

Study of Farmland Birds

in Koshi, East Nepal and Lumbini, Central Nepal

FINAL REPORT



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Himalayan Nature

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Summary

The unique biodiversity that is found in the rural and urban settings and in farmlands is nowhere represented in the protected area system of lowland. Lumbini, the only known breeding site of globally threatened Sarus Crane, holds the best known population. Similarly, Koshi farmlands hold important populations of Lesser Adjutant. These are the largest globally threatened species that are frequently found outside the protected areas. Farmers' tolerance to existence of wildlife has changed over years mainly because of the market driven economy. The project aimed to find out the status, distribution and conservation of farmland birds, habitats information, annual crops, utility of pesticides and aware local community to motivate them in the conservation of farmland birds.

Ten transects each were made in Koshi and Lumbini. All transects were visited five times between September to October 2011. A total of 100 kilometers distance was covered throughout the survey period.

A total of 100 semi-structured questionnaires was surveyed to gather information on the crops grown throughout the year including the pesticides and fertilizers being used. Key respondents were local farmers, fishermen, local shopkeepers of agro chemicals.

A total of 148 species of bird was recorded from the surveyed farmlands representing 59 bird Families. Common Myna was the most frequent and most abundant bird recorded in Koshi farmlands followed by Black Drongo, Asian Pied Starling whereas Black Drongo is the most abundant and the most frequent bird species followed by Cattle Egret, House Crow in Lumbini farmlands.

40% respondents were found positive towards farmland birds conservation however, 54% were in opposition. The reasons behind the opposition were due to different unfriendly activities by farmland birds such as crop consumption, crop loss and damages.

Almost all the respondents had altered their ways of farming. It was found that around 21% were still following

the traditional way of farming. On the contrary almost 79% of people followed new methods of farming. Almost all local farmers of Lumbini and Koshi used different pesticides in different seasonal crops namely maize, paddy, vegetables and lentils. Different pesticides with varied quantity were being used for a single crop type. Endosulphan was the most repeatedly used pesticides in the crop followed by Endosel, Myagic and different forms of Endophil.

The project encompassed an effective participatory approach to work with local farmers and educator and learners groups for the protection of farmlands birds by informing and involving them on harmful impacts of chemicals fertilizers not only on farm biodiversity but also on our health. Awareness programmes were conducted in nine different schools including higher secondary schools sharing the ecological, cultural importance of farmlands birds. Altogether 1001 students and teachers were present in the programmes. Some recommendations have been put forth to harmonize the relation with nature and integral people.



Background

Although rated as one of the poorest country in the world, Nepal government has given special emphasis on the conservation of biological diversity. For this government has set aside 17 protected areas all over Nepal covering nearly 16% of country's land. Increasingly it has been realized that not all types of biodiversity can be conserved by designating protected areas. In Europe farmland birds are declining rapidly due to the change in agricultural practice. These include previously common species such as Eurasian Tree Sparrow and even House Sparrow. For people living in Nepal it is shocking to hear this but this phenomenon may be already at progress also in our country. Most European countries are capable of mobilizing wealth of resources and techniques to partly restore what was lost. Nepal does not have comparable wealth of resources to do the same. Therefore it is urgent that we value the biodiversity conserved in this unique but often neglected landscape. A total of 184 species, 21% of the total recorded utilizing agricultural habitats for foraging at some time. A smaller number of these species breed in agricultural lands and associated micro-habitats. Agricultural areas are unprotected but still form valuable habitats for many species, including some which infrequently occur in protected areas, notably the globally threatened Sarus Crane *Grus antigone* (Inskipp and Baral 2011). Cranes have for a very long time captivated human imagination and fascinated human with their body plumage, dance and songs. They are monogamous. Sarus Cranes are the tallest flying bird of the world and live close to human settlements. Similarly, Lesser Adjutant *Leptoptilos javanicus* is a majestic wader that is found in the central lowland agricultural fields. It nests in loose colonies on large trees. The sight of it in agricultural field is a sign of harmonious living with human beings. Besides these farmland birds, there are several other threatened species like Imperial Eagle *Aquila heliaca* (Vulnerable), Indian Spotted Eagle *Aquila hastata* (Vulnerable), White-rumped Vulture *Gyps bengalensis* (Critically Endangered) and Slender-billed Vulture *Gyps tenuirostris* (Critically Endangered).



Introduction

Farmland is now considered the world's most widespread habitat (BirdLife International 2008). BirdLife International (2008) considered that the expansion of agriculture, resulting in habitat destruction, is one of the greatest threats to the world's biodiversity. Intensification of farming practices, such as the loss of crop diversity, destruction of grasslands and excessive use of pesticides and fertilizers, has led to the degradation of agricultural and semi-natural habitats, and causing declines in biodiversity across huge areas. Overall, agriculture currently destroys and degrades more habitat than any other factor, according to BirdLife International (2008). In addition agricultural expansion and intensification is regarded as the main threat to globally threatened species, affecting 87% of these entire species worldwide (Van der Weijden 2010).

Cultivation forms the chief habitat for a relatively small number of bird species, however. These include the Sarus Crane which is chiefly found in cultivated fields in the terai, which it utilizes for both foraging and breeding. A recent study found that 70% of nests were on paddy field bunds and 30% on marshy wetland bunds (Paudel, 2009b). The Lumbini farmlands, Important Bird Area is the only area in Nepal where the species regularly breeds (Baral and Inskipp, 2005). Other globally threatened species Indian Spotted Eagle and Lesser Adjutant often nest in trees in cultivated areas. Indeed, with the exception of Chitwan National Park and Sukla Phanta Wildlife Reserve, all nests of Lesser Adjutant in the country are in private cultivated lands or at the edge of community forests. Cultivation is also an important foraging habitat for Lesser Adjutant. In sugarcane plantations, for example at Koshi and Chitwan, large numbers of buntings, including Yellow-breasted Bunting *Emberiza aureola*, were recorded in the 1980s and 1990s, although numbers are much reduced nowadays (Inskipp and Baral 2011).

