**Conservation Leadership Programme: Project Reporting**

## Final Report

**F01149413 - Scaling-up Mitigation of Human-Crane Conflict in Driefontein Grasslands, Central Zimbabwe.**

**Host country and site location;** Zimbabwe, Driefontein Grasslands.

**Institution involved/participated:** BirdLife Zimbabwe.

**Overall aim;** Mitigating human-crane conflict through applying environmentally friendly management systems that reduces crop damage by cranes.

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**Date when the report was completed;** September 2015

# Contents

# Acknowledgement

The Project Team would like to thank the Conservation Leadership Programme for financially supporting this project. We are also grateful to mentorship we got from the CLP Team during project implementation. The Project Team expresses sincere gratitude to local communities in Driefontein Grasslands for their cooperation during this project. Many thanks to Richard, Joachim and Emanuel for their field assistance on data collection. Special thanks goes to the local councillor, Mr David Mudziwapasi, for his support on the project. Many thanks to Mr Osiman Mabhachi for his mentorship and advice during project implementation. We also express gratitude to BirdLife Zimbabwe for its support on this project.

# Section 1:

## 1.1. Summary

The Wattled (*Bugeranus carunculatus*) and Grey-crowned (*Belearica regulorum*) Cranes found in Driefontein Grasslands were in the past associated with crop depredation resulting in conflicts with subsistence farmers in the Important Bird Area. We introduced the use of human model scarecrow as a mitigation measure to curb the human-crane conflict and communities were fully engaged. The objectives were to investigate the magnitude of maize crop damage by cranes, scale up the use of the environmentally friendly crane-deterrent method in vulnerable maize crop fields, promote growing of non-vulnerable crops, and influence policy implementation on Crane and biodiversity conservation in Driefontein Grasslands. Eight maize plots were sampled, erected with human model scarecrows, and monitored during the dry and wet planting seasons. A total of 637 plants were damaged in plots erected with scarecrows, constituting 6.8 % of total plants in these plots, while 2208 plants were damaged in control plots, representing 29.7 % of total plants in these plots. We observed improved human attitude towards crane conservation as a result of use of scarecrows, education and awareness outreach and policy influence. Crane surveys conducted showed 31% and 46.7 % increase in Wattled and Grey Crowned Crane populations respectively.

## 1.2. Introduction

Driefontein Grasslands is an Important Bird Area (IBA) located on the central watershed of Zimbabwe. It is characterised by open wet grasslands separated by pockets of Miombo Woodlands. This IBA, rich in birds and other biodiversity, is found outside the protected area systems of the country (unprotected) and is communally managed. Three globally threatened bird species namely the Wattled Crane (*Bugeranus carunculatus*), Grey Crowned Crane (*Balearica regulorum*) and Secretary bird (*Sagittarius serpentarius*) are found there. The Driefontein Grasslands is the key breeding and foraging area for cranes in Zimbabwe supporting more than half of total Crane population found in the country. The Wattled and Grey Crowned Cranes were reported to damage maize crops in Driefontein Grasslands resulting in conflict with subsistence farmers. The purpose of this project was to mitigate the human-Crane conflict by putting in place a management system that reduces crop depredation by cranes. The project scaled-up the use of environmentally friendly human-model scarecrows as a mitigation measure to temporarily deter Cranes from entering vulnerable maize crop fields and promoted active community participation in Crane conservation. There was wide community and stakeholder engagement in promoting Crane conservation and influencing positive human attitude change towards Cranes in this IBA. Local key stakeholders who include the Environmental Management Agency (EMA), Agricultural Technical and Extension Services (AGRITEX), Driefontein Mission and Gutu Rural District Council through the local ward councillor were involved during project implementation. The local councillor played a pivotal role in assisting community mobilisation. EMA provided technical support on wetland management. AGRITEX provided technical advice on crop field assessments and other agricultural issues. Driefontein Mission allowed the researchers access to their crop field and assist with some information related to project field observations. Effective policy implementation governing Crane conservation was advocated for by the project implementers and stakeholders. This project demonstrated environmental friendly ways of reducing crop damage by Cranes, influenced positive human attitude towards Cranes, and showed that humans can coexist with Cranes.

