



Final Report

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Project Title: Mitigating human-crane conflict in Driefontein Grasslands, Central Zimbabwe

Host country: Zimbabwe

Site Location: Driefontein Grasslands, Central Zimbabwe

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Names of involved institutions: BirdLife Zimbabwe

Overall project aim: To improve the conservation of cranes through mitigating human-crane conflict in the Driefontein Grasslands.

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Section 1

1.0 Summary

An attempt to resolve the human-crane conflict in Driefontein Grasslands, Central Zimbabwe commenced in August 2010. The globally threatened Wattled Crane *Bugeranus carunculatus* and Grey Crowned Crane *Balearica regulorum* are attracted to newly cultivated crop fields and they therefore conflict with local communities. The aim of this project was to improve conservation of cranes through mitigating the human-crane conflict in Driefontein Grasslands. The specific objectives of the project were to investigate roles of crane species in crop depredation, assess the effectiveness of crane deterrent methods, and raise awareness on crane conservation. Eight study sites that were in proximity to crane foraging, breeding and roosting sites were sampled. The major crops damaged by cranes were maize at germination stage especially by Grey Crowned Cranes. The scarecrow models tested in this project were effective in reducing crop damage by cranes. No crop damage was recorded in crop fields where scarecrows were erected. Crop damage by Grey Crowned Cranes was recorded in sampling plots without deterrents. Awareness on crane conservation was raised through stakeholders` meetings and workshops between August and December 2010. The project received overwhelming support from the local communities and they appreciated the team`s efforts to deter cranes from their crops.



Driefontein Grasslands, Zimbabwe (photo by Togarasei Fakarayi).

1.1 Introduction

The Wattled Crane and Grey Crowned Crane are the two crane species found in Zimbabwe. Driefontein Grasslands (19°23'S 30°47'E), is the key breeding and foraging area for cranes in

Zimbabwe, supporting a significant number of both species. The site is an Important Bird Area and is rich in birds and other biodiversity. The Driefontein Grasslands is located outside the Protected Areas system of Zimbabwe. Therefore, the survival of cranes in Driefontein Grasslands depends on the people who live in the area and share natural resources with the cranes. The population of cranes in the area has declined drastically over the past six years due to human disturbances and loss of wetland habitats. Wetlands in Driefontein Grasslands have ecological, socio-economic and scientific values. Both small scale farmers and cranes rely on the wetlands and grasslands for survival. The farmers use the area for crop production and livestock grazing. As more land was opened up for cultivation by subsistence farmers since the land resettlement programme in 2000, Wattled and Grey Crowned Cranes have adapted to the changes in land use. Cranes are now using the croplands as part of their foraging grounds. They are attracted to newly ploughed fields where they can easily feed on tubers, mainly of the perennial sedge *Cyperus esculentus*, and other rhizomes found from turned soils. However, the cranes were reported to damage crops, resulting in conflict with the farmers who viewed these birds as crop pests. The major crops damaged by cranes were maize at germination stage and rice at milking stage. The extent of crop damage by cranes was not known and no attempt to resolve the conflict had been done before.



Wattled and Grey Crowned Cranes in Driefontein Grasslands (photos by Dr. C. Chirara (right) and Togarasei Fakarayi (left)).

In 2010, the CLP grantees from BirdLife Zimbabwe tested a method of using scarecrows to reduce crop damage by cranes in an attempt to mitigate the human-crane conflict. The project was an eye opener to local villagers who in the past have limited capacity and knowledge of environmentally friendly methods that deter cranes from damaging crops. In the past the villagers used to tie pieces of used clothes on the fences of their fields but this was ineffective as the cranes continued to destroy crops. The only method that was effective was to chase cranes from crop fields by humans, a method that would require a lot of manpower and compromised the co-existence of cranes and humans. However, the problem of crop damage by cranes was not completely solved by this method as the cranes entered crop fields very early in the morning before humans guard their crop fields. The conflict remained due to increased cases of crop damage. There was a gap in knowledge on effective methods that prevent crop damage by cranes. This project demonstrated an environmentally friendly way of preventing crop damage by cranes without direct human and dog interference. The overall goal of this project was to improve conservation of cranes through mitigating the human-crane conflict in Driefontein Grasslands.

