaran, 1990). They weigh between 510 and 740 gms. (Ali and Ripley, 1969). There is a distinct seasonal sexual dimorphism in this species. Males in their breeding plumage are black with three pairs of elongated spatulate ending plumes on either side of the head and just behind the ear coverts (Sankaran, 1990). The female is cryptically coloured and on overall sandy buff mottled with blackish markings on the back. The white on the wing is absent, instead has pale buff patches which show up in flight. The male in the non breeding season are like the female in appearance except that they retain much of the white on the wings.

Habitat

Ali and Ripley (1983) described their habitat as tall grassland with scattered bushes and standing crops of cotton and millets. The primary habitat requirement for breeding is grasslands where sufficient grass cover is available during the breeding season. In western India, the principal breeding range, the grasslands are the *Sehima nervosum*, *Chrysopogon fulvus* type. The Lesser Florican also uses corplands of cotton (*Gossypium* sp.), sorghum (*Sorghum vulgare*), maize (*Zea mays*), soyabean (*Glycine max*), sugarcane (*Saccharum* sp.), rice (*Oryza sativa*), mustard (*Brassica campestris*), groundnut (*Arachis hypogea*), lentil and wheat (*Triticum vulgare*). This species is also known to use lightly wooded country, grazed lands and scrublands dominated by *Zizypus* sp.

Territory

During the breeding season, the Lesser Florican is solitary (Baker, 1921; Dharmakumarsinhji, 1950; Sankaran, 1994). The Lesser Florican can follow a dispersed lek system and territories are usually spaced out at distances of between 250 and 500 meters. Each territory is approximately a hectare or more in area and males restrict their activities to their territories.

Courtship behaviour

The display related to breeding of Lesser Florican has been differentiated into attraction displays and courtship displays (Dharmakumarsinhji, 1950 cited in Srivastav and Rana, 1998). The attraction display is aerial and mainly performed to attract the female, whether present or not. The courtship display is performed only in the presence of the female and is

directed toward it. The female is extremely shy and therefore not easily visible. It can only be seen when nesting, since it will not leave the nest except when forced to do so. Generally the female selects moist areas with tall, thick grasses.

Nesting behaviour

In contrast to the pugnacious and conspicuous male, the female Lesser Florican is elusive and shy. Clutch size was most commonly four than three, with only one instance of five (Sankaran, 1990).

Sensitivity

The Lesser Florican is highly sensitive and has powerful sense of sight and hearing. As a result, the female is difficult to sight on the ground (Srivastav and Rana, 1998). Males tolerate the presence and movement of bluebills and backbills in the vicinity, but their response to the presence of wolves, wild boar and jackals has not been observed so far.

The males are extremely sensitive to human presence and maintain a safe distance of at least 100m. from moving jeeps and human beings. Females are hypersensitive to any unfamiliar objects and can remain motionless for up to 30 minutes.

1.3 Objectives

- To estimate the population of Lesser Florican in the study area.
- To find its distribution both inside and outside the park.

1.4 Justification

The main aim of this project was to examine the shrinkage in the breeding range and population of the Lesser Florican and the causes for this reduction. It is a difficult bird to study primarily because of the type of habitat, which it occupies, and also because of its elusive behavior. So much of its ecology remained obscured.

In India, population survey of Lesser Florican has been carried out at a regular interval and status report is updated. But in Nepal apart from including in protected species list no work has been done for about three decades. The population status of Lesser Florican remains obscured in Nepal. Among endangered species, birds got least attention from conservation perspectives.

Survey of Lesser Florican and population record has been included in the Management Plan of Royal Bardia National Park 1997-2001. Unfortunately, no work has been done to cover this species. So this Project will update the status of Lesser Florican in the Royal Bardia National Park.

2. STUDY AREA

2.1 Location and boundaries

The Royal Bardia National Park (RBNP) is located (81°20' E and 28°35' N) in the mid western region of Nepal. RBNP is the largest (968 Sq. Km.) protected area in terai region of Nepal. The park extends in Bardia and a part of the Banke district, about 400 Km. southwest of Kathmandu. The northern boundary of the park is formed by the crest of churia range. The eastern boundary extends upto the Surkhet-Kohalpur road. Geruwa river, the eastern branch of Karnali river is the western boundary of the park. The southern boundary adjoins agricultural settlements and part of the east-west highway of the country.

2.2 History of the park

In 1969, part of the area was established as Royal Hunting Reserve. After seven years in 1976, it was gazetted as Royal Karnali-Bardia Wildlife Reserve (area 348 Sq. Km.). In 1982, it was renamed as Royal Bardia Wildlife Reserve (RBWR). Later in 1984, the area was enlarged to include Babai valley in the north-east. 1,572 families comprising about 95,000 people residing in the Babai valley were resettled in the Taratal area near the Indian border (Anon, 1993). In 1989, the whole area was declared as Royal Bardia National Park.

