Farmland Based Important Bird Areas (IBAs): Are they safe from current using practices of chemical pesticides?

Submitted To

The Rufford Small Grant Foundation

Submitted By

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October 2017

1. Background

Birds suffer tremendously in obtaining insects in chemical sprayed sites. It overall threatens 187 Globally Threatened Birds (GTBs) by degrading habitats and food supplies (Birdlife 2004).Yearly, approximately 672 million birds are directly exposed to pesticides, about 10% (67 million birds), are estimated to die immediately. Many legal pesticides have been found harm to birds. About 40 pesticides, most of which are allowed in US, are known to kill birds even applied as per instructions (US National Fish and Wildlife 2000). Pesticide using trend is increasing by 10-20% $year^{-1}$ in Nepal (Jasmin et.al 2008 in Sharma et.al 2012).

As other countries, Nepal, too, has started to popularize use of pesticides to increase production. Nationally/internationally banned pesticides are easily available in local market through illegal routes (Manandhar 2004 in IPEP 2006). Pesticide imported/formulated in Nepal increased with 6 folds during 1997/1998 - 2011/2012 (Dhital 2015). Guidelines on good labeling practice for pesticides is presently revised (2015) to make stakeholder more conscious (FAO / WHO 2015). Government's realization to dispose 80 metric-tons pesticide urgently (Kantipur 2009) proves "Extreme Use of Toxic Chemicals" in Nepal. Pesticides are also imprudently used for poaching birds and fishing in addition to agricultural field (IPEP 2006, Paudel 2010, BCN / DNPWC 2011, Ekantipur 2015, IUCN 2015). Despite the enforcement of Pesticides Acts and Regulations, several pesticides are haphazardly being used in Nepal because farmers perceive pesticides as miracle to control insects and enhance production. Though current use of pesticides in Nepal has been proclaimed moved away from the most toxicity, several studies showed majority of the farmers are still using chemicals despite being banned by international convention (IPEP 2006).

Chemicals (pesticides) affect biodiversity negatively (Fent *et*.al 2006 in Klotz 2007, BCN / DNPWC 2011, HMGN / MFSC 2002, GON / MFSC 2009, GON / MFSC 2014, ICIMOD / MOEST / GON 2007). Herbicides impact massively on bird populations by eliminating their food (arthropods) and destroying nesting cover (weeds) during breeding season (Boatman *et*.al 2004, Boatman *et*.al 2007). Farmland birds are facing problem due to pollution (Stoate et al. 2003). Side effects and long-term impacts of such chemicals to human-health and farmland birds are often ignored. Farmlands (wetland) are treated with poisonous synthetic chemicals, many of which have been banned or restricted in other nations too. Similarly, effortlessly available nationally banned pesticides in local area have been creating critical threats to broader areas' farmland birds and IBAs.

2. Objective

The major objectives of this project were;

1. Assess the available pesticides and using practices of chemical pesticides.
2. Appraise local knowledge towards the consequences of using chemical pesticides to human health, environment and farmland birds
3. Sensitize the local community towards consequences of chemical pesticides.
4. Analyze the water of these farmland to predict the habitat condition to farmland birds

3. Project Site

Lowlands, main agricultural sites of Nepal, are important habitat of globally threatened birds. Lowlands; Jagdishpur, Lumbini and Chitwan are listed as IBAs because of hosting globally threatened and migratory birds. Due to regular irrigation facility with crop cultivation, these sites are preferred habitat of farmland birds so abundance of threatened birds in the area is comparatively high. Urbanization and shrinking of agricultural land have made farmers change their usual farming practices into intensive farming to increase production. Proximity and open international boarder has proliferated banned pesticides.