1.2 Project Members

Togarasei Fakarayi (Project Leader)

Holds BSc Environmental Science Honours Degree in Wildlife and Rangeland Management (2006), currently studying towards MSc in Tropical Resources Ecology at the University of Zimbabwe. Togarasei Fakarayi has over four years experience working with communities and other stakeholders in promoting conservation of birds and other biodiversity in priority conservation sites. Since 2007, Togarasei was involved in promoting crane and wetland conservation in Driefontein Grasslands. The candidate also has vast experiences in climate change programmes. He is currently employed by BirdLife Zimbabwe as Projects Officer. In this project Togarasei played a significant role on project development and management, field data collection, data analysis, report writing, engaging the local communities and training them during project implementation.

Kanisios Mukwashi

Kanisios Mukwashi is an ecologist and animal scientist by profession. He is a holder of MSc in Tropical Resources Ecology and BSc Honours Degree in Agriculture (Animal Science) from the University of Zimbabwe (2006 & 2004). He has vast experiences working in the field of ecological research and wildlife conservation. He worked for Zimbabwe Parks and Wildlife Management Authority for three years (2004-2007) as an ecologist and was involved in various wildlife-related projects including community work. He is currently working for BirdLife Zimbabwe as the National Project Manager of the Important Bird Areas Monitoring Project, funded by the European Commission since 2007. In this project he was involved in project development, data collection, training and workshops with local communities in Driefontein Grasslands and report writing.

Innocent Magunje

The candidate holds a BSc in Environmental Science Honours Degree in Wildlife and Rangeland Management. Innocent has a wide experience in bird identification and ringing. He worked for BirdLife Zimbabwe from October 2008 to June 2011. In this project he has contributed immensely on bird identification, field data collection, training and workshops with communities in Driefontein Grasslands.

Section 2

2.0 Aim and Objectives

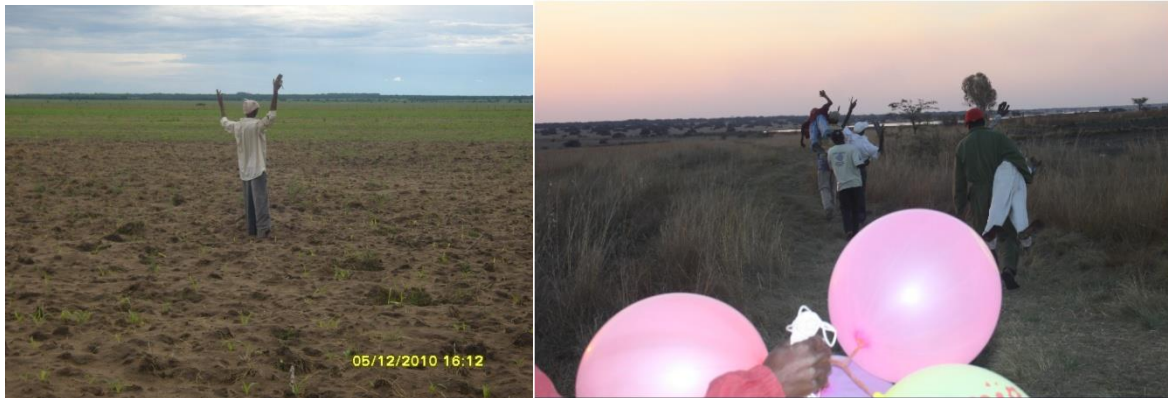
The overall aim of the project was to improve the conservation of cranes through mitigating the human-crane conflict in Driefontein Grasslands, an Important Bird Area.