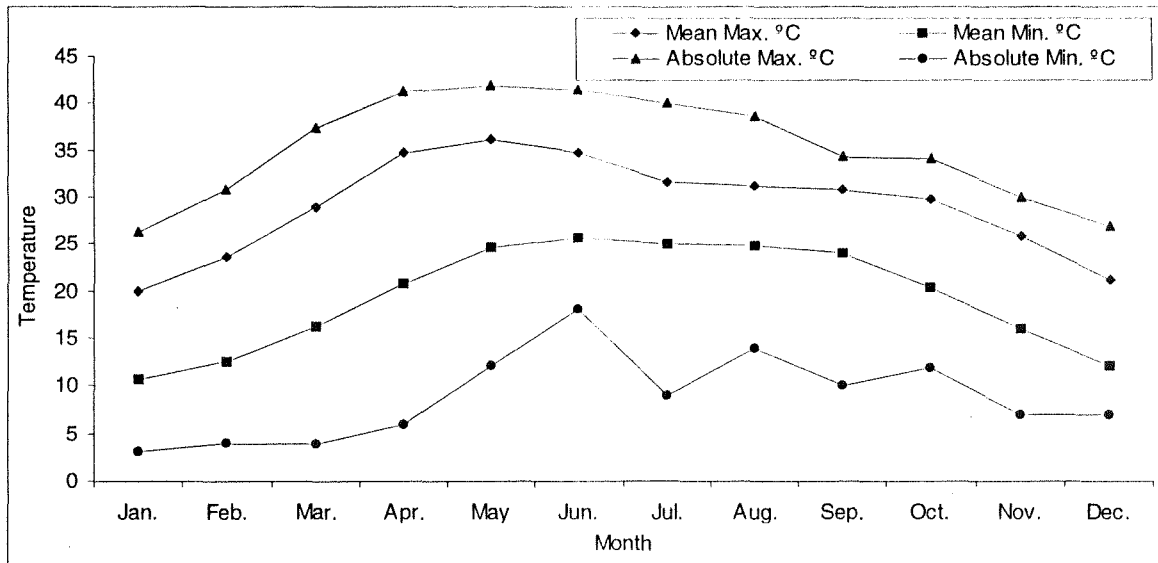
2.3 Climate

Royal Bardia National Park has a sub-tropical monsoonal climate, with three distinct seasons in the annual cycle: the **Hot-Dry** from mid February to mid June, the **Monsoon** from mid June to late September and **Cool-Dry** from late September to mid February (Dinerstein, 1979). The temperature increased steadily during the hot season until the monthly maximum of 36.09°C reached in May. In the monsoon season most of the total annual rainfall (about 80-90% of total rainfall) occurs during four months (June, July, August and September) of the year. In the cool season temperature decreased steadily until monthly minimum of 10.71°C reached in January.

For the period of 1980-1998, the highest average annual maximum and minimum temperatures of 29.87°C and 18.47°C, respectively were recorded in the year 1987. The absolute maximum temperature of 41.9°C and minimum temperature of 3.1°C were recorded in May, 1996 and January, 1987, respectively. The highest rainfall of 2799 mm

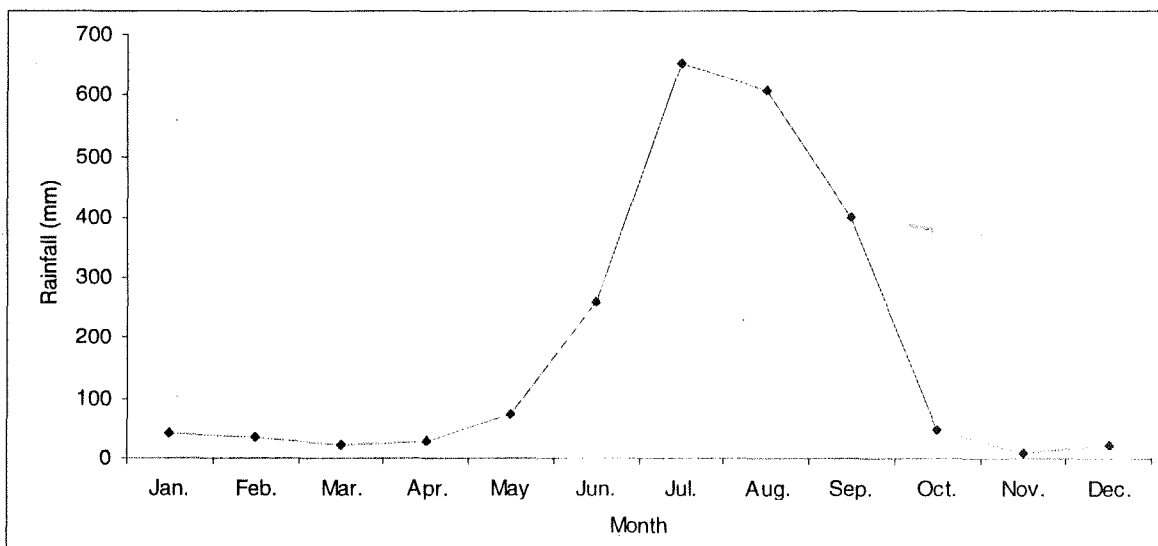
and lowest rainfall of 1593 mm occurred in the year 1990 and 1992, respectively. The highest mean monthly rainfall of 637.19 mm occurred in July and lowest monthly rainfall of 8.95 mm occurred in November. The highest monthly rainfall of 1023 mm occurred in August 1985.

Figure 1: Monthly variations in mean maximum, mean minimum, absolute maximum, absolute minimum temperature for the year 1980-1998 recorded at Chisapani-Karnali.