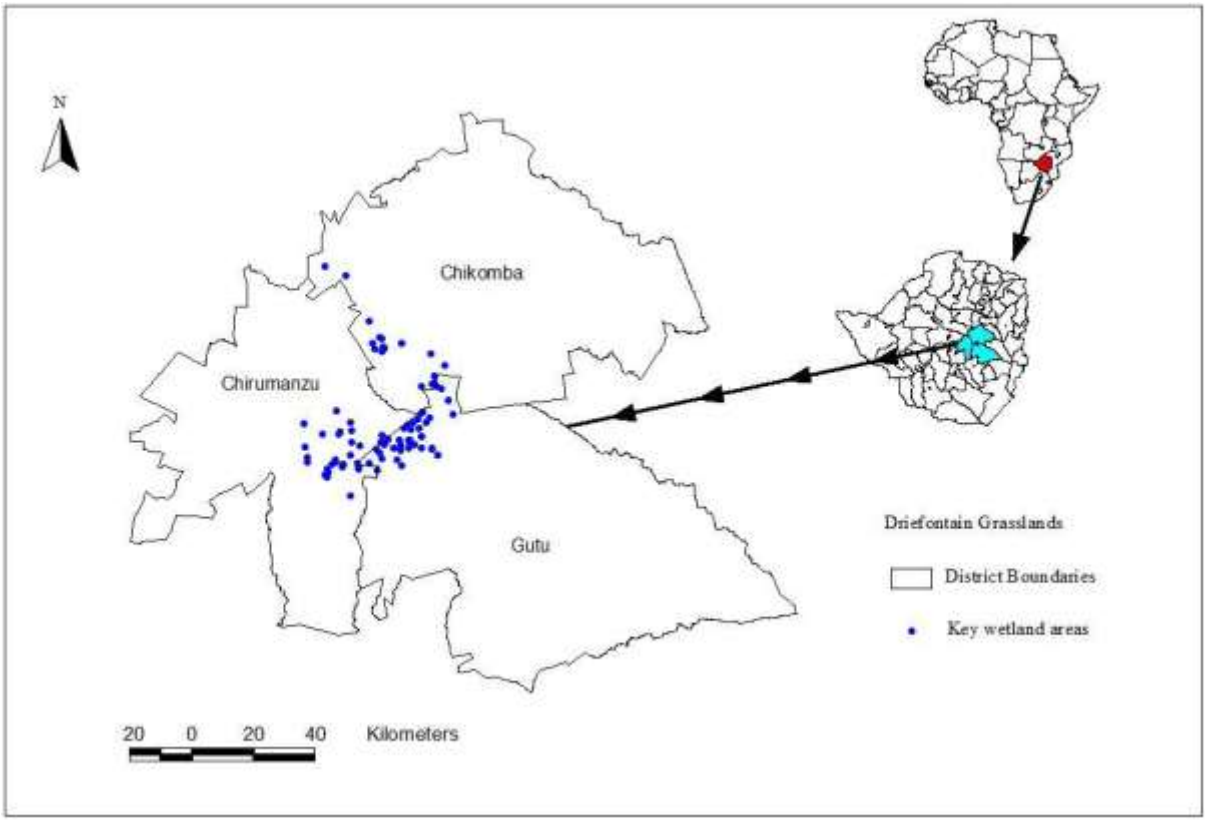


**Fig. 1.** Location of Driefontein Grasslands

## 1.3. Project Members

Togarasei Fakarayi

Holds MSc in Tropical Resources Ecology, BSc Honours in Environmental Science. Togarasei has eight years of experience in conservation and is currently involved in projects working with communities on capacity building, wetland management and Crane conservation. Togarasei was the Team Leader in this project. He was responsible for project development and management, coordination of project activities, field data collection, data analysis, report writing, engaging the local communities and training them during project implementation. Togarasei is currently working for BirdLife Zimbabwe, as the Important Birds and Biodiversity Manager.

Kanisios Mukwashi

Holds a Master of Science Degree in Tropical Resources Ecology, Bsc Honors Degree in Agriculture (Animal Science). Kanisios has experience in project design and management, IBA management and capacity building. In this project Kanisios played a pivotal role in project development, community engagement, data collection and report writing. Kanisios is currently studying for a doctoral programme with Bayreuth University in Germany.