Bird populations in farmlands are considered to be a good indicator of the broad state of wildlife and the countryside because they occupy a wide range of habitats. Healthy bird populations signify a healthy state of the plants and invertebrates on which they feed. Though, farmland birds

have been living harmoniously for a long time with human beings, most local people do not know the significance and benefits of such birds in their farming lands. The farm lands of Lumbini and Koshi; Important Bird Areas encompass a large rural area where agriculture is the main land use followed by forest. The birds are ecologically important as they help in pollination, control of harmful pests, dispersal and form the matrix within which other wildlife habitats coexist. The main problems of farmland birds are agricultural changes such as over-use of pesticides and fertilizers, the growing of cash crops at the expense of rice which has been grown traditionally in Nepal, and the intensification of agriculture resulting in the loss of uncultivated field changes and corners, which form valuable habitats for birds and other wildlife (Inskipp and Baral 2011).

Both study areas are Important Bird Areas of the country and shelter globally threatened farmland bird species like Sarus Crane, Lesser Adjutant which play major roles in the functioning of the ecosystems and benefitting local communities by controlling pests. They have become an important source of revenue through bird watching tourism in Nepal.



Rationale of the project

The unique biodiversity found in the farmlands is nowhere represented in the protected area system of Nepal. It is already known that species such as Sarus Crane and Lesser Adjutant cannot be protected by setting up a nature reserve alone. Farmers' tolerance to existence of wildlife has been changed over the years mainly because of the market driven economy. In Nepal there has been a considerable amount of work done on threatened birds, especially globally threatened species in the last 20 years. In contrast there has been very little monitoring of common bird species or of those habitually frequenting agricultural lands. Monitoring of farmland birds in Nepal started in 2007, but due to lack of sufficient funding, the work is limited to studies in the Lumbini farmlands Key Bird Area (KBA). In 2007, three transects were made in the Key Bird Area (KBA) and these were regularly monitored (Hem Sagar Baral per. comm.)

Bird populations in farmlands are considered to be a good indicator of the broad state of wildlife and the countryside because they occupy a wide range of habitats. Healthy bird populations signify a healthy state of the plants and invertebrates on which they feed. Though, farmland birds have been living harmoniously for a long time with human beings, most local people do not know the significance and benefits of having such birds in their farming lands.

Nevertheless, people are slowly giving up the age old sustainable method of farming beside the threats such as illegal hunting, chemical pollution and bird trade.

Project objectives

This project aimed to find out the status and distribution of the farmland birds in Koshi and Lumbini and also measure the habitat features that promote bird diversity in farmlands.

The specific aims were as follows:

- To survey the present status and distribution of farmland birds,
- To identify and measure the habitat conditions,
- To gather information on the crops which are grown throughout the year and also to know about the pesticides and fertilizers being used,
- To create stewardship in local people in preserving the farmland birds and their habitats
- To know bird species that use farmlands in these two localities and see spatial variation between the two sites on species composition



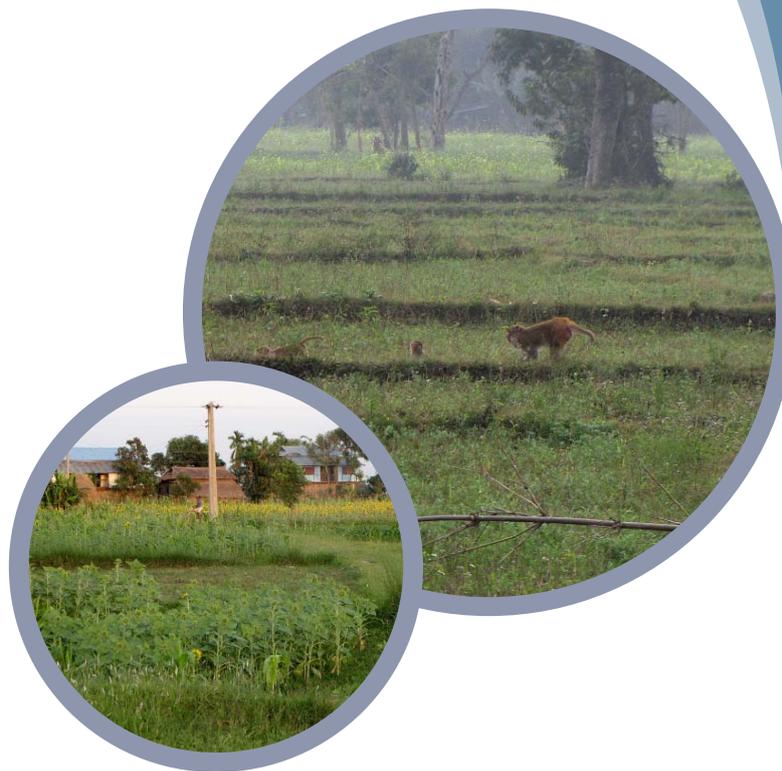
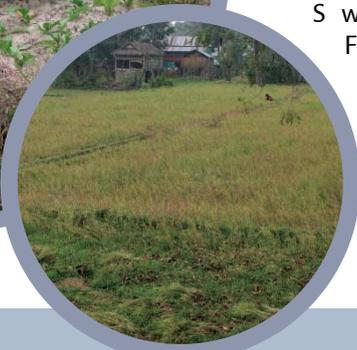
Study areas

The farmlands of Lumbini and Koshi encompass a large rural area where agriculture is the main land use followed by forests managed by community or sacred groves like Lumbini. In case of Koshi, Koshi Tappu Wildlife Reserve lies adjacent to the farmlands surveyed. Both study areas are Important Bird Areas of the country and shelter globally threatened farmland bird species like Sarus Crane, Lesser Adjutant which play major roles in the functioning of the ecosystems and benefitting local communities by controlling pests and offering revenue through bird watching tourism in Nepal.

The farmlands around Lumbini cover a large rural area where agriculture is the main land use (68%) followed by forests which covers 21.6% of the area. The forest, scrubs, wetlands and grasslands surrounding Lumbini are especially important refuge for wildlife. This area has been best known population of the globally threatened Sarus Crane in Nepal and is the only known site in the country where the species breeds regularly (BCN and DNPWC, 2011). Globally threatened birds have been recorded here which include White-rumped Vulture, Indian Spotted Eagle and Lesser Adjutant that breed and are all seen regularly.

nearly all the water birds recorded in this country. It also has the largest heronry in Nepal (Baral 1993). An endemic subspecies of Rufous-vented Prinia *Prinia burnesii nepalicola*, was described from here (Baral et. al. 2007).