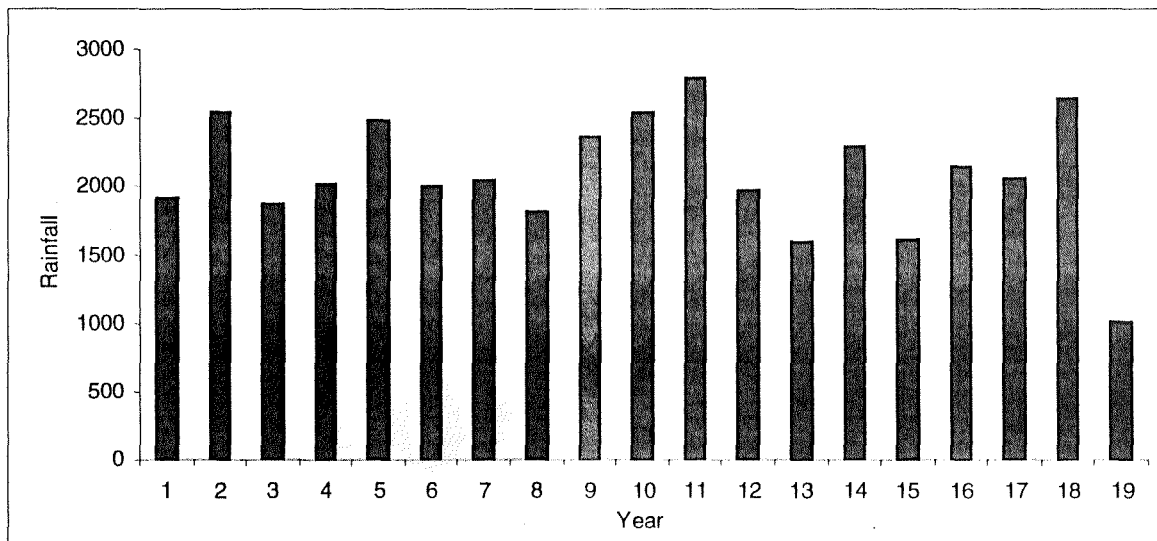
(Source: HMG/Dept. of Hydrology and Meteorology).

Figure 2: Monthly variations in average monthly rainfall (mm) for the year 1980-1998 recorded at Chisapani-Karnali.



(Source: HMG/Dept. of Hydrology and Meteorology).

Figure 3: Total annual rainfall (mm) for the year 1980-1998 recorded at Chisapani- Karnali.



(1=1980..... 19=1998)

(Source: HMG/Dept. of Hydrology and Meteorology).

2.4 Flora

A vegetation study conducted by Dinerstein (1979) classified six major vegetation types. This was later modified by Jnawali and Wegge (1993) to seven major vegetation types. These are:

Sal forest: Sal forest covers 75 percent of the total park area. It is dominated by *Shorea robusta* in association with *Terminalia tomentosa* and *Buchanania latifolia*.

Khair-Sisso forest: Khair-Sisso forest is composed of *Acacia catechu* and *Dalbergia sissoo* and is restricted to major water courses and flood plain islands.

Moist-riverine forest: In this type of forest *Syzygium cumini*, *Mallotus philippinensis*, *Bombax ceiba* are common together with shrub species like *Callicarpa macrophylla* and *Murraya koenigii*.

Mixed hardwood forest: Species of this forest type grows on well drained flat land. *Adina cordifolia*, *Casearia tomentosa*, *Mitragyna parviflora* are some species of this type of forest.

Woody Grasslands: Woody grasslands are grass covered areas with sparsely distributed trees. *Imperata cylindrica*, *Saccharum spontaneum*, *Vetivera zizanoides*, *Cyperus kyllingia* etc. are the common grasses. Tree species like *Bombax ceiba*, *Adina cordifolia*, *Bauhinia malbarica* and *Mallotus philippinensis* are also sparsely distributed in the habitat.

Figure 4: Land use pattern of Royal Bardia National Park



Area (Sq. Km.)		
Abandoned agricultural land	35.90	
River	61.51	
Forest	867.66	
Grass land	2.93	
Total	968.00	

(Source: Resources Nepal, 1998)



Phantas: These are the previously cultivated fields which in due course of time re-vegetated into open grasslands. *Imperata cylindrica*, *Saccharum spontaneum* and *Narenga porphorycoma* are the dominating grass species of the phantas.

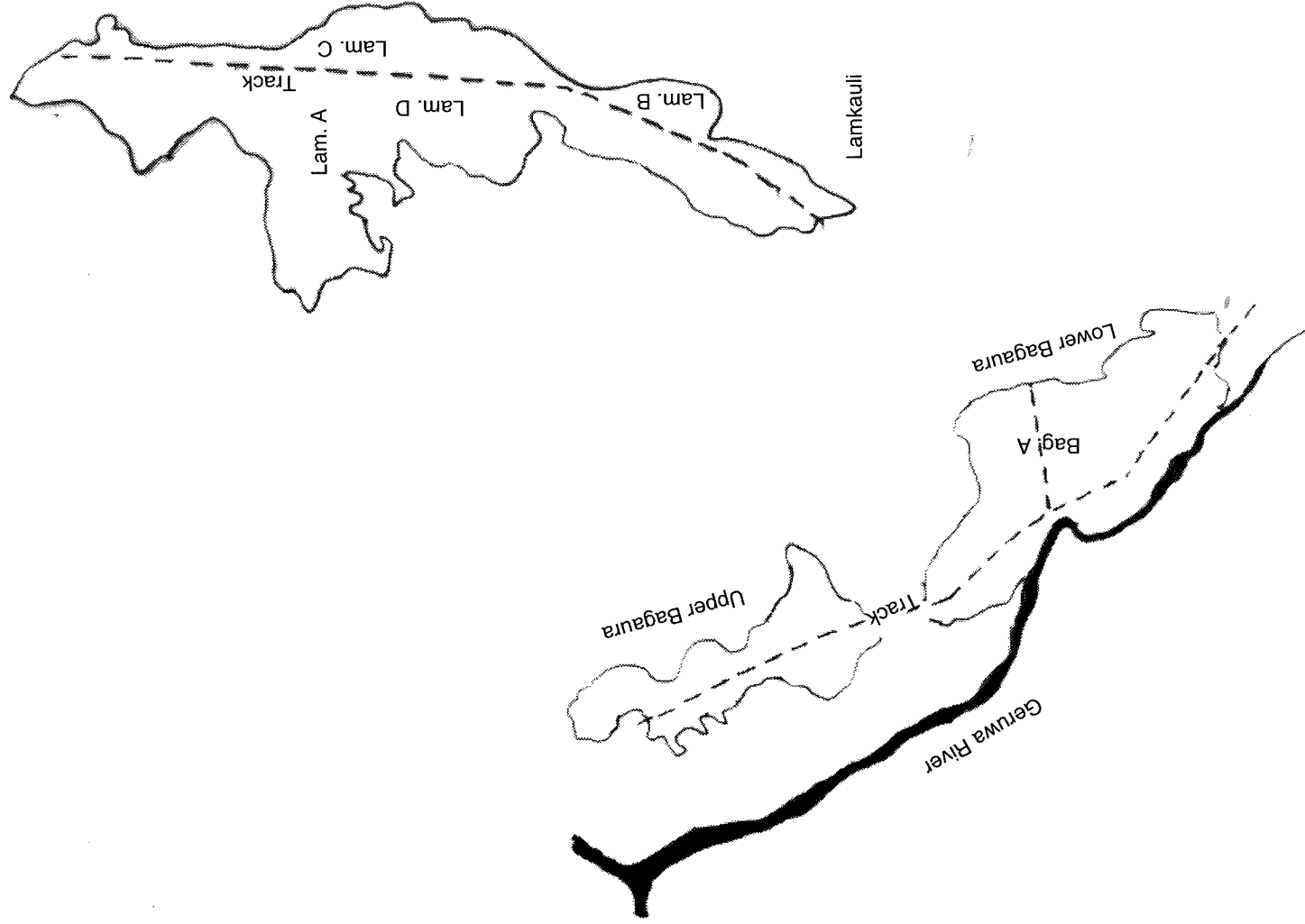
Flood plain grassland: These are the tall grasses of the flood plains along the Geruwa river. The dominating species of these grasslands are *Saccharum spontaneum*, *Saccharum bengalensis*, *Phragmites karka* and *Narenga porphorycoma*.