Innocent Magunje

Holds BSc Environmental Science Honours Degree. Innocent has experience in bird identification and environmental education. He was involved in project development, field bird surveys, environmental education and awareness in communities, and report production. Currently, Innocent is the Education and Youth Officer at BirdLife Zimbabwe.

# Section 2:

## 2.1. Aim and objectives

This project aimed at promoting a management system which reduces crop depredation by Cranes contributing to the resolution of human-crane conflict in the Driefontein Grasslands IBA. Its objectives were; investigating magnitude of crop damage by Cranes, scaling-up the use of environmentally friendly scarecrows as a crane-deterrent method in maize crop fields, promoting growing of small grain crops that are not vulnerable to damage by Cranes, and influencing effective policy implementation on Crane and biodiversity conservation.

## 2.2. Methodology

Sixteen cultivated sampling plots (4-8 hectares each) were identified from eight villages. One sampling plot at each village was erected with a combination of human model scarecrows and air-filled plastic balloons at germination stage of the maize plant. Scarecrows were strategically erected in croplands at 40-50m from each other. The human model scarecrows was covered with clothes and placed in crop fields/gardens for three weeks from onset of seed germination. Clothes and scarecrow positions were changed after every two days.

A second plot in each village acted as a control. Germinating maize plants in all the plots under study were quantified before the observations to estimate the total number of plants in the sampled plots. Quantification was done by counting the number of planted lines and determining average number of plants per line. The average number of plants per line was determined by physical counting of total plants from 5 lines selected at random. An assessment of damaged crops in all plots (including control plots) was conducted during planting seasons (August-September and November-December). The number of uprooted germinating maize plants by Cranes were recorded as crop damage and it was observed through physical counting along planted lines in cropland. Observations of Cranes in sampled plots were conducted manly in the mornings and evenings when Cranes visited these fields. In addition some information on Crane sightings in wetlands habitats was gathered to check presence of Cranes in their usual foraging and breeding habitats in the area.

A plot of one farmer was identified among six villages and used as a demonstration plot for a treatment/trial of alternatively use small grains as another option to investigate the level/magnitude of damage by cranes on these small grains grown by farmers. Unlike maize, the small grains were not vulnerable to cranes. A cluster of 40-50 farmers per plot was then set up for learning and knowledge sharing on growing of small grains.

Two ground surveys of cranes were conducted to monitor crane population in the project area.

A community outreach programme was conducted in sixteen villages to raise awareness of the project and Crane conservation and to influence proper management of wet grasslands resources. In order to influence policy implementation, Site Support Groups (SSGs) were trained in policy and advocacy, with more emphasis on advocating for implementation of local by-laws. In addition, a wide range of stakeholders including the local authorities, environmental management agency, other civil society organisations and traditional leaders were reached during advocating for more conservation action in the project area.

Descriptive statistics were used to analyse trends the data set. A t-Test was used to test significant difference in crop damage between the guarded and control plots. The relationship between crop damage and Crane species was measured using a correlation matrix. A two-way Analysis of variance was used to measure effect of sample plots on crop damage.

## 2.3. Outputs and Results

**2.3.1.Objective 1:** To investigate magnitude of maize crop damage by cranes in Driefontein Grasslands by December 2014.

**2.3.2.Outputs:** Crop damage by the two crane species was investigated. More damage was recorded during the dry seasons as compared to wet seasons (Fig. 1, 2, and 3 below). The maize crops were damaged by cranes at a stage when they have 2-3 leaves with a seed underneath. After the germinating maize seed disappears there was no more damage recorded even if the cranes entered into the crop fields. The affected maize plots where damage was recorded were mainly caused by the Grey Crowned Cranes.