Specific Objectives were;

- To investigate the role of crane species in crop depredation by December 2010
- To assess effectiveness of crane deterrent methods in reducing crop damage by March 2011
- To raise public awareness in the Driefontein Grasslands on the conservation status of cranes by October 2010

2.1 Methodology

Eight field sampling plots were selected from Shashe and Chinyaure villages. The crane deterrents, in the form of human and dog models, and plastic balloons of about 30 cm diameter with different colours, were set up in one crop field sampling plot in each village (fig 3). The scarecrows were erected in two distinct sampling plots in each of the planting seasons (Table 1). The dry-season study sites were communally owned maize gardens and the wet-season sites were individual maize crop fields. The estimated size of the community garden sampling plots was about 10 hectares and the individual crop field was about 6 hectares. The scarecrows were put up in sampling plots at germination stage of the maize crop. In each season, two sampled plots were control plots for each planting season.



Human models and plastic balloons scarecrows (photo by Togarasei Fakarayi).

The human model scarecrows were covered with clothes and placed in crop fields for three weeks from the onset of germination of maize seeds. The clothes on the human model scarecrows and their positions were changed after every two days. Plastic balloons that were blown-off were replaced in the mid-mornings and evenings. Observations in crop fields were made to determine the effectiveness of scarecrows and the role of crane species in crop depredation. An observation on the occurrences of cranes in crop fields, time of arrival and departure, bird activity and the type of food preferred by cranes was carried out in all the sampling plots. Crop size and attributes damaged were observed in crop fields soon after cranes had left the scene. Observations were done in the mornings from as early as 0500hrs until mid-morning and evenings until dark, when cranes were most likely to use the field. The local communities were trained on the use of the scarecrows. Awareness on crane conservation was raised throughout the Driefontein Grasslands through workshops and stakeholders meetings. At the end of the project feedback was obtained from members of the local communities whose fields were sampled. This was done through interviewing 12 farmers.

Table 1: Sampling in crop fields

Planting seasons	Type of Field	Number of Fields/plots sampled	Number of sampled plots with scarecrows	Number of scarecrows (Human Models) erected	Number of scarecrows (Dogs) erected	Number of scarecrow (Balloons) put
Dry season	Community garden	4	2	12	8	30
Wet season	Individual Crop field	4	2	10	8	30

Data processing and analysis: The data collected from the field was extracted from field data sheets and collated in excel for analysis.

2.2 Outputs and Results

From this study it was found that the Grey Crowned Cranes caused damage to crops in gardens and fields. The Grey Crowned Cranes were observed digging and picking up food (presumably root tubers and rhizomes). They also uprooted and consumed germinated maize seeds. It was observed that the most preferred food for both species of cranes were tubers mainly of a perennial sedge *Cyperus esculentus*, a common plant in wetlands and community gardens. Both species of cranes were observed running after insects (mostly grasshoppers) with wings raised.



A perennial sedge Cyperus esculentus common plant in Driefontein Grasslands (photo by Togarasei Fakarayi).

Behaviour of cooperative feeding observed might be a strategy of disturbing insects and catching them easily. Few cranes were observed in crop fields during the wet season and no crop damage was reported. No Wattled Cranes were recorded in crop fields during either season (Table 2). They were observed foraging entirely in wetlands and uplands, at some distance from the crop fields. Other bird and small animal species observed in the crop fields that might damage crops included Spur-winged Goose *Plectropterus gambensis* and Spring hare *Pedetes capensis*. However the effect of these species on crops needs further investigation. In this study there was no Wattled Crane observed in sampling plots.

The scarecrows tested in this project proved effective in reducing crop damage. No crop damage was recorded in sampling plots where scarecrows were erected. In sampling plots without scarecrows, crop damages were recorded. Most Grey Crowned Cranes flew over the sampling plots with scarecrows and landed at a distance outside the plots. However, on two occasions few Grey Crowned Cranes flew into the gardens (with scarecrows) but restricted

themselves to the edges and did not forage on crops. In control sampling plots, flocks of Grey Crowned Cranes were recorded and crop damages were noted. One of the control sampling plots at the Shashe garden was completely destroyed by a flock of Grey Crowned Cranes so much that the maize had to be replanted. All 12 farmers interviewed have indicated zero crop damage in the 2010 planting seasons, and 11 of them had their crops damaged in 2009, 2008, and 2007 planting seasons. Only one farmer did not observe crop damage in 2009, and encountered insignificant damages in 2008 and 2007.