Koshi Tappu provides habitat for 493 species of resident and migratory birds (Baral per. comm.). The area holds large populations of globally threatened Swamp Francolin and is home to



Collection and permission

Literature review

Literature survey on the research were collected and reference were made to work done by Himalayan Nature in Lumbini in 2006 and a review paper on the impacts of agriculture on Nepal birds (Inskipp and Baral 2011).

Permission from Social Welfare Council

Social Welfare Council (SWC) is the government organization formed to monitor I/NGO's in Nepal. It gives approval to run projects in Nepal after the commitment of funding from international organizations. Approval was given to carry out the study on farmlands birds in Lumbini and Koshi after our application.



Preparation and Field based activities

Preliminary survey

Preliminary surveys of the Koshi and Lumbini farmlands were made before the main bird survey started.

Survey form

After discussion with relevant experts, a sample form that was used in the 2006 farmland bird survey of Lumbini was slightly modified for our use and a questionnaire form in both English and Nepali language were prepared (Annex-I and III).

Inception meeting

Inception meetings were conducted in Lumbini and Koshi to inform the local people about our research objectives and methodologies.

Transect sampling

Ten transects each were made in Koshi and Lumbini. Each transect length was one kilometer. All transects were visited five times between 3rd September to October 2011. A total of 100 kilometers distance was covered throughout the survey period.

Each transect was split into five segments of 200m in which habitat and birds were recorded in a separate sheet. Each segment was given a period of 20 minutes. All birds were recorded on sight and sound with taking care to avoid double counting.

A total of 148 species of bird was recorded from the surveyed farmlands representing 59 bird Families. A total of 11360 birds were counted. The most frequent and the most abundant bird was Common Myna followed by Black Drongo, Cattle Egret and Asian Pied Starling (Illustration: 1) and please refer Annex-II for the list.

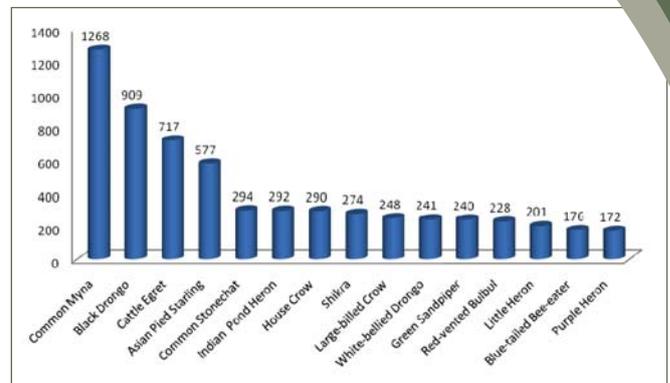


Illustration: 1. Individual number of top 15 farmland birds recorded in Koshi and Lumbini farmlands

From Koshi farmlands 114 bird species were recorded and 104 were recorded from Lumbini farmlands surveyed (Illustration: 2)

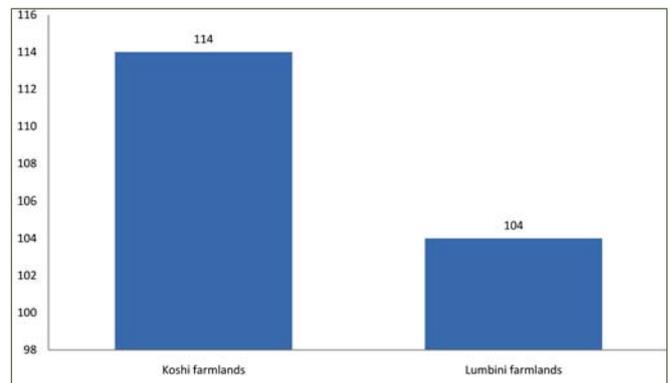


Illustration: 2. Spatial variation and the species richness

As many as 42 species were common to both places. In Koshi farmlands, Common Myna was the most frequent and most abundant bird recorded followed by Black Drongo, Asian Pied Starling (Illustration: 3)

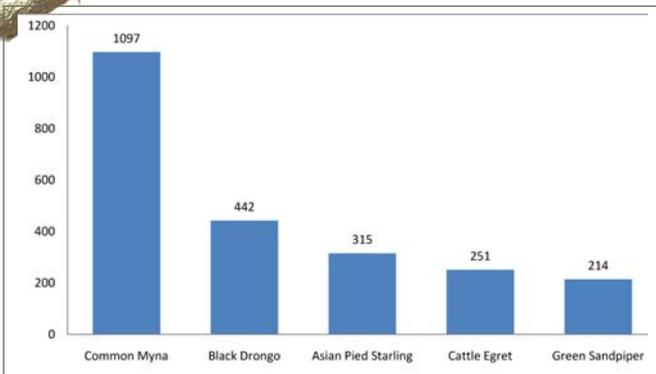


Illustration: 3. Individual number of top 5 birds recorded in Koshi farmlands

on the other hand, in case of Lumbini farmlands, Black Drongo is the most abundant and the most frequent bird species followed by Cattle Egret, House Crow (Illustration: 4).

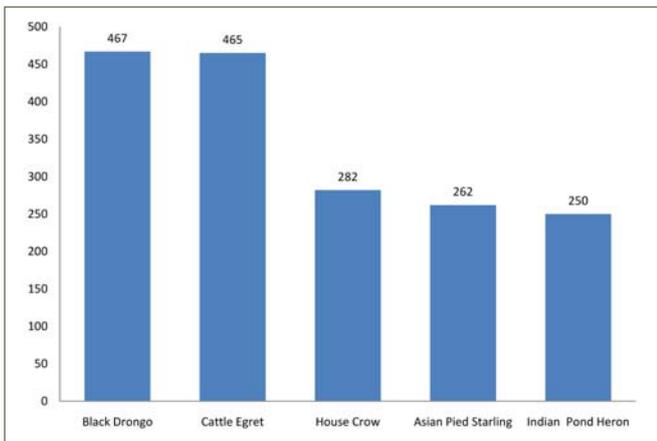


Illustration: 4. Individual number of top 5 birds recorded in Lumbini farmlands

Activities of farmland birds such as perching, flying, roosting, calling and resting were also recorded during the

survey. It was found that 60% of birds were observed while searching for food, 30% while flying and 10% while making a call. Heavy rainfall during the survey delayed bird count in the field.