Lumbini, habitat of 207 species birds, is found to be prominent nesting sites to migratory globally threatened 25 Sarus cranes in 2005 (ICIMOD / MOEST / GON 2007). The Jagdishpur reservoir is surrounded by smaller lakes serving as a buffer zone for bird movements of 42 recorded species. The site provides important resident, wintering and stopover habitats for waders, other water-birds, and small passerines (WWF / DNPWC Wetland fact sheets, IUCN-2015). Similarly, Chitwan supports approximately 7.16% of world or 75% of Nepalese bird species (ICIMOD / MOEST / GON 2007). Most of these birds use local farmland for feeding, roosting, nesting, dodging and ambushing purpose. The sites are eventual habitat of *Grus antigone, Leptoptilos dubius, Leptoptilos javanicus*, *Haliaeetus leucoryphus* and many more wetland/farmland birds so these farmlands are famous all over the world.

Based on learning of previous projects, findings preliminary survey, concerned literatures, this project concept is developed. Similarly, pesticides are frequently used for poaching farmland / wetland birds in these IBAs (Ekantipur 2015, IUCN 2015) but the extent of available of chemical and their using pattern in locality is unknown.

4. Activity

To achieve proposed objectives, following activities were carried out.

A. Pocket Area Identification: We made six days field visit program in all three sites; Jagdishpur, Lumbini and Chitwan as preliminary visit. During this visit, we observed pesticide shops, farmlands, reservoir and other wetlands. Similarly, we made discussion with pesticide sellers, farmers, students, youth, conservationists, government officials for the prominent site selection. In the area identification, we focused on agricultural land, birds' habitat, wetland, farmer settlement and their proximity to market.

B. Interaction: We interacted with students, local conservationists, farmers and pesticide sellers.

a. Pesticide Seller: We held interaction meetings with pesticide sellers in order to know about locally demanded pesticides, their availability, using trends and farmer preferences with respect to toxicity. We presented power point presentation concerned with overall scenario of pesticide using trend in Nepal and future ways to reduce using trend of chemical pesticide. Then pesticide seller interacted openly with us and shared without any hesitation that neither farmer nor pesticide seller are serious about consequences of pesticide demanding, selling and using the pesticide.

They shared that farmer use to also demand red coloured (Level) pesticide but the selling of yellow coloured (level) pesticide is maximum which fall in second category of toxicity. In addition, sellers also opened only 5 % (5 in 100) farmers use to ask pesticide with name. This means farmers do not pay attention to the name and consequences of toxic pesticide, they only target effective (quickly reacting).

This situation has created immense pressure to living organism, birds, environment and own health too. Pesticide seller suggested the large coverage/mass media based program for creating awareness by targeting farmers and regular monitoring of pesticide shops from authorized institution.

b. Farmer: We also organized farmer interaction program in all sites. We gathered farmers in a common forum and discussed about their understanding about the using practices and consequences of pesticides to birds, living organism (helpful living beings). We also tried to explore using trend of chemical pesticides by farmers. We also shared presentation concerned with consequences and alternatives to toxic chemical. In response, they said that they hardly pay attention to pesticides' impact to health, environment, birds and other friendly living organism, very few farmers were found aware about consequences of pesticide use. But they frankly responded that using the toxic pesticide is their obligation because they have to use cheap, quick effective and whatever available in the market.

They suggested that the use of toxic chemical pesticide will be reduced if concerned institution monitored pesticide shop properly and educating farmers through door to door visit program. Many farmers are less aware about level, its meaning and possible impacts so school teaching program can play vital role to disseminate pros and cons of using chemical at household level. Children can react their parents while dealing (buying and using) chemical pesticide.