2.5 Fauna

Some 32 large mammals (Dinerstein, 1980) and 235 bird species (Inskipp, 1983) have been recorded. Greater Indian one-horned rhinoceros (*Rhinoceros unicornis*), Swamp deer (*Cervus duvauceli*), Asian elephant (*Elephas maximus*) and the Tiger (*Panthera tigris*) are worldwide endangered mammals, found in the park. Two species of monkeys are common; rhesus (*Macaca mulata*) and common langur (*Presbytis entellus*). The study area has dense population of chital (*Axis axis*), hog deer (*Axis porcinus*) and wild boar (*Sus scrofa*), (Stone and Wegge, 1996). Nilgai (*Boselaphus tragocamelus*) is now an endangered species in Nepal and needs intensive monitoring (Khatri, 1993). Striped hyena (*Hyaena hyaena*), jackal (*Canis aureus*), wild dog (*Cuon alpinus*), sloth bear (*Melursus ursinus*), and sambar deer (*Cervus unicolor*) are known to be present but in low numbers (Dinerstein, 1979). Other endangered species recorded in the Karnali river system are Gangetic dolphin (*Platanista gangetica*) and gharial (*Gavialis gangeticus*) (Pers. obs.).

Protected birds include great hornbill (*Buceros bicornis*), white stork (*Ciconia ciconia*), black stork (*Ciconia nigra*), Bengal Florican (*Houbaropsis bengalensis*), Lesser Florican (*Sypheotides indica*) and sarus crane (*Grus antigone*).

Figure 5: Map of Bagaura and Lamkauli phanta



Not in scale

Distribution of Bengal Florican

3. METHODOLOGY

Survey was carried out in Royal Bardia National Park (RBNP). The main focus of the study was the three prime grasslands of RBNP viz; Khauraha, Bagaura and Lamkauli. For easy observation, grasslands were divided into blocks and observed from Machans and near by trees. Search effort was carried for three days in each prime habitats and two days spent on other possible grassland habitat which were visited on an elephant back and a motorbike. In total, eleven days were spent looking for the floricans using 10x50 binocular.

Important florican areas were visited during the breeding season *i.e.* in the month of May when territorial male would be easily seen during their aerial displays. As the bustards are very territorial during the breeding season (Rahmani *et al.*, 1991), the location of a territory *i.e.*, display site of a male is the identification of an individual male florican.

As Lesser Floricans are most active in the early mornings and evenings (Ali and Ripley, 1969), daily observations were carried out mainly in the early morning (6:30-10:00) and late afternoon (15:30-19:00). No observations were made in the afternoon.

Local naturalists, bird watchers, park officials and local villagers were asked about the sighting of bird. Information were collected from the park officials on the techniques practiced for grassland management. Conservation related information were also collected.

4. RESULT & DISCUSSION

4.1 Present status

Lesser Florican migrates into the protected grassland during the breeding season. They are monsoon breeders and the breeding season begins by the end of June or early July. During breeding they are extremely territorial and exhibits display to attract the female (*Rahmani et al.*, 1991). These characters of florican make them easy to see. Keeping this in mind, surveys were done in the month of May when the floricans migrate into the grasslands and start making territory. Due to the recent burning, the height of the grass was low and the sighting was convenient. The height of the grass was ranging from 10 to 110 cms.

During the present survey, altogether eleven days were spent in search of Lesser Florican in the grasslands of RBNP. Three major grasslands of RBNP: Khauraha, Bagaura and Lamkauli were the prime concern of the present study. In addition to this, other suitable grassland habitats, where there are chances of florican sighting were also covered on an elephant back and a motorbike.