Three globally threatened species were recorded in Lumbini farmlands namely Lesser Adjutant, Sarus Crane and White-rumped Vulture whereas only one species; White-rumped Vulture in Koshi farmlands.

Farmland surveyed had 80% land was harvested whereas 20% was left barren. Almost 80% of surveyed farmlands had fully grown paddy plants followed by seasonal lentils, mustard and sunflower plants. Different seasonal crops varied from young to fully grown stage. Weather frequently changed from sunny, partially clouded, and clouded to rainy.



Photo: Sighting of farmland birds at Lumbini & Koshi

Questionnaire Survey

To gather information on the crops which are grown throughout the year and also to know about the pesticides and fertilizers being used, semi-structured questionnaire was carried out with local farmers, fishermen, local shopkeepers of agro chemicals etc. The questionnaire survey made inquiries on seasonal crops, cash crops, major crop, time period of cultivation, major farmland birds, frequency of encounters (rarely, sometimes, and frequently), location etc (Annex-III).

Farmers responded that rice and maize was the most cultivated crops 10 years ago. Now this is being replaced by Sunflower, Barley and Mustard.

To our query if the farmer left the field barren, it was found that 48% left barren for different activities. Of the 56%, 29% respondents left the field for Fish farming followed by 11% for residential purposes, 4% due to marsh lands, 2% for grasslands and 2% for nurseries. It was found that only 52% left their field to enrich the soil fertility.

Of the total people surveyed, almost all the respondents cultivate sunflower and maize during January/ February, rice during June / July, and potato and lentils in November / December.

To know the local perception on the importance of farmlands birds, 40% respondents were positive towards farmland birds conservation however, 54% were in opposition. The reasons behind the opposition were due to different unfriendly activities of farmland birds such as crop consumption, crop loss and damages.

Changes had occurred in farming system with in a period 10 years. Almost all the respondents had altered thier ways of farming. It was found that around 21% were still following the traditional way of farming. On the contrary almost 79% of people followed new methods of farming. It was found that around 19% had used chemical fertilizers and pesticides followed by 15% respondents used improved agro seeds, around 14% with improved irrigation provision to farmlands, 10% used tractors while ploughing farmlands etc (Fig:1).



Of the 93 families who shared their land holding size, 23 families held more than 1 ha of land, whereas 70 families had less than 1 ha. In total, 75.48 ha of land belonged to the family surveyed during the studies. Richer 23 families owned nearly 60% of the total land in the surveyed area.

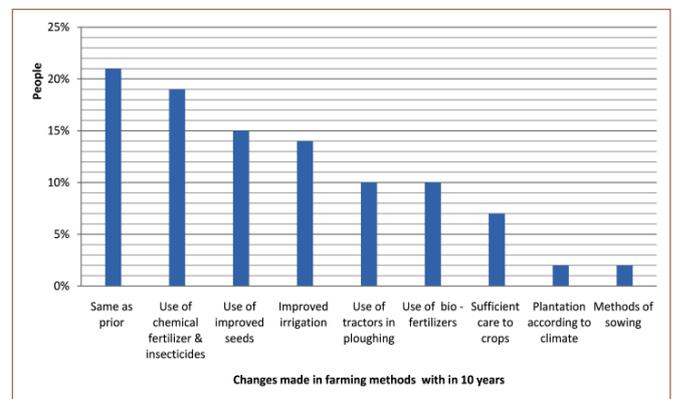


Fig: 1. Agricultural changes within a decade

To the query on the type of fertilizers used in the farmlands, it was found that 88% respondents used chemical fertilizers while only 12% respondents apply both biological and chemical fertilizers in the farmlands (Fig: 2)

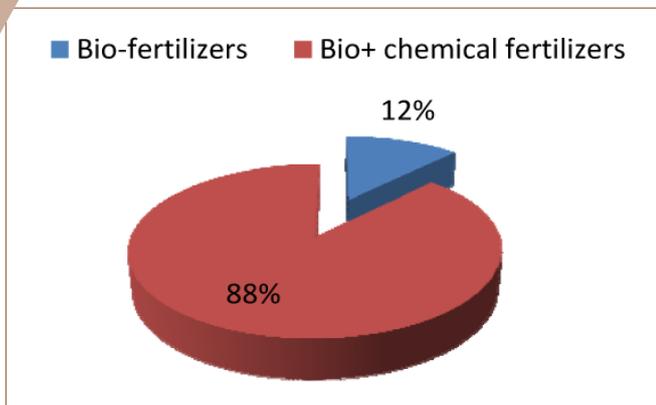


Fig:2. Fertilizer application

Of the 98 respondents, almost 90 complained the damage caused by farmlands birds either by eating up the sowed seeds, riped ones or by carrying away the young saplings. Only a few, 8 were in favor of farmlands birds since they had not caused any damage or loss to their farmlands.

Of the 100 questionnaires used for survey, 54% responded that farmland birds are declining whereas 41% responded that they are increasing. The reason of decline being hunting, loss of forests and excessive use of agrochemicals and the reason behind the increment were abundance of food and awareness in local farmers (Fig: 3).