In our initial visit also, we met more than 60 farmers of three sites during this period. Most of the farmers of Chitwan told they use to buy pesticide from local market in the most of time and they rarely visit big market; Narayangarh. In case of Jagdishpur, farmers use both local and Indian market for buying pesticide. Whereas in Lumbini, farmers frequent uses the Indian markets. Regarding understanding about the pesticides' impact to health, environment, birds and other friendly living organism, very few farmers were found aware about consequences of pesticide use. But they frankly responded that using the toxic

pesticide is their obligation because they have to use cheap, quick effective and whatever available in the market.

c. Students: While visiting the Jagdispur reservoir, we met some local students in group and discussed about their understanding about the threats to farmland/wetland birds. In the discussion, they shared that people use to kill birds for food and sometimes entertainment. Some students said without any hesitation they also involve in bird hunting as entertainment. They have known that bird killing is illegal but they are unaware about legal punishment for involving in bird hunting. Regarding the use of pesticide in their locality and its impact to birds, environment and health, most of them told pesticides are being used by farmer in the area but they are less aware how the use of pesticide introduces the hazardous consequences to birds, human and environment. By feeling the student's understanding, we have planned to organize education by targeting students.

d. Conservation Stakeholders: We held interaction meetings with conservation officers, local youth, and representatives of local conservation institution/ NGOs and share project objective and future strategies of project implementation. In this interaction, we built consensus to organize the project activities in the coordination of local institution as far as possible. In the interaction with local youth working in conservation and environment, we came to know that most of the farmers use to use the pesticides and majority of the farmers use to bring the pesticide from India as well. They also highlighted that pesticide shops are in very few numbers in Lumbini area however this site is main agricultural area of the districts. It is due to easy access to Indian market.

e. Academician: Teachers and academic institution are the foremost important media to change society and create difference. So, we also made interaction with conservation related teacher of Institute of Forestry and local schools. We requested teachers to highlight the issue of consequences of pesticide to aquatic ecosystem, environment and the human health while teaching biodiversity conservation, environment and health courses to students.

Most of teachers told us that they have not emphasized this issue so enough though the issue of chemical pesticides is major threat to agro-biodiversity, environment and human

health. They also made commitment to scale up the message broadly through teaching program in days to come.

C. Pesticides Shop visit: We visited chemical pesticide shops to know the most demanded pesticides, their availability and their toxic level. Altogether, more than 40 chemical pesticide shops were visited. Out of 40, 15 in Rupendehi (Lumbini area), 8 in Kapilvastu (Jagdishpur area) and 17 in Chitwan district were visited. We listed pesticide, their level and selling trend. We also captured the photo of these pesticides. We observed all kind (red, yellow, blue and green level) of pesticide. Among of them, the intensity of yellow is higher with compare to others. We also observed few red colour (level) pesticides which are supposed to be serious. We found yellow labelled pesticides, comes under the second category of hazardousness, are the most demanded in the local areas. Majority of pesticide seller said that they focus the buyers' (farmers') preferences so they sell quick working pesticides. Sellers of Lumbini area highlighted they have to keep more hazardous pesticide in the shop because farmers go India if they do not find quickly reactive pesticides in the area. Similarly, sellers of the Chitwan also responded in line with Lumbini if they do not find the quickly reactive pesticide in one shop they use to visit another shop. We questioned sellers; do you explain the meaning of label (red/yellow/blue/green) while selling pesticide? In rare case, they use to share if costumers ask but mostly not in practices? We found red labeled pesticides in very low number. Most of the red labeled pesticides available in the area are used for killing rodent (rats). The rodents died from such pesticides are more serious to birds because most of the birds feed on those rats or its carcass. The residual persistence on the carcass of rat might have huge chance in affecting birds. We also noticed people asking pesticide with the aim of using for fishing. We found that Indian pesticides are highly available in Lumbini and Jagdishpur sites. The main reason behind this is proximity to boarder.

The interesting things that we observed, pesticide are available in other shop besides agro-vet. And, people keep pesticide in same shop from which they sell food, vegetables and children dolls/toys. This means sellers are not conscious with their health, children and ecological environment. In rural areas of Nepal also, people sell pesticide within daily needed things, like food, vegetable and others. Such cases are found within project sites and other areas also.