Grey Crowned Cranes scared by the deterrents erected in the garden (Photo by Kanisios Mukwashi).



Villagers at Chinyaure Village follow proceedings at a stakeholders' meeting held at Chinyaure Village, Driefontein Grasslands (Photo by Innocent Magunje)

Public awareness on crane conservation was raised through stakeholders meetings, workshops and informal discussions during an outreach programme. Four workshops on crane conservation were held with villagers in the Driefontein Grasslands. The workshops

were attended by more than 200 villagers that included community and church leaders, the AGRITEX Officers, Environmental Management Agency Officer and the Rural District Council Officer. An article on Crane Conservation in Driefontein Grasslands had featured in a local newspaper, The Financial Gazette of 3-9 May 2011. Two articles on improving crane conservation through mitigating human-crane in Driefontein Grasslands were published in the African Crane, Wetlands and Communities Newsletters 7 and 8 in December 2010 and September 2011 respectively. Similar articles also featured in the BirdLife Zimbabwe's bi-monthly newsletter- *Babbler* of March/April 2011 and the CLP Newsletter of July 2011.

Table 2: Crane observations in and around sampled plots

Planting seasons	No. of Crane Sightings observed in sampling plots with deterrents						Crane observations outside crop field with deterrents (100m radius)	Crane observations outside crop field with deterrents (>100m and <500m radius)		No. of crane sightings observed in control sampling plots		
	GCC			WC				GCC	WC	GCC	WC	
	D1	D2	D3	D1	D2	D3						
Dry Season (Shashe Village)	0	0	6	0	0	0	73	0	25	2	28	0
Dry Season (Chinyaure Village)	0	3	0	0	0	0	12	0	18	4	17	0
Wet Season (Shashe Village)	0	0	0	0	0	0	3	0	4	2	0	0
Wet Season (Chinyaure Village)	0	0	0	0	0	0	2	0	3	2	2	0

Key: D1: distance<50m from scarecrow
D2: distance between 51-100m from scarecrow
D3: distance > 100m from scarecrow
GCC: Grey Crowned Crane
WC: Wattled Crane

2.3 Achievements and Impacts

The project has demonstrated an environmentally friendly science-based human-crane conflict resolution method. The method was welcomed by local villagers in Driefontein Grasslands and generated great interest in crane conservation in the area. The scarecrows used in this project were viewed as environmentally-friendly by local villagers since they did not cause any harm to cranes. Villagers whose crop plots did not have deterrents requested for the scarecrows, expressing their satisfaction on the effectiveness of the scarecrows used in this project. The method was also shared with the wider community nationally, regionally and internationally through electronic and print media. This has drawn attention of many conservationists working on cranes and who are facing similar problems in their areas of work worldwide. Although the two crane species were accused of damaging crops, the finding from this study shows that the Grey Crowned Crane caused major crop depredation in

crop fields than Wattled Cranes. However, if deterred from entering crop fields they would not come back until towards sunset (evening) when they were on their way to roosting sites.

The lower number of cranes observed in sampling plots with scarecrows showed that the cranes were deterred by the scarecrows. This study also showed that the problem of crop damage by cranes is at its peak in crop gardens cultivated during the dry season and was mainly caused by Grey Crowned Cranes. Wattled Cranes infrequently visited crop fields. During the wet season, there appeared to be plenty of food and water bodies and cranes have a wide range of foraging habitats available besides crop fields. There were few observations of Grey Crowned Cranes during the wet season and they were thought to be breeding in hidden places. During the dry season when the surrounding areas are dry, availability of wetlands and other water sources are limited, and soil penetrability is low in other foraging grounds. The ploughed crop gardens close to human settlement and located at the edges of wetlands are also used as foraging grounds by cranes during the dry season as they have high soil penetrability. The Grey Crowned Cranes appeared in large numbers during the dry season. Although literature on the use of scarecrows in Southern Africa is generally scarce, the various scarecrows that have been tried showed limited success in deterring cranes. In contrast, the scarecrow models tested in this project seemed to work effectively. The project needs to be scaled up to cover the entire project area in order to expand these mitigation efforts. The subsistence farmers in Driefontein Grasslands plant their crop gardens at different times during a season. Therefore, if the method is to be tested on a large scale, the scarecrows should be set up in crop gardens when the crops are most vulnerable to damage by cranes. The cranes will have options to feed in crop lands without deterrents or where deterrents have been removed after crops have passed the vulnerable stage (three weeks after maize germination). The project received great support from local communities and a request made by villagers living outside the study areas for more scarecrows showed the effectiveness of the scarecrow method. The program has generated more interest towards crane conservation in the Driefontein Grasslands.