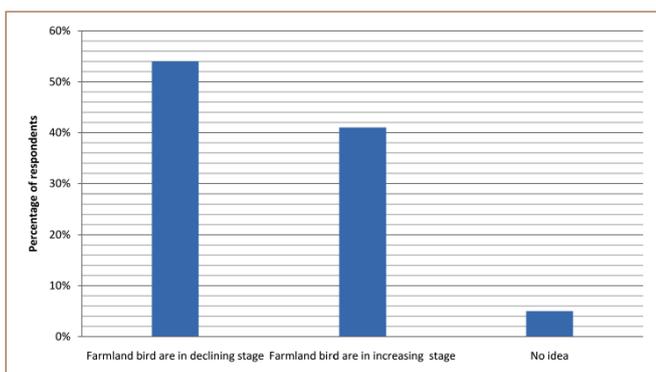


Fig: 3. Population change of farmland birds within a decade

To the query on the reasons of population declination, 35% of respondent accused hunting as major reason followed by 28% due to forest destruction, 18% due to excessive use of chemicals and 5% responded due to climate change and food shortage (Fig:4).

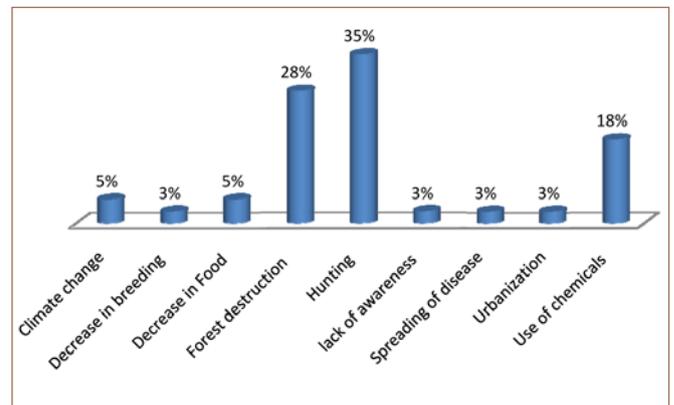


Fig: 4. Reasons of farmland birds declination

To the query on how the birds be conserved, around 22% urged for reduction in hunting, 14% felt the need of intensive education and awareness programmes, around 12% suggested to controlling the use of chemicals in the farmlands, around 8% with innovative idea of cultivating crops only for birds, 7% advised for incentive for the crop damage caused by farmland birds and around 6% suggested for law enforcement and so on (Fig:5).

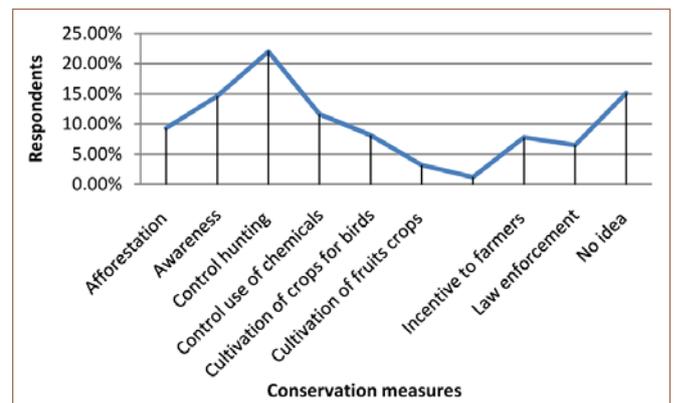


Fig: 5. Measures to conserve farmland birds

Application of pesticides

Of total 100 people surveyed, almost all local farmers of Lumbini and Koshi used different pesticides in different seasonal crops namely maize, paddy, vegetables and lentils. In addition, there was improper uses of the pesticides. Endosulphan was the most repeatedly used pesticides in the crop followed by Endosel, Myagic and different forms of Endophil. It was found that different pesticides with varied quantity were being used for a single crop type (Annex-IV).



Education outreach programmes

Conservation of birds depends on protection and management of the plant community in their natural habitat, maintenance of a healthy agro-environment and a pollution-free physical environment. Students often play an important role in conveying information and in bringing changes in the perception of their parents and neighbour towards conservation of natural resources. Realizing this need, school visits and teaching activities were held to raise awareness level in students. The programme highlighted mainly on endangered farmland birds, its status, importance of such birds in the farmlands and the consequences of their disappearance, negative impact of pesticides on human health, farmland birds, agro-biodiversity, environment and crop production. We conducted awareness campaigns in

nine different schools including higher secondary schools reflecting and sharing the ecological, cultural importance of farmlands birds. Altogether one thousand and one students and teachers were present in the programmes (Annex-V). We really appreciate their enthusiasm, active participation and cooperation in both Lumbini and Koshi. Furthermore, local people were motivated for participatory bird monitoring at Kosi Bird Observatory (KBO). It is one of the research and training center for bird watching, bird monitoring program and wetland studies, established in 2010 by Himalayan Nature at Koshi. More than 300 farmland posters produced by Himalayan Nature were distributed in the areas as part of the awareness and education programmes. KBO (<http://www.himalayannature.org/KBO.htm>) was the main base for carrying out all our activities.



Program at Suryapura Sec. S., Lumbini



Program at Shree Mahendra H.S.S., Koshi



Program at Shree Adhiyari S.S., Lumbini



Program at Shree Adarsha H.S.S., Koshi



Program at Kaushika L.S.S., Koshi



Program at Shree Basanta Ritu H.S.S., Koshi

Public stewardship

The project encompassed an effective participatory approach to work with local farmers, educator and learners groups for the protection of farmlands birds by informing and involving them on harmful effects of chemicals fertilizers, its chronics and long term harm not only to the biodiversity but also on the human especially to the children and elderly people of a society. In addition the programme highlighted various services provided by birds to maintain safe and healthy agro-ecosystem. Interaction program was held to discuss and find out some best possible ways at the local level to safeguard the farmland bird population and possibility of increasing their population. The farmers were taught to monitor such progress themselves in a participatory way, although it was not a strict scientific monitoring, but it potentially of great value for conservation. The outcome of this novel approach was linked to the value of our own health, promotion of tourism and resulting economic incentives to local community.

The project's target audience and their Involvement

Local farmers, community members, fishermen, students, local government and other nature conservation organizations were our main audience. We have selected them as they are directly and indirectly involved in the farming activities and they play an influential role in changing the habitats and food of farmland bird communities. Local government is involved in planning and it is important that some conservation organizations also learn about our study. The target audience were engaged during questionnaire survey and during outreach programmes.