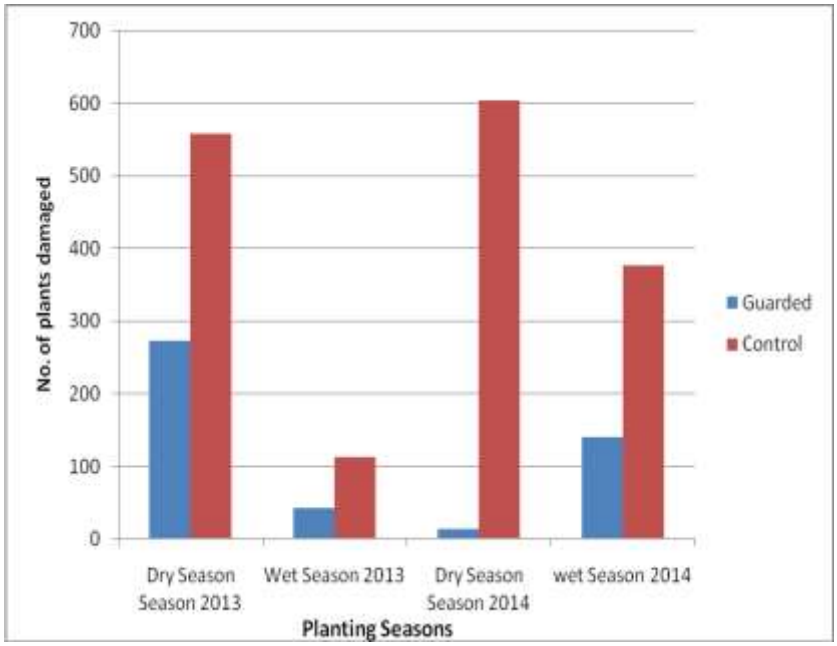


**Fig. 2.** Total crop damage recorded from the 8 guarded and 8 control plots.

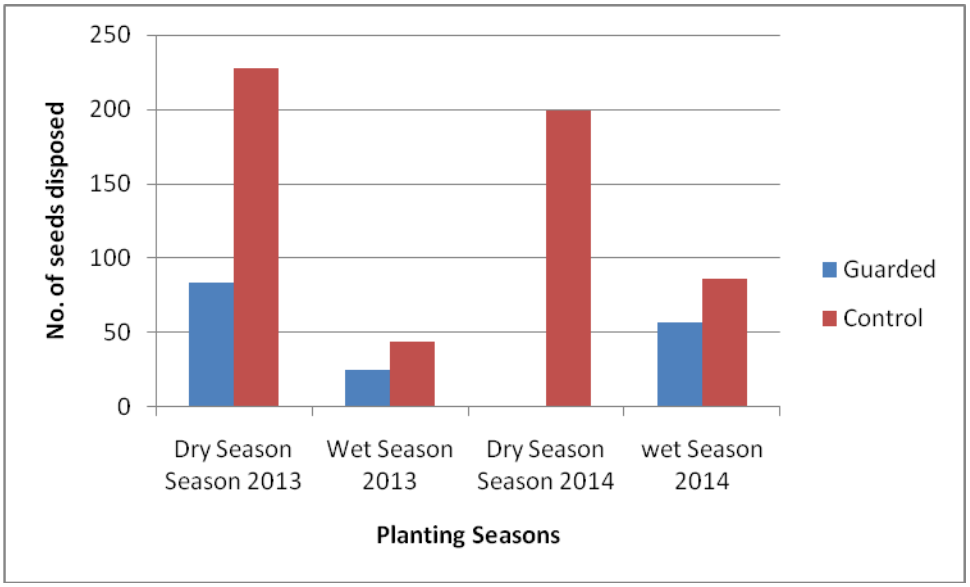


**Fig. 3.** Seed disposal recorded from both guarded and control plots.

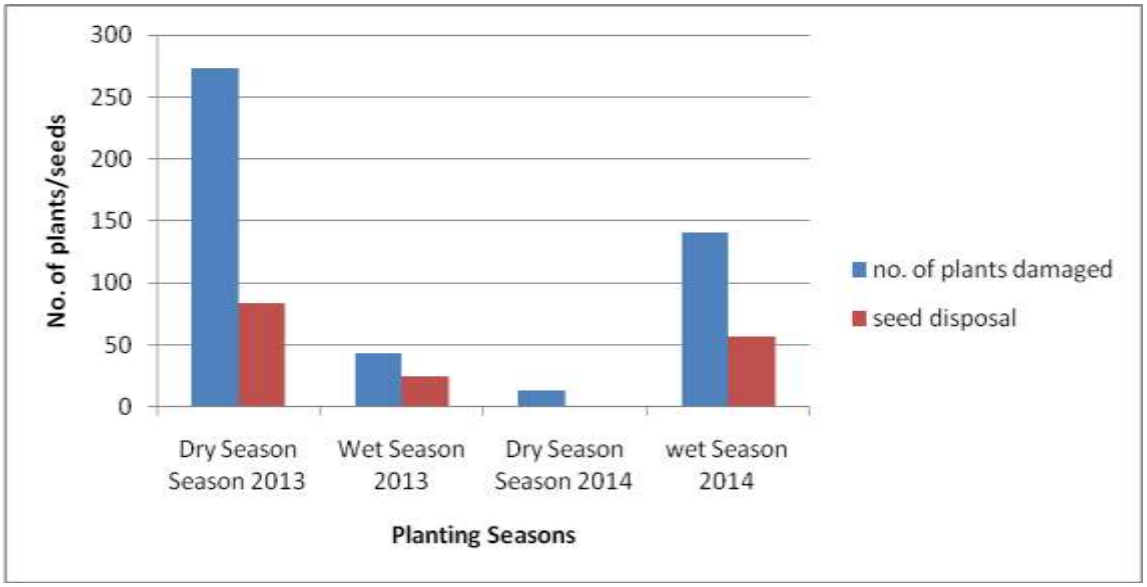


**Fig. 4.** Plant damage and seed disposal recorded from guarded plots. Collectively are considered crop damage.

**Table 1:** Correlation between Crane bird species and crop damage

| | *GCC* | *WC* | *C.damage* |
|---|---|---|---|
| GCC | 1 | | |
| WC | 0.554618 | 1 | |
| C.damage | 0.512666 | 0.236249 | 1 |

* GCC-Grey Crowned Crane
*WC-Wattled Crane
*C.damage-Crop Damage

There was a positive correlation between crop damage and the two Crane species. However, crop damage is strongly correlated to Grey Crowned Cranes as compared to Wattled Cranes.
A t-Test revealed a significant ($p<0.05$) difference in crop damage between the guarded and control plots. This indicates effectiveness of the scarecrows in reducing crop damage. A two-way Analysis of Variance (ANOVA) revealed significant ($p<0.05$) differences in crop damages across the 8 guarded plots indicating that location of sites had an influence on Crane visits to the plots.

**2.3.4. Objective 2:** To scale-up the use of environmentally friendly scarecrows as crane-deterrent method in maize crop fields by June 2014.
**2.3.5. Outputs:** The use and effectiveness of human model scarecrow on reducing crop damage was tested in 8 villages. On our initial CLP Future Conservation Project (2010/2011) we sampled two fields erected with scarecrows per season from two villages for two planting seasons and 60 people were involved. In 2013/2014 we sampled eight Fields with scarecrows per season from eight villages for four planting seasons. During this phase (2013/2014) 250 people were trained on proper use of scarecrows to reduce crop damage by Cranes. It was agreed to erect scarecrows for a period of at most three weeks from onset of maize germination when crops are vulnerable to damage. Less damage (6.8 % of total plants in guarded sampling plots) was recorded in sampling plots erected with scarecrows. 