D. School Teaching: We organized school teaching activities in 13 schools of project sites. For school teaching, we have prepared the education material (power point presentation) and utilized for educating students and teachers. The teaching focused on misuse and consequences of pesticide. It has highlighted how the pesticide is polluting environment, possessing threat to biodiversity and impacting own health. From this activity, more than 1500 hundred students have got chance to know about the impact of pesticide and possible measure to reduces the use of pesticides. Students were urged to pay attention to pesticides when their household members bring pesticide for use. After knowing the consequences of chemical and possible measure of control, students became more curious to our education. They showed will to contribute in minimizing use of pesticides for bird, environment and health conservation.

E. Questionnaire Survey: The questionnaire survey is our major part of the project so we developed questionnaire having the issue of chemical pesticides, farmers'/pesticide sellers' awareness level and survey the pesticide available in locality.

a. Social Survey: So far, we have interviewed more than 350 farmers through household / farm visits. For the social survey, we mobilize local people and students in fullest so that they can understand about their locality in the case of use and misuse of pesticide and possible impact to environment and biodiversity. We asked farmers to show the pesticide that they are frequently using in their farmland. We found farmers are using the yellow labelled pesticides more and red labelled less. The farmers are using red labelled chemical to control rodents specifically rats.

People do not care about the suggested volume of pesticide and precaution while using the pesticides.

b. Pesticide survey: In addition with 350 farmers' households, we conducted pesticide survey more than 40 pesticide shops. We searched pesticide in shops and found more hazardous pesticides (yellow labelled). This means the most of the red labelled chemical pesticides are banned in the country so use of second category pesticide (yellow labelled) is high.

C. **Public Hearing and Discussion:** With the preliminary results of the social survey and pesticide survey, we organize common forum hearing and discussion forum to share about the situation. Most of the participant realized the excessive use of chemical pesticide and the misuse of the pesticide, Finally participants agree to reduce to

Based on these surveys information, we are preparing the article based on these survey data to publish in the journals.

F. Soil/Water Sample Collection: To know the impact of the pesticide, we have collected water and soil samples and sent laboratory for analysis of chemical / toxicity and their impaction to bird, bird's prey, aquatic ecosystem and agro-biodiversity. The samples were tested in the laboratory for quality assessment and the result of will be compared with the aquatic level water quality. The initial result of the water sample has shown the pollution. And we are trying to collect season wise more water sample.

G. Promotional Material: For the education and interaction purpose, we have developed education (promotional) materials for school teaching and interaction. We have expected that these materials will be helpful to many conservation stakeholders. During this project, we developed following promotional materials.

a. Educational Slide: We have prepared the two presentation slides which can be utilized to create awareness among the farmers, conservationists, students, pesticides sellers and other stakeholders who are working with environment, bird, agro-biodiversity conservation and human health.

b. Booklet: We have produced book in details which will be guideline to educate the school children, farmers, conservationists, students, pesticides sellers and other stakeholders who are working with environment, bird, agro-biodiversity conservation and human health. This document will be further developed into educational toolkit where we keep the unit wise question section. This helps to measure the learning of readers and used as the training manual. The booklet has covered advantage and disadvantage of chemical pesticides, their toxicity, how to know the toxic chemicals, consequences of chemicals, reducing ways chemical use and their alternatives. It has also focused how farmland birds are suffering from the excessive uses of chemical pesticides.

c. Poster Production and Distribution: We produced and distributed the poster in all the project sites. The poster has reflected the possible impacts of chemical pesticides' use to farmland birds and its ecology. We also dispatched posters in public places and the pesticide shop also. The toxicity identification label is also shown in the poster which helps to share the meaning of red, yellow, blue and green coloured label.

e. T-shirt Production: As advertisement and project identity, we produced T-shirts having the farmland bird conservation message with The Rufford Foundation logo. These T-shits are distributed to those members who involve in project. Members use to wear these t-shirts during the project activities. This t-shirt has been beneficial to disseminate project objective and supporting agencies.