In spite of all these efforts, no florican was sighted during the survey. Inquiries with local people, bird watchers and naturalists about the bird revealed that no birds were seen for the last 10 years. Ram Din Chaudhary, a bird watcher from Tiger Tops, who has been in the job for the last 15-20 years, also shared the experience of not sighting the bird for a long time. Experienced bird watcher of the park office, Jit Bahadur Khadga also said that he had not seen the bird around the area. Apart from these two, several others who are interested in bird watching were asked and the same answer was noted. While discussing about the status of Lesser Florican, Dr. Shanta Raj Jnawali, a wildlife professional remarked, "During my decade of fieldwork in Bardia, I have never sighted the bird nor heard about its presence." According to renowned ornithologist Mr. Hem Sagar Baral, "The sightings of Lesser Florican are doubtful because bird watching activity during florican's presence in Nepal is almost not, as the florican possibly visits Nepal from May onwards only. I have not seen the bird during my grassland bird study from 1996-1998. In my view, it is near to extinction."

The difficulties in sighting floricans, could also be attributed to the limitations discussed by previous workers.

The major limitation in achieving the status is that the Lesser Florican is migrant and movements into and in breeding areas are subject to quantum and distribution of rainfall. The other limitation is that during good monsoon years, floricans can be found almost anywhere including large grasslands, small grasslands, patches of grasslands in between crop fields and even in crop fields (Sankaran, 1991 cited in Sankaran *et al.*, 1992).

Detail about the Lesser Florican status in Nepal in the past remains obscured. Searching the past records, two instances of Lesser Florican sighting in RBNP was noted. A male was observed at upper Bagaura in February 1980 by R. Bista (Inskipp and Inskipp, 1983). Similarly, Inskipp and Inskipp (1983) recorded a male florican in Lamkauli phanta. These records suggest that the Lesser Florican existed in the past in RBNP.

Table 1: Distribution and population of Lesser Florican.

Site	Geographical co-ordinates	Citation	Status of species at the locality
Kathmandu valley	28°N 85°E	Hodgson 1829, 1844	Collected in 19 th century on May 23 and June 26. Year unknown.
Suklaphanta	28°48'N 80°15'E	Inskipp & Inskipp, 1991	No details given.
Upper Bagaura (RBNP)	28°38'N 81°20'E	R. Bista pers. comm. in Inskipp & Inskipp, 1983	One in February, 1980.
RBNP	28°38'N 81°20'E	Inskipp & Inskipp, 1983	One male on May 17 & 19, 1982.
RBNP	28°38'N 81°20'E	Suwal & Sherestha, 1988	One on June 9 or 10, 1988.
Meghauli (Chitwan)	27°33'N 84°08'E	Diesselhorst, 1968	One individual between March 29 and April 4, 1962.
Kacchuwani (RCNP)	27°32'N 84°29'E	T. Maskey pers. comm. in Inskipp & Inskipp, 1983	One male observed on May 11 by a Gaida Camp naturalist guide.
Chitwan Jungle Lodge (RCNP)	27°34'N 84°35'E	Couronne & Kovacs, 1986	Summer visitor. One female on March 9, 1986
RCNP	27°30'N 84°38'E	White & White, 1996	Summer visitor. Two males were seen on April 12, 1996.
Rapti Dun	27°30'N 84°38'E	Halberg, 1987	Rare spring/summer visitor. One female on May 3, 1987.
Kathmandu valley	28°N 85°E	Fleming & Traylor, 1961	Three seen on July 26, 1960 of which 1 was collected.
Koshi Tappu	26°35'N 87°05'E	Cox, 1998	Rare. A female was clearly observed running across the embankment road from a closely grazed patch of grass slightly flooded littoral grassland; about 500m. of Kusaha on June 29.
West of Itahari in Morang or Sunsari	-	-	Not other details.

Source: (Baral & Inskipp, 1997).

Comparing the past records with this one, it shows that either the population of Lesser Florican has dwindled to the large extent or the limitations discussed earlier restricted the estimation of the population status clearly. It may be that the birds started making territory during the peak monsoon season (*i.e.* late June-July). Due to difficulty of access during the monsoon, it is hard to get the clear cut picture about the birds. But information gathered from the people who regularly visited the place throughout the year confirmed that the birds were hardly seen in the area.

So much of the ecology of this species is still to be studied. In case of Nepal, information on Lesser Florican is very little. So an intensive survey about the presence of Lesser Florican and its distribution in Nepal should be done to know whether this species of bird uses the grasslands area of terai region as its breeding area or not. Apart from this, a good knowledge about its wintering habitat should be there, so that both types of habitat can be protected for the healthy population of this species. But a male florican seen by Inskipp and Inskipp (1983) in the month of May suggests that grasslands of terai may be the breeding ground.

4.2 Habitat

Ali and Ripley (1983) described their habitat as "tall grassland with scattered bushes and standing crops of cotton and millets. The primary habitat requirements are grasslands where sufficient grass cover is available during the breeding season. In western India, the principal breeding range, the grasslands are of *Sehima nervosum*, *Chrysopogon fulvus* type (Sankaran *et al.*, 1992). The Lesser Florican also uses cropland of cotton (*Gossypium* sp.), *Sorghum* (*Sorghum vulgare*), maize (*Zea mays*), soyabean (*Glycine max*) and sugarcane (*Saccharum* sp.), rice (*Oryza sativa*), mustard (*Brassica campestris*), groundnut (*Arachis hypogea*), lentils and wheat (*Triticum vulgare*) (Sankaran *et al.*, 1992). The three habitats studied here are the open grasslands.

Lamkauli (9 ha.):

This is savanna grassland with the central area free of trees and surrounded by *Shorea robusta* forest. The dominant species were *Imperata cylindrica*, *Saccharum* sp. and *Vetiveria zizanioides*. Provides a good and open habitat for grassland birds. Well managed by the park authority. Bengal Florican seen in the area.