95% of villagers involved welcomed the idea of using environmentally friendly methods in reducing crop damage.

**2.3.6.Objective 3:** To promote growing of small grain crops that are not vulnerable to damage by cranes in Driefontein Grasslands by December 2014.
**2.3.7. Outputs:** There were no recorded cases of crop damage by cranes from small grains plots, providing evidence that small grains are not vulnerable to damage by these bird species. Some local stakeholders appreciated the idea of considering the growing of small grain crops. However, there were mixed feelings among villagers on this idea as processing of small grains was regarded as labor intensive. During the December 2014 season, the small grain crops were poor due to erratic rains.

**2.3.8. Objective 4:** To influence effective policy implementation on crane and biodiversity conservation by December 2014.
**2.3.9.Outputs:** Some local by-laws governing wetland conservation and natural resources management were identified by the local communities. However, a need to align traditionally local regulations with the council's by-laws was noted as a requirement for smooth implementation. Outreach visits to local villages were conducted to influence crane conservation and proper management of wetland habitats. Awareness materials distributed during these visits include 1,380 posters, 1000 A5 size fact sheets and 800 brochures. This project also influenced the holding of a Community Wetland Awareness Day meeting, which was held in July 2014 in Driefontein Grasslands. There was further raising of awareness on crane conservation with more emphasis on the co-existence between humans and cranes. The project team also took that opportunity to engage high-level decision makers who attended the event.