H. Article Preparation: We have prepared the article in local language to publish in local paper. The written article is submitted to the newsletter of conservation institution working in the project sites. Similarly, we are writing article for the publishing journal by targeting the international scientific communities.

कृषी विषारी : स्थानिय स्तरमा उपलब्धता, प्रयोग, प्रभाव र न्यूनिकरण

I. Student Involvement: We are mobilizing conservation based students imperatively. While involving in project activities, a student named Mr. Prashant Shrestha has showed interest to do his B Sc thesis on the issue of pesticide and birds. We are supporting him also. Besides him, other many students are working with us. This has been making opportunity to students to strengthen themselves in conservation sectors in one hand developing competent human resources in concerned field on the other. Similarly, we mobilize the local people and local students of conservation field. We have expected that these students have got chance to learn about their locality so they will play role to reduce the use of pesticide for long term.

J. Misuse of Chemical Pesticide: With the primary data collection and direct observation, we were collecting information about chemical pesticides through news, newspaper and incident happening at local level. During this searching, we found the many cases (see annex).

5. Output

These are the major output of this project;

- Increased in awareness level amongst farmers, pesticide sellers, teachers and students
- Farmers knew about impact of chemical fertilizer / pesticide to human health, farmland birds, ecology, land productivity and soil quality.

- Pesticide sellers knew that they have been selling more toxic pesticide and it might enhance misuse of pesticide if attention is not made. They also knew that their simple attention will put crucial role to decrease misuse of chemicals.
- Participatory exploration showed advantages and disadvantages of organic and chemical based farming. Farmers were convinced that chemical pesticide / fertilizer are the key cause of chemical based farming.
- Promotional material production and distribution has played immense role to create awareness in large scale.
- Conservation message has been disseminated in wide range so many more people got chance to be aware about the consequences and alternatives of chemical fertilizers/pesticides.
- Knowledge of community about the consequences of using chemical pesticides was explored.
- We found pollution in the farmland which is not in favour to farmland birds and aquatic life.

6. Outcome

With the findings and having knowledge about the impact of chemical pesticides / fertilizer, farmers, students and teachers pesticide seller will implement their learning in future that assures following outcomes.

- Uses of toxic pesticide and trend of using chemical will be decreased.
- Farmers will implement project learning in coming days which put long last contribution to restore farmland bird population and maintain agro-biodiversity.
- Knowing consequences of chemical pesticides, sellers will focus eco-friendly biological pesticides which minimize use of chemical pesticide.
- Project findings will be guideline to conservation stakeholders that will be baseline for making effective plan in future. The plan implementation will assure positive effort to make site safe.
- Collected information of water quality showed the sites are not in favour to birds and other aquatic animals. Article based on this information will attract the attention many conservation stakeholders to work on it.
- Project ensures the reduction of chemical fertilizer/pesticide which ultimately creates sound environment and safe habitat to all organism depend on farmland and protects health of people as long run contribution.

7. Conclusion

Using trend of chemical is high in the project site which has been polluting the water of the farmland and created pressure to birds and agro-biodiversity. Low awareness level amongst pesticide sellers and buyer (farmers) with respect to toxicity is major cause of excessive use of high toxic pesticide. Second category (yellowed labelled) chemical pesticides were observed as widely used pesticide in locality where as red colour pesticide are still being used. The red colour chemical pesticides are commonly used for killing rodents specifically rats. Water quality is not found enough good as needed for aquatic animals. Indian pesticides are also found in the locality for which people visits Indian market frequently. This means there is also pressure of Indian chemical pesticide due to open boarder with India close to the settlement.

The project was able to explore ground evidence of existing use of chemical pesticides and their potential impacts to environment, birds and agro-biodiversity. Field based interaction program kept immense contribution in delivering message to grass root level people in controlling misuse of toxic pesticide. The project has played effective role in delivering consequences of using chemical and its effective alternatives. Through this short term project, we are able to produce many promotional/educational materials which can play effective role in educating large scale of people in days to come. We In this one year project, we can cover some areas but there are still many areas similar to these site and having international importance from wetland and bird conservation perspective. So it is necessary to continue such kind of project in other sites also. In addition, community outreach program (activity) is still indeed to organize as follow up this program because one year and one time awareness activity will not enough in such prominent sites.