Photo: Interaction with local people

Discussion and Conclusion

Many species of birds recorded in the farmlands including some of the globally threatened bird species shows their importance as good bird habitats. Results show that Koshi farmlands are slightly richer compared to Lumbini farmlands. This may be because of the proximity of Koshi farmlands to two Important Bird Areas, Dharan Forests and Koshi Tappu Wildlife Reserve and Koshi Barrage. However from the globally threatened birds' point of view, Lumbini has shown good numbers of three species, White-rumped Vulture, Lesser Adjutant and Sarus Crane compared to Koshi.

It is clearly evident that the mosaic of habitats (mixed farmland, crops & livestock), forests, grassland, rivers and wetlands found both in Lumbini and Koshi IBAs support a rich and diverse assemblage of birds including globally threatened birds. These birds are very dependent on these habitats and therefore vulnerable to any changes or loss. Not only have both the area suffered the loss of wetlands, but many of the existing wetlands and fisheries are being managed unsustainably. Most of the farmers are still small-scale subsistence farmers, with all the family members working the land to grow enough food to support their family and selling any extra at market. Although rice production is still the main crop grown in both areas, the farming system has been changing over the last 10 years. Hybrid crops and improved varieties are now planted instead of local varieties and expansion into mustard, sunflower and vegetable farming is now seen. Only a minority of farmers is using traditional methods. With the advent of modern mechanization, some farmers now share tractors to plough the fields. Most of the farmers possess small field sizes which could be an important factor in the provision of feeding and nesting opportunities for farmland birds. There seems little respect for the protection and conservation of their environment and natural resources. Many are illiterate and do not have the knowledge to understand the importance of birds and the long-term impacts of chemical use on their health and the environment. Moreover, we talked about the ecological role of farmland birds and how these can be used as an economic driver for the region through bird watching tourism.

Effectiveness and continuity are the fundamental elements of the project. We believe awareness creation through local farmer groups has a great role to play in the conservation of farmland birds. Therefore, we urge for regular surveys and extensive awareness programmes in the days to come.



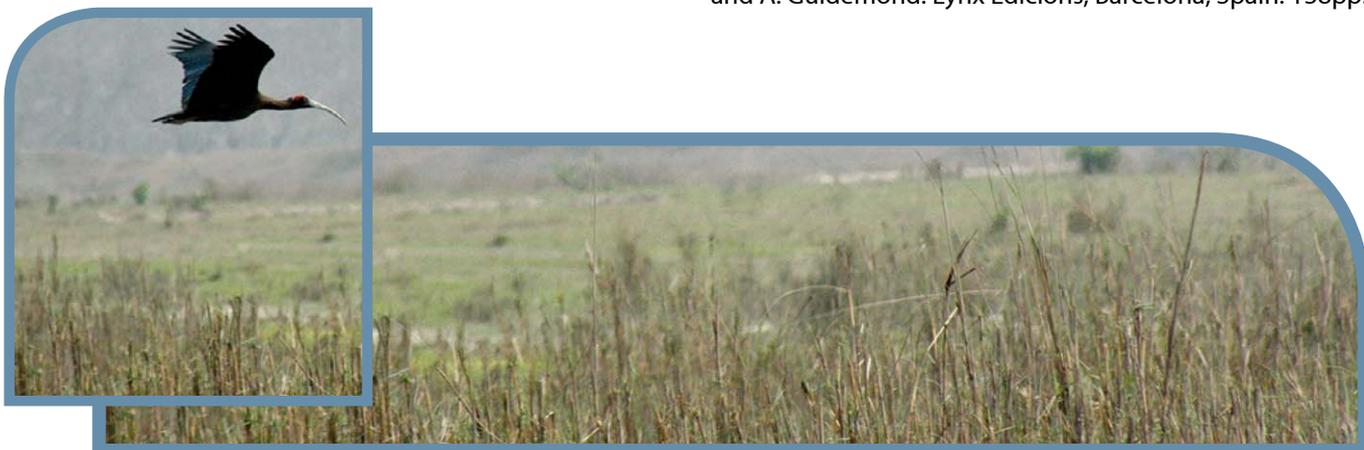
Recommendations

- Only six months survey will not be enough to study farmland bird population. Further long term research should be conducted to monitor and evaluate the status of farmland birds in Koshi and Lumbini farmlands,
- Raise awareness and educate local community members about farmland birds,
- Lobby for proper research and monitoring to assess the long term impacts of pesticide/fertilizer use on birds and other biodiversity,
- Provide training and education workshops (talks and demonstrations on farmland bird management) directly to the farmers,
- Promotion of organic farming, methods of integrated pest management and use of effective microorganisms' techniques.



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List of recorded birds

Species	Scientific Name	Family
Ashy Prinia	<i>Prinia socialis</i>	Sylviidae
Asian Koel	<i>Eudynamys scolopacea</i>	Cuculidae
Asian Openbill	<i>Anastomus oscitans</i>	Ciconiidae
Asian Pied Starling	<i>Gracupica contra</i>	Sturnidae
Asian treepie	<i>Crypsirina temia</i>	Corvidae
Bank Myna	<i>Acridotheres ginginianus</i>	Sturnidae
Barn Swallow	<i>Hirundo rustica</i>	Hirundinidae
Black Crowned Night Heron	<i>Nycticorax nycticorax</i>	Ardeidae
Black Drongo	<i>Dicrurus macrocercus</i>	Dicruridae
Black-rumped Flameback	<i>Dinopium benghalense</i>	Picidae
Black Francolin	<i>Francolinus francolinus</i>	Phasianidae
Black-headed Oriole	<i>Oriolus larvatus</i>	Oriolidae
Black Ibis	<i>Threskiornis melanocephalus</i>	Threskiornithidae
Black Kite	<i>Milvus migrans</i>	Accipitridae
Black-shouldered Kite	<i>Elanus axillaris</i>	Elanidae
Blue-tailed Bee-eater	<i>Merops philippinus</i>	Meropidae
Blue-throated Barbet	<i>Megalaima asiatica</i>	Capitonidae
Brahminy Starling	<i>Sturnia pagodarum</i>	Sturnidae
Bronze-winged Jacana	<i>Metopidius indicus</i>	Jacanidae
Brown-capped Pygmy Woodpecker	<i>Dendrocopos nanus</i>	Picidae
Brown Crake	<i>Amauornis akool</i>	Rallidae
Brown Shrike	<i>Lanius cristatus</i>	Laniidae
Cattle Egret	<i>Bubulcus ibis</i>	Ardeidae
Chestnut-bellied Nuthatch	<i>Sitta castanea</i>	Sittidae
Cinnamon Bitten	<i>Ixobrychus cinnamomeus</i>	Ardeidae
Common Babbler	<i>Turdoides caudata</i>	Timaliidae
Common Greenshank	<i>Tringa nebularia</i>	Scolopacidae
Common Hawk-Cuckoo	<i>Hierococyx varius</i>	Cuculidae
Common Hoopoe	<i>Upupa epops</i>	Upupidae
Common Myna	<i>Acridotheres tristis</i>	Sturnidae
Common Sandpiper	<i>Actitis hypoleucos</i>	Scolopacidae
Common Snipe	<i>Gallinago gallinago</i>	Scolopacidae