The education and awareness programme was an essential tool that helped to transform humans from practising unfriendly environmental activities to friendly environmental conservation activities. Awareness on crane conservation was raised among 200 villagers through stakeholders meetings and sensitisation workshops. More interest on crane conservation was generated at local level and the level of community participation has increased by at least 50%. However, many communities in the Driefontein Grasslands wanted the scarecrow method to be expanded into their areas. Since the beginning of the project no cases of bird poisoning or persecution were recorded throughout the Driefontein Grasslands. Outside the project sites, villagers have to guard their crop fields during germination stage and very few cases of conflict were reported. The villagers have exercised restraint when chasing cranes away from germinating crop fields.

There was a positive community response towards crane conservation since the beginning of the project. Breeding improvement for both species of cranes was witnessed in Driefontein Grasslands after the breeding season. Seven and five pairs of Wattled Cranes successfully bred in November 2010 and January 2011 respectively. In August 2011 about 8 juveniles of Grey Crowned Cranes were recorded in a flock. Comparing to previous years breeding success has improved in 2011. BirdLife Zimbabwe records have indicated less than four pairs that bred successfully in the past four years. Improvement in breeding success could be due to positive community response towards crane conservation coupled by less human disturbance on breeding sites.

Section 3

3.0 Conclusion

The findings from this study have indicated that the problem of crop damage by cranes is high during the dry season. During the rainy season cases of crop depredation by cranes were very low presumably due to increase of water availability, high soil penetrability and food abundance in many parts of the Driefontein area. The Grey Crowned Cranes caused major crop damage in crop fields especially during the August-September planting season. Key crop destroyed by cranes was maize at germination stage. The scarecrow models tested in this project were effective in reducing crop damage by cranes. This was indicated by no crop damage in sampled crop fields erected with scarecrow structures. Great support by local communities towards the use of these scarecrows and the increased community participation was clear evidence that the project has mitigated the human-crane conflict in the area. Education and awareness on crane conservation has significantly contributed to a positive change of human behaviour towards crane conservation. There is need to scale up the project to cover other areas to expand these mitigation efforts.

3.1 Problem encountered and lessons learnt

The available scarecrows were not enough to cover crop fields of all villagers in the entire project area. Initially villagers whose crop fields were not sampled were reluctant to participate and cooperate with project implementers. This problem was solved through holding meetings with villagers and clarifying that the scarecrows were being tested and that the project was at its infant stage. Field sampling was also a problem because other fields in the key crane sites were not yet planted. To overcome this, sampling was done with a bias towards fields whose crops were germinating, and scarecrows were allocated to fields that attract cranes. Villagers tended to associate all crop damage with cranes because they wanted to get assistance from project implementers. To solve this, villagers were told that the cranes were attracted to newly ploughed fields where they could easily turn the soil to feed on roots, worms, plant tubers and bulbs. It was discovered that other bird and small animal species such as Spur-winged Goose *Plectropterus gambensis* and Spring hare *Pedetes capensis* could also cause significant crop damage, and the message was communicated to villagers. Although literature on the use of scarecrows in Southern Africa is generally scarce, the various crane scarecrows that have been tried showed limited success. In contrast the scarecrow models that have been tested in this project seemed to work effectively. Another lesson learnt is that it is very important to closely work with the community when administering community projects. The overwhelming support of the project by the villagers showed their willingness to co-exist harmoniously with cranes. The awareness workshops proved to be effective means of communicating.