8. Acknowledgement

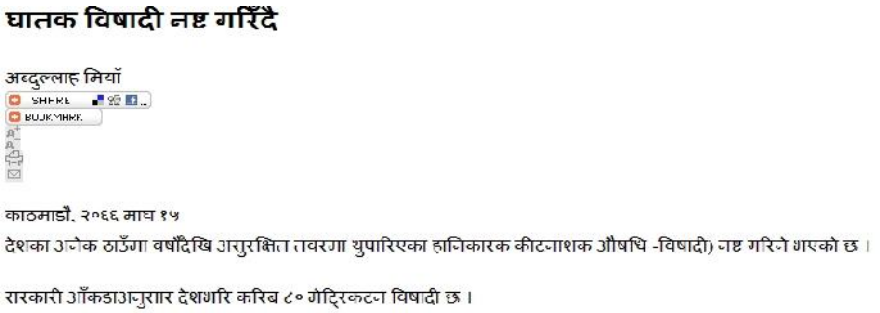
Many helping hands were with me to accomplish this project. I would like remember Professor Krishna Raj Tiwari PhD, Dean, Institute of Forestry, Tribhuvan University, Nepal, Rhishja Cota Larson, Annamiticus, USA, Dev Raj Gautam, Care-Nepal for their incredible support. Local partners; Schools, Farmer groups, Pesticide sellers, Co-workers (RSG-Grantees), NGOs (SHEAC, Unity for Conservation), CBOs (Mrigakunja User Committee, Lothar User Committee), Teachers forum, clubs, teachers, students etc also deserve thanks for their support during the project activities. I would like to thank Bishnu Hari wagle, Prashant Shrestha, Santosh Paudel, Manita Khanal, Prashanta Ghimire, Anu paudel, Sima Acharya.

Last but not least, I would like to express special gratitude to RSGF for financial assistance. I am very much thankful to RSGF because its support has been playing crucial role in developing my career.

Annex

Misuse of Chemical Pesticide in Nepal (some cases)

1. News: There is around 80 metric ton pesticides in Nepal which is going to disposed (News case).



घातक विषादी नष्ट गरिँदै

अब्दुल्लाह मियाँ

काठमाडौं, २०६६ माघ १५

देशका अनेक ठाउँमा वर्षौंदेखि अनुमतिविना ल्याइएका हानिकारक कीटनाशक औषधि -विषादी) नष्ट गरिने भएको छ ।

सरकारी आँकडाअनुसार देशभरि करिब ८० मेट्रिकटन विषादी छ ।

2. Misuse of chemical pesticide for killing wildlife by keeping in died livestock (News case)

शुक्लाफाँटामा बाघ मार्नका लागि चारोको रूपमा गाईको प्रयोग

महेन्द्रनगर । शुक्लाफाँटा वन्यजन्तु आरक्षमा शिकारीले बाघ मार्न खाडा पशु चौपायाको प्रयोग गर्ने थालेका छन् । उनीहरुले बाघ मार्न आरक्षमा मरेका छाडा चौपायाको सिनोला विषादी मिसाइन थालेका छन् ।