<i>Species</i>	<i>Scientific Name</i>	<i>Family</i>
Common Stonechat	<i>Saxicola torquatus</i>	Muscicapidae
Common Tailorbird	<i>Orthotomus sutorius</i>	Sylviidae
Coppersmith Barbet	<i>Megalaima haemacephala</i>	Megalaimidae
Crested Bunting	<i>Melophus lathami</i>	Emberizinae
Eurasian Collared Dove	<i>Streptopelia decaocto</i>	Columbidae
Eurasian Golden Oriole	<i>Oriolus oriolus</i>	Oriolidae
Eurasian Thick-knee	<i>Burhinus oedincnemus indicus</i>	Burhinidae
Eurasian Wryneck	<i>Jynx torquilla</i>	Picidae
Great Egret	<i>Ardea modesta</i>	Ardeidae
Great Tit	<i>Parus major</i>	Paridae
Greater Coucal	<i>Centropus sinensis</i>	Cuculidae
Green Bee-eater	<i>Merops orientalis</i>	Meropidae
Green Sandpiper	<i>Tringa ochropus</i>	Scolopacidae
Greenish Wabbler	<i>Phylloscopus trochiloides</i>	Phylloscopidae
Grey Francolin	<i>Francolinus pondicerianus</i>	Phasianidae
Grey Wagtail	<i>Motacilla cinerea</i>	Motacillidae
House Crow	<i>Corvus splendens</i>	Corvidae
House Sparrow	<i>Passer domesticus</i>	Passeridae
Indian Grey Hornbill	<i>Ocyrceros birostris</i>	Bucerotidae
Indian Pond Heron	<i>Ardeola grayii</i>	Ardeidae
Indian Roller	<i>Coracias benghalensis</i>	Coraciidae
Intermediate Egret	<i>Mesophoyx intermedia</i>	Ardeidae
Jungle Babbler	<i>Turdoides striata</i>	Pnoepygidae
White-eyed Buzzard	<i>Butastur teesa</i>	Accipitridae
White-throated Kingfisher	<i>Halcyon smyrnensis</i>	Alcedinidae
Long-tailed Shrike	<i>Lanius schach</i>	Laniidae
Large-billed Crow	<i>Corvus macrorhynchos</i>	Eurylaimidae
Large grey Babbler	<i>Turdoides malcolmi</i>	Timaliidae
Lesser Adjutant	<i>Leptoptilos javanicus</i>	Ciconiidae
Lesser Whistling Duck	<i>Dendrocygna javanica</i>	Dendrocygnidae
Lineated Barbet	<i>Megalaima lineata</i>	Megalaimidae
Little Egret	<i>Egretta garzetta</i>	Ardeidae
Little Cormorant	<i>Phalacrocorax niger</i>	Phalacrocoracidae
Oriental Honey-buzzard	<i>Pernis ptilorhyncus</i>	Accipitridae

<i>Species</i>	<i>Scientific Name</i>	<i>Family</i>
Oriental Magpie Robin	<i>Copsychus Sacularis</i>	Turdidae
Paddyfield Pipit	<i>Anthus rufulus</i>	Motacillinae
Peregrine Falcon	<i>Falco peregrinus</i>	Falconidae
Red Avadavat	<i>Estrilda amandava</i>	Eurylaimidae
Pied Bushchat	<i>Saxicola caprata</i>	Turdidae
Pied Kingfisher	<i>Ceryle rudis</i>	Cerylidae
Plain Martin	<i>Riparia paludicola</i>	Hirundinidae
Plain Prinia	<i>Prinia inornata</i>	Cisticolidae
Plum-headed Parakeet	<i>Psittacula cyanocephala</i>	Psittacidae
Indian Pond Heron	<i>Ardeola grayii</i>	Ardeidae
Red-vented Bulbul	<i>Pycnonotus cafer</i>	Pycnonotidae
Red-wattled Lapwing	<i>Red-wattled Lapwing</i>	Vanellus indicus
Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>	Pycnontidae
Richard's Pipit	<i>Anthus australis</i>	Motacillidae
Rufous-winged Bush-Lark	<i>Miraфра assamica</i>	Alaudidae
Rose-ringed Parakeet	<i>Psittacula krameri</i>	Psittacidae
Rufous Treepie	<i>Dendrocitta vagabunda</i>	Corvidae
Sarus Crane	<i>Grus antigone</i>	Gruidae
Scaly-breasted Munia	<i>Lonchura punctulata</i>	Passeridae
Shikra	<i>Accipiter badius</i>	Accipitridae
Spotted Dove	<i>Spilopelia chinensis</i>	columbidae
Spotted Owlet	<i>Athene brama</i>	Strigidae
Thick-billed Flowerpecker	<i>Dicaeum agile</i>	Dicaeini
White-bellied Drongo	<i>Dicrurus caerulescens</i>	Dicruridae
White-breasted Kingfisher	<i>Halcyon Smyrnensis</i>	Alcedinidae
White-breasted Waterhen	<i>Amaurornis phoenicurus</i>	Rallidae
White-browed Wagtail	<i>Motacilla madaraspatisensis</i>	Motacillidae
White-eyed Buzzard	<i>Butastur teesa</i>	Accipitridae
White-throated Kingfisher	<i>Halcyon smyrnensis</i>	Alcedinidae
White Wagtail	<i>Motacilla alba</i>	Motacillidae
White-billed Crow	<i>Corvus woodfordi</i>	Corvidae
White-rumped Vulture	<i>Gyps bengalensis</i>	Accipitridae