Upper and Lower Bagaura (6 ha.):

This is also savanna grassland with the central area free of trees, southern side surrounded by riverine forest and rest by *Shorea robusta* and mixed forest. The dominant species were *Imperata cylindrica*, *Saccharum* sp. and *Vetiveria zizanoides*. Provides a good and open habitat for grassland birds. Upper Bagaura phanta was dominated by tall grass species. There was also encroachment of shrub and tree species. It was not a good habitat for the floricans. Lower Bagaura phanta is well managed by the park. Bengal Florican seen in the area.

Khauraha:

Encroachment of trees and short bushes were seen. A regular uprooting of the trees and bushes is recommended. Not a good habitat for floricans to thrive. Scattered patches of grass. It does not provide sufficient space for territory formation. *Imperata cylindrica* is not dominant.

All other surveyed small patches of grasslands are covered by the same species of grasses. *Saccharum* sp. is dominant on the flood plains.

Apart from these, croplands favoured by the floricans exist around the park and could serve as their breeding habitat. But local farmers said that they have not seen the bird in their cropland. Though, the favoured habitat of the florican, grasslands do occur in the area, grass species favoured by floricans were lacking.

4.3 Conservation issues

The main important management practice for the survival of any species will be its habitat management. Grasslands in the case of Bardia were maintained. Regular weeding of unwanted species of grasslands was done by the park to prevent advance succession. Harvesting and burning of the grass are done annually, two or three months prior to monsoon. This type of practices before the breeding season prevents perturbation to the floricans and height of the grass will support the floricans.

The main grasslands inside the park were well protected. But grasslands around the periphery are overgrazed and lots of anthropogenic activities were seen. If well maintained, this type of grasslands could provide additional habitat for floricans.

Conservation awareness is an indispensable tool for preservation of bio-diversity with the involvement of local people. With our isolated approach of conservation, local people were refrained from having knowledge of their traditional resources. So, people around the area should be well informed about the bird and importance of its conservation.

5. CONCLUSION & RECOMMENDATIONS

5.1 Conclusion

Though the past records suggest the presence of Lesser Florican in the grasslands of Royal Bardia National Park (RBNP), no Lesser Florican was recorded in this study. There was no exact population estimation of Lesser Florican in the past. So, this study cannot predict that the population has decreased or Lesser Florican do not exist in RBNP.

Different limitations discussed earlier might have restricted in finding the status of Lesser Florican. Furthermore, much of the ecology of this species remains obscure, which adds further difficulties in studying this bird. So, intensive study on wintering and breeding habitat of Lesser Florican in Nepal should be done.

5.2 Recommendations

1. Much of the ecology of Lesser Florican remained obscure. So more researches should be done in this species. The distribution of Lesser Florican in Nepal is unknown. Exact determination of Florican breeding and wintering habitat in Nepal, if any, should be done.
2. Detail on movement, habitat, behaviour of florican outside its breeding season is unknown. It is difficult to study this bird during this period. So a study should be undertaken on this aspect with the use of advanced methods such as satellite telemetry.
3. Grasslands outside protected area should also be preserved and prevented from overgrazing and other anthropogenic activities.
4. Annual burning and harvesting of the grass inside the protected area should be done two or three months before the breeding season starts (May-June) or sometime after the breeding season (end of October).
5. Emphasis should be given on the general awareness of the local people.

Part II:

Bengal Florican

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Bengal Florican

1. INTRODUCTION

1.1 Background

The Bengal Floricans (*Houbaropsis bengalensis*) is included under the endangered species list of IUCN Red Data Book, Appendix I of CITES and one of the nine protected birds under National Park and Wildlife Conservation Act 1973 of His Majesty the Government of Nepal.

It's distribution range varies from Assam, East Pakistan, duars and terai of Bhutan, Bengal, Nepal and Kumaon, to less common, rare or straggler, west of the Manas, in Nepal and Kumaon terai (Ali and Ripley, 1969).

The known population of less than 300-400 individuals from its distribution range, puts it at serious risk from further habitat loss, warranting inclusion in the International Council for Bird Preservation (ICBP) list of endangered species (Collar and Andrew, 1988 cited in Weaver, 1991). Bengal Floricans, one of the three bustard species endemic to the Indian Subcontinent, has undergone an alarming decline throughout its former range in the north and north-eastern regions as its grassland habitat has been lost to cultivation, afforestation or degraded by overgrazing.

In 1982, ICBP initiated a preliminary study of the status, distribution, ecology and behavior of the Bengal Floricans to gather lacking information. In Nepal, the survey located 35-50 floricans distributed between five sites: Royal Chitwan National Park (RCNP), Royal Bardia National Park (RBNP), Royal Suklaphanta Wildlife Reserve (RSWR) and Koshi Tappu Wildlife Reserve (KTWR) and an unprotected area near the Koshi Barrage in the east of the country (Inskipp and Inskipp, 1983).

The Koshi Barrage site appears to have lost its small population since 1980 following a change in the course of river during the monsoon. There has been only one confirmed record from KTWR since 1986, a single in 1989 (Weaver, 1991). There has been no record from the KTWR since 1990. Considering the present situation, it is unlikely that Bengal Florican still thrives in the grasslands of KTWR. Due to rapid population growth and urbanization in the Nepalese terai, the unprotected grasslands have been already

converted to cultivated fields. So presence of Bengal Florican outside the protected grasslands is questionable.

Even, inside the protected grasslands the population of Bengal Florican is dwindling. Due to its elusive nature and diurnal habit, hunting pressure on this species is almost not. And hitherto, there is no official record of florican hunting. Apparent cause of population decline can be attributed to improper management of the grassland habitat.