3. Misuse of chemical pesticide for killing wildlife by keeping in bait (Photo:Youban K Parajuli)

चराको चोरी सिकार बढ्यो

4. Misuse of chemical pesticide for killing water birds by keeping in bait (Photo:Youban K Parajuli)

5. Misuse of chemical pesticide for fishing by direct spoiling (mixing) in river/wetland. (News case)

6. Death of deer due to taking/grazing pesticide used vegetables in farmland.

7. Chemical pesticides are being sold with the children gift (doll).

8. Chemical pesticides are being sold with daily used vegetable.

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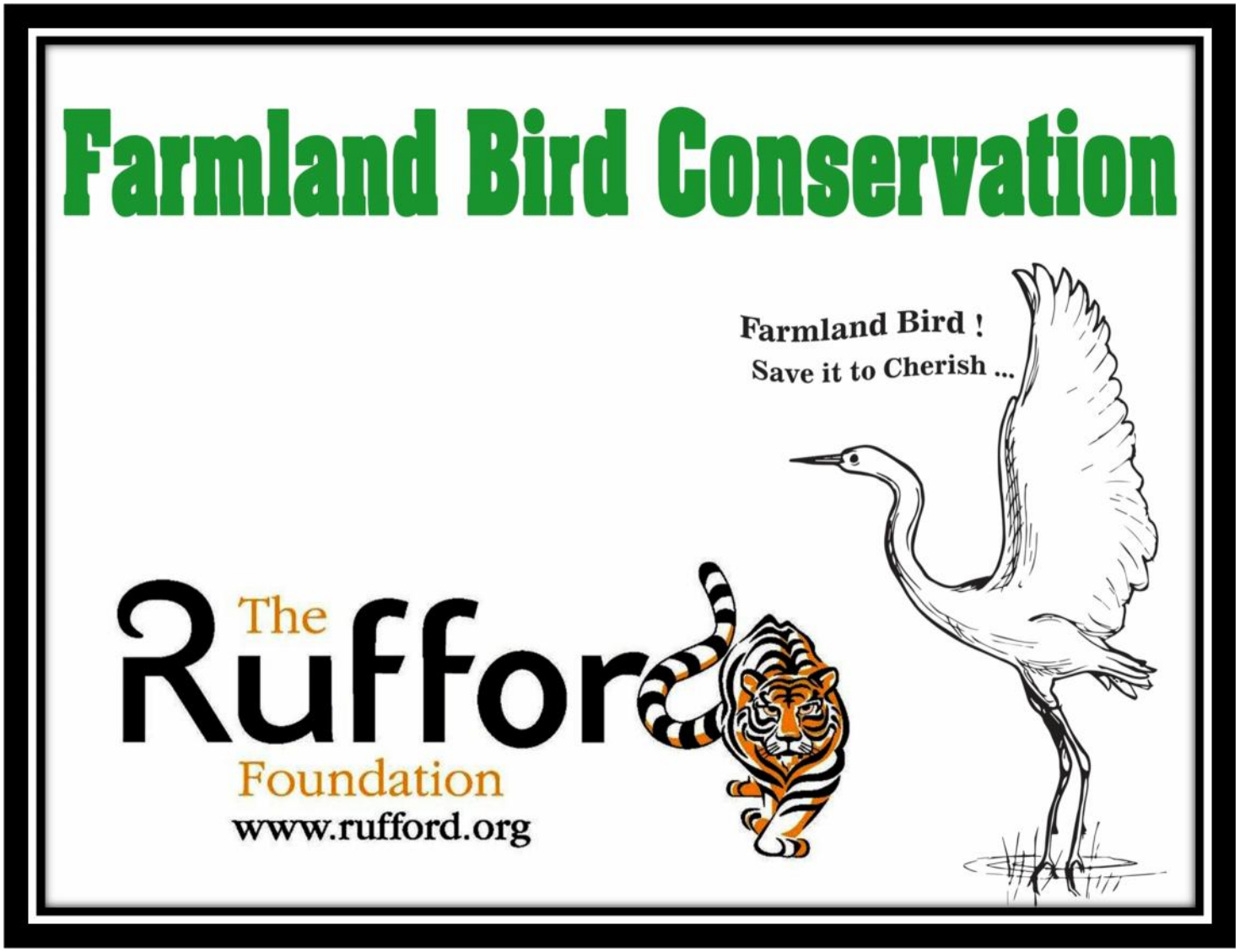

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