<i>Species</i>	<i>Scientific Name</i>	<i>Family</i>
White-throated Kingfisher	<i>Halcyon smyrnensis</i>	Alcedinidae
Woolly-necked Stork	<i>Ciconia episcopus</i>	Ciconiidae
Yellow Crowned Woodpecker	<i>Dendrocopos mahrattensis</i>	Picidae
Yellow Wagtail	<i>Motacilla flava</i>	Motacillidae
Zitting Cisticola	<i>Cisticola juncidis</i>	Cisticolidae



Oriental Bird Club

Himalayan Nature



No. P934

Farmland Birds Survey

Questionnaire Survey-2011-2012

1. What kinds of crops did you grow annually before 10 years?

आजभन्दा दश बर्ष अघि तपाईंले कुन-कुन बाली लगाउनुहुन्थ्यो ?

2. Have you made any changes in your farming practice within the last 10 years period? If yes, then please mention the changes in agricultural pattern?

यो दश बर्ष अघि भित्रमा के तपाईंले आनो खेतीपाती लगाउने तरिकामा कुनै परिवर्तन ल्याउनुभएको छ ? छ भने के के परिवर्तन ल्याउनुभयो ?

3. How much katthas / bighas land do you own?

तपाईंसँग कति कट्ठा/ विगा जग्गा छ?

4. Do you leave your field barren? If yes, then how long and why?

के तपाईं आनो खेत बाझो छोड्नुहुन्छ। छोड्नुहुन्छ भने कति समयसम्म (महिना/वर्ष) र किन छोड्नुहुन्छ।

5. What type of fertilizers do you use for the crops? तपाईं आनो बालीमा कस्तो मल प्रयोग गर्नुहुन्छ?

i. Bio-fertilizer (जैविक मल) ii. Chemical fertilizer (रसायनिक मल) iii. Other (अन्य)

6. What types of crops do you cultivate in a year? Also please mention the season for particular crops.

एक वर्षमा कुन कुन बाली लगाउनुहुन्छ ? कुन बाली कुन समयमा (मौसम) लगाउनुहुन्छ ?

7. Are farmland birds important to your farmlands? If yes, then what are their benefits to the farmlands?

तपाईंको विचारमा खेतबारीमा पाइने चराहरूले खेतबालीलाई के के फाइदा पुऱ्याउँदछन् ?

8. Do you know any damage caused by farmland birds? Mention type of bird and nature of damage.

के खेतबारीमा पाइने चराहरूले कुनै हानी गर्दछन् ? गछन् भने के कस्ता बेफाइदा गर्दछन्

9. Do you think there have been any changes in the population of farmland birds during the last 10 years?

विगत दशवर्षको अवधिमा तपाईंले यी चराहरूको संख्यामा के- कस्तो परिवर्तन देख्नुभएको छ?

If the population has increased, the reason for this

बढेको छन् भने बढ्नुको कारण बताउनुहोस् ?

If the population has decreased, the reason for this घटेको छ भने घट्नुको कारणहरू बताउनुहोस्?

10. Do you know the ways to conserve the farmland birds?

तपाईंको विचारमा कृषि भुभागमा पाइने चराहरूको संरक्षण गर्न के- के गर्नुपर्ला ?

Application of pesticides on different seasonal crops in lowland Nepal

तराईमा विभिन्न मौसमको बालीमा प्रयोग गरिने किटनासकहरूका सूची:

<i>Types of crops</i> बालीको प्रकार	<i>Name of pesticides</i> किटनाशकको नाम	<i>Used quantity</i> प्रयोग गरिने मात्रा

Application of pesticides in different crops

Major crops	Name of pesticides(trade name)	Used quantity	
Maize	Endosel	2 ml per L	
	Endophil-Z78	20 gm per 0.03 ha	
	Forer	1/2kg per 0.03 ha	
	Furadon	1/2 kg per 0.03 ha	
	Endosulphan	150ml per 100 L	
	Cardan	1/2kg per 0.03 ha	
	Fardan	1/2kg per 0.03 ha	
	Endophil278	5gm per 20L	
	Action	200ml per 100L	
	Myagic	150ml per 100L	
	Mustard	Endophil-Z48	20gm per0.03 ha
		Myagic	1ml per L
	Paddy	Myagic	1 ml per L
Neurokobi		150ml per 100 L	
Potash		1/2kg per 0.03 ha	
Endosulphan		1ml per L	
Furadon		0.5kg per 0.03 ha	
Endosel		15ml per 100 L	
Potato	Chloropyrepus	1ml per L	
	Diyothem45	200ml per 100L	
	Saf	20gm per 100L	
	EndophilZ48	20gm per 0.03 ha	
Lentil	Myajin	20ml per 100 L	
	Myagic	150 ml per 100 L	
	Endophil	10 gm per 20 L	
	Cardan	1/2kg per 0.03 ha	
	Endosel	150ml per 100L	
	Diyothem45	255ml per 100L	
	Endosulphan	2ml per L	

List of participating schools

Name of School	Address	Total participants
Kaushika Lower Secondary School	Ward no-6, Baraha Chetra	95
Shree Adarsha Higher Secondary School	Baraha Chetra-3, Sunsari	290
Shree Basanta Ritu Higher Secondary School	Mahendranagar-4, Sunsari	241
Shree Mahendra Higher Secondary School	Mahendra Nagar-4, Titrigachi	86
Shree Buddha Adarsha Higher Secondary School	Khungai Lumbini	135
Shree Suryapura Higher Secondary School	Suryapura-3, Rupendehi	210
Shree Adhiyari Secondary School	Akala-2, Rupendehi	44



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