2. METHODOLOGY

Bengal Florican (*Houbaropsis bengalensis*) is one out of 150 lekking species of birds reported by Johnsgard (1994). The males collect in communal display arenas called leks. These may be attended by males for much of the breeding season and much of the day, although females may attend them only briefly to mate. Peak numbers of males of lekking species occur just before egg laying and often just after dawn (Sutherland, 1997). As Bengal Floricans are most active in the early mornings and evenings (Ali and Ripley, 1969); observations were carried out mainly in the early mornings (06:30-10:00) and late afternoon (15:30-19:00). No observation was done in the afternoon.

Important florican habitats were visited during the breeding season of the florican when the territorial males were easily seen during their aerial display. As had been proved by earlier studies, bustards are very territorial during breeding season (Ali and Rahamani, 1982-84; Sankaran and Rahamani, 1986; Manakadan and Rahamani, 1986). Thus, the location of a territory, *i.e.* display site of a male, was the identification of an individual male florican. As hens were not easy to locate, the population estimate is based on the assumption of equal sex ratio. Survey was carried out on three sites: Khauraha, Bagaura and Lamkauli phanta. Observation was done with binocular (10x50) from the Machan for over viewing the grassland, generally with minimal disturbance to floricans. The number of floricans seen, their sexes, activity, time, weather and time spent in each area were noted together with general impression of habitat.

Group discussions were held among park officials, game scouts and local people for gathering information about the presence of Bengal Florican in the sites other than previously studied.

3. RESULT & DISCUSSION

3.1 Population status

In the present study total of 5 Bengal Floricans (3 males/2 females) were recorded. As the grasses were not so tall, viewing of the floricans was very convenient. All male floricans observed were occupying the short grass patches, whereas the females observed in Lamkauli occupied the tall grass area by the side of the road. Both the males observed in Lamkauli have their distinct territories. The first male referred to as Lam. A occupies the north eastern part of the grassland, and the second male referred to as Lam. B occupied the south western part. Both the males established their territories on either side of the motorable road and never seemed to cross the road. This means, no overlapping of territories was observed. It may be due to the abundant space available for the two to establish their territories. All the male birds observed were on the ground as well as in flight, but the females were never seen on flight. The females (Lam. C & D) were located between the territories of male. Once the female was observed within 50m. from the male (Lam. A)

Only one male was recorded in Bagaura. Since, there was no other male, it wandered around most part of the grassland.

No florican was recorded in Khauraha. Habitat alteration by the encroachment of trees, bushes and tall grass species might have restricted Khauraha for holding the population of floricans.

Apart from the three grasslands, most of the small grass patches and probable florican habitats outside and inside the park were covered on an elephant back and a motorbike. But no record was made. Since the grass cover was short and the viewing was easy, the study assumes to have covered all the floricans.

Table 2: Summary of Bengal Florican recorded in RBNP, 2000.

Site	Days spent	No. of visits	Male	Female	Sub-adult
Lamkauli (Upper & Lower)	4	7	2	2	-
Bagaura (Upper & Lower)	3	6	1	-	-
Khauraha (Upper & Lower)	3	6	-	-	-
Other places	2	3	-	-	-
Total	11	22	3	2	-

Table 3: Details of Bengal Florican observation in Bardia, 2000.

Date	Time	Site	Male	Female	Sub-adult	Activity	Display
April 28	16:30	Lam. A	1	-	-	Flying	Aerial
	18:05	Lam. B	1	-	-	Feeding	-
	18:14	Lam. C	-	1	-	Feeding	-
April 29	06:45	Lam. B	1	-	-	Flushed and flew about 200m. and again flew about 600m. with chirp sound 8 times;	Aerial
	07:00	Lam. B	1	-	-	Walking	Ground
	07:40	Lam. C	-	1	-	Walking (about 50m. close to male)	-
	09:28	Lam. B	1	-	-	Walking	-
	17:52	Lam. B	1	-	-	Standing	-
April 30	07:25	Bag. A	1	-	-	Standing	-
	09:00	Bag. A	1	-	-	Foraging	-
	09:20	Bag. A	1	-	-	Foraging	-
	16:53	Bag. A	1	-	-	Standing	-
May 1	07:30	Bag. A	1	-	-	Foraging	-
	08:20	Bag. A	1	-	-	Standing	-
	06:40	Bag. A	1	-	-	Flying	Aerial
May 2	17:23	Lam. A	1	-	-	Standing	-
	17:48	Lam. C	-	1	-	Foraging	-
May 4	07:05	Lam. B	1	-	-	Standing	-
	07:53	Lam. A	1	-	-	Foraging	-
	08:00	Lam. D	-	1	-	Walking	-

Lam.- Lamkauli, Bag.- Bagaura

So, altogether, the present study recorded 5 floricans (3 males/2 females). Inskipp and Inskipp (1983) reported 9-10 floricans (8-9 males/1 female) in Bardia. Weaver (1991) reported 6 birds (5 males/1 female). Weaver also reported a single male florican from Bagaura. The current population shows the decreasing trend, and the chance of survival of floricans in the grasslands of Bardia is meager, if present trend continues.

In most of the study conducted in Bardia, there was no recording of sub-adult. This suggests that although having seemingly ideal habitat, the reproductive potential of floricans could be low. So, further studies should focus on this aspect.

Table 4: Summary of counts of Bengal Floricans over two decades (1980-2000) in Bardia.

Source	Male	Female	Sub-adult	Total
Inskipp and Inskipp, 1983	8-9	2	-	9-10
Weaver, 1991	5	1	-	6
Present study, 2000	3	2	-	5

The population of florican is slowly dwindling rather than being maintained. If the population of this site remains constant also, it poses serious threat to floricans in the long run because of inbreeding. Also, there is no evidence that Bengal Floricans are migratory. So, gene exchange between population and recolonization of deserted sites will be unlikely.