3.2 In the future

Substantial visits to the project area by the CLP team will be done. The crane species and their habitats will also be monitored beyond the grant period. The Local Conservation Groups (LCGs) in the Driefontein Grasslands have been tasked to monitor and ensure proper use of the available scarecrows by local villagers. They are also involved in the crane conservation program. The CLP team has trained some of the members of the LCGs on crane and habitat management and the members will continue to raise awareness on crane conservation among the villagers. There is need to continue carrying out surveys of crane species in Driefontein

Grasslands and frequent monitoring of their habitats. The project needs to be scaled up to cover the entire project area to expand these mitigation efforts. Education and awareness on crane conservation should be a continuous process. Improving the livelihoods of local communities would also be essential as it will help to reduce pressure on the wetland habitats of cranes.

Section 4

Appendices

1. Copy of media coverage, May 2011.

2. **Bird species inventory in Driefontein Grasslands**
 1. African Fish-Eagle
 2. African Jacana
 3. African Palm-Swift
 4. African Stonechat
 5. Abdim's Stork
 6. African Wood-Owl
 7. African-marsh Harrier
 8. Barn Owl
 9. Bateleur
 10. Black-backed Puffback
 11. Black-bellied Bustard
 12. Black-collared Barbet
 13. Black Crow
 14. Black-headed Heron
 15. Black-headed Oriole
 16. Black-shouldered Kite
 17. Blacksmith Lapwing
 18. Crowned Lapwing
 19. Blue Waxbill
 20. Brubru
 21. Cape Longclaws
 22. Cape Vulture
 23. Cape-turtle Dove
 24. Cattle Egret
 25. Common Waxbills
 26. Corncrake
 27. Croaking Cisticola
 28. Dark-capped Bulbuls
 29. Egyptian Geese
 30. Fiery-necked Nightjar
 31. Great Snipe
 32. Grey crowned Crane
 33. Grey Go-Away Bird
 34. Grey Heron
 35. Kori Bustard
 36. Kurrichane Thrush

37. Lesser Kestrel
38. Lizard Buzzard
39. Long-billed Crombec
40. Meyer's Parrot
41. Miombo blue-eared Starling
42. Pallid Harrier
43. Rattling Cisticola
44. Red-billed Buffalo Weaver
45. Red-billed Quelea
46. Red-billed Teal
47. Red-capped Lark
48. Rufous-naped Lark
49. Saddle-billed Stork
50. Senegal Coucal
51. Shikra
52. Southern Ground-Hornbill
53. Tawny-flanked Prinia
54. Black-crowned Tchagra
55. Temminck's Courser
56. Wattled Crane
57. Wattled Lapwing
58. White-backed Vulture
59. White-bellied Sunbird
60. White-browed Robin-Chat
61. White-faced Duck
62. Yellow-billed Kite

3. An article about this project featured in the African Cranes, Communities and Wetlands Newsletter 7, a newsletter of the International Crane Foundation/Endangered Wildlife Trust Partnership. (www.ewt.org.za).
4. An article about this project featured in the African Cranes, Communities and Wetlands Newsletter 8, a newsletter of the International Crane Foundation/Endangered Wildlife Trust Partnership. (www.ewt.org.za).

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Address list and web links

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Gauteng, South Africa
www.ewt.org.za

Distribution list

- BirdLife Zimbabwe
- International Crane Foundation/Endangered Wildlife Trust
- Zimbabwe Parks and Wildlife Authority, Harare
- Environmental Management Agency; Gutu and Harare Offices.
- Gutu Rural District Council; Gutu Office
- Ministry of Environment and Natural Resources Management, Harare
- Department of Agricultural Technical and Extension Services (AGRITEX), Driefontein
- Wildlife and Environment Zimbabwe (WEZ), Harare
- Shashe Village, Driefontein
- Chinyaure Villages, Driefontein
- Daviot Villages, Driefontein
- Chipisa Villages, Driefontein
- Grootfontein Villages, Driefontein
- Chinu Villages, Driefotein
- Good Hope Dekete Villages, Driefontein
- Local schools, Driefontein
- Driefontein Mission, Driefontein