Furthermore, we don't have any idea about the viable population required for a long term survival. So, maintaining a healthy population at all present habitat is the most crucial conservation strategy for this species.

3.2 Habitat

According to Ali and Ripley (1969), the Bengal Florican lives in "tall grassland interspersed within scattered shrub and bushes especially where grazed down to about half meter high or regenerating after the seasonal fire. Inskipp and Inskipp (1983) have also found them almost entirely in pure grassland.

The dominant grass species in most florican habitats are *Imperata cylindrica*, *Saccharum* sp., *Setaria pumilla*, *Desmostachya bipinnata*, *Themeda* and *Cymbopogon* sp.

In Bagaura and Lamkauli *Imperata cylindrica* was the dominant grass species in the short grass area. Male floricans existed in the areas where there were more *Imperata cylindrica*. Male floricans were seen feeding on the shoots of *Imperata cylindrica*. Female recorded in Lamkauli occurred in the tall grass area dominated by *Saccharum spontaneum*. The two important grass species in the Bagaura and Lamkauli grasslands of Bardia were *Imperata cylindrica* among the short, and *Saccharum* sp. among the tall grass species. Apart from these grasses, species like *Vetiveria* and *Desmostachya* were also recorded.

Bagaura and Lamkauli both were open grasslands. But in Bagaura, tree species preferred by floricans like Simal (*Bombax ceiba*) and Khair (*Acacia catechu*) occurred in the grasslands where as in Lamkauli, encroachment of trees in the grassland was less.

Preferred grass species, *Imperata cylindrica* was rare in the case of grasslands like Khauraha. Encroachment of grassland by tall grass species, saplings and bushes were more.

The structure and height of grass appear to be extremely important to floricans in choice of habitat early in the breeding season (Weaver, 1991). The grass height in Bardia was fair at the time of study. It ranged from 17-110 cm. At Lamkauli height of *Imperata cylindrica* ranged from 17-35 cm. and *Saccharum* species ranged from 40-110 cm. At Bagaura, *Imperata cylindrica* ranged from 18-25 cm. and *Saccharum* sp. were above 39 cm. Thus, the condition of the grassland habitats observed in Bardia was ideal for breeding. The grass height provided sufficient cover and shelter. Some small patches of tall *Saccharum*

sp. provided good habitat to Female floricans for nesting and egg laying. To lay eggs, the female chooses a spot, somewhere among 1-1.5 m. high grass, away from the open patches (Narayan and Rosalind, 1990).

3.3 Conservation strategies

Grassland management is necessary to maintain habitat suitable for floricans. Annual harvesting and burning of the grasses are prescribed. Grass burning benefits the birds by opening up areas suitable for use as display grounds and the species certainly shows a liking for areas which have been recently burnt (Baker, 1912 cited in Inskipp and Inskipp, 1983). In Bardia, grasslands undergo annual controlled burning in January-February. Prior to this in December, the local villagers are allowed to enter the protected areas to cut grass which they need for thatch. However, if burning is carried out in their breeding season, it could destroy eggs or young birds. So, burning or harvesting should be done before the breeding season. Normally January-February seems to be the correct time for the burning of grasses in Bardia. This may have no disturbance to the floricans also. But a displaying male recorded by Inskipp and Inskipp (1983) in December suggests that the current time of burning the grasses may disturb the floricans. So, during burning or manipulating the grasslands, breeding season of the floricans should be taken into consideration.

It has been suggested that regular burning or heavy grazing in Nepal actually encourages the growth of *Imperata cylindrica* at the expense of taller grasses (Dinerstein, 1979). A healthy ungulate population also opens up the grassland.

3.4 Threats

No apparent threat to the florican was determined. There was no hunting pressure as the species is included under the protected list and hunting is strictly prohibited.

Grasslands like Bagaura and Lamkauli were the ideal florican habitats. They were well managed by the park. But other grassland patches need attention. Grasslands, on the vicinity of the park and close to the human settlement, were overgrazed and suffered from anthropogenic activities. Sufficient space needed for territory formation of large population was lacking in Bardia. The size of the breeding territories vary from 2 to 4 hectares and invariably includes an open patch of 1 to 2 hectares where the grass is short (<50 cm.) and not too dense at least for the first three months of the breeding season (Narayan, 1990).

As for the predators, only wild boars (*Sus scrofa*) were seen around the area. These predators could feed on the eggs and chicks of floricans. Eggs could be trampled by the herbivore (Swamp deer) activities. The study conducted in the last two decades shows the increase in the population of the swamp deer where as the population of Bengal Florican is declining. If there could be any negative interaction between the two species, should be studied.

4. CONCLUSION & RECOMMENDATIONS

During the present study, five Bengal Floricans (3 males/2 females) were recorded in Royal Barida National Park (RBNP). Comparing the study of last two decades, the population of Bengal Florican is declining. Grasslands like Bagaura and Lamkauli were identified as ideal florican habitat. All other grassland habitats other than this two need alteration. No apparent threats to the floricans were identified. There was no information about the viable population of Bengal Florican required for long term survival. So, maintaining the healthy population at all present habitat is recommended.

It is recommended that:

1. Invasion of saplings and tall grasses should be checked. Weeding of such species should be done immediately.
2. People were not aware about this species. So, whenever possible, people should be informed about different aspects of florican behaviour.
3. Very little is known about the ecology of Bengal Florican outside the breeding season. So, advance research like radiotelemetry should be used to study the movement of floricans outside the breeding season.
4. Healthy population of wild ungulates, to some extent, helps in maintaining grassland habitat. And interaction of Bengal Florican with other grassland species should be studied.
5. Yearly monitoring of florican population in all prime habitat should be done.

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