## 2.4. Communication and application of results

Communication of research findings was done through a feedback workshop held with communities at the end of the project. In addition, there was informal communication to villagers during post project visit to the area. In February 2015, the project team got an opportunity to meet with site support groups and many stakeholders during a Provincial

Wetlands Day Commemoration held in the project area. Follow-up communication on key project issues and milestones achieved in the project and by stakeholders was done during this event. The local communities showed tremendous interest in continuation of the project based on the positive outcomes achieved and they also cited the use of scarecrows as an environmentally friendly method of preventing crop damage by Cranes. The SSG leadership has been instrumental in assisting with the communication of project results in communities as well as encouraging villagers on using this environmentally friendly method in reducing crop damage by Cranes.

## 2.5. Monitoring and evaluation

Informal interviews on effectiveness of scarecrows were conducted with the communities during the outreach exercise. We also assessed community attitude on Cranes during informal talks to get their views towards project end. Crane counts of 2013 and 2014 were part of the monitoring and we measured the conservation impact of the project based on changes in crane population in the first and second year of the project.

## 2.6. Achievements and Impacts

- Project results revealed that maize crops are vulnerable to Cranes for a short period between 2-3 weeks from onset of germination. This was shared with communities so that they realise that the magnitude of the problem was small if crop fields are well managed during the germination stage of their maize crops as opposed to their initial negative attitude on Cranes prior to this project.
- The project demonstrated environmentally friendly way of reducing crop damage by Cranes. The model proved to be effective in reducing crop damage. The project was well received by the local communities who are now aware of safe methods of preventing their crops from damage by Cranes and the importance of Crane conservation. Most villagers are now practicing this approach and some were innovative to the extent of constructing their own scarecrows using locally available materials. This brought a win-win situation in promoting crane conservation without compromising food security of poor people in the area. Most villagers trained on proper use of scarecrows developed interest in crane conservation. They played a key role in knowledge sharing and awareness raising on crane conservation.
- Engagements with stakeholders and communities during the project attracted participation of high-level decision makers in the area. Through our influence communities in Driefontein hosted two important events which brought more than 400 people including policy makers to this area. Such events made local communities realise the importance of these birds and a need to co-exist with them in the area. Following meetings with the district environmental and agricultural Officers and local authorities there was great appreciation of wetland and Crane conservation as well as working towards filling up policy gaps by the authorities. This project set a foundation for further engagements in policy and advocacy for improved Crane and biodiversity conservation.
- Improved awareness, local capacity and behavior. More than 1000 people were reached during the community outreach visits. There was wide awareness on the importance of wetlands and Crane conservation. Capacity of the four Site Support Groups (SSGs) in conservation was enhanced. Human behavior towards cranes was further improved. This was indicated by increase of Crane population in the study area during project implementation. Nine breeding successes were recorded during the

project period. Wider knowledge sharing and awareness across 16 villages reached contributed to reduced conflicts between Cranes and people.

### 2.7. Capacity Development and Leadership capabilities

This project contributed to improved skills on community and stakeholder engagement among the project team. Stakeholders were engaged at different levels during the project where various strategies were applied. The use of human model scarecrows to prevent crop damage was quite a new model and phenomenal. The project team improved on research skills by applying this approach and by working with rural communities we improved our leadership skills. There was also great improvement among project team members on the project planning, management and monitoring, communication and awareness raising. Policy and advocacy skills of team members were improved as the team members were able to effectively engage authorities at the district level. The project team gained more confidence in leading a project.

## Section 3:

### 3.1. Conclusion

The project managed to put a management system in Driefontein Grasslands in order to reduce crop depredation by Cranes. Local communities were exposed to this environmentally friendly system of reducing crop damage while promoting conservation of Cranes in their area. This was well received by villagers across 16 villages in the Driefontein Grasslands contributing to reduction of human-crane conflict in this area. The project revealed small damages (6.8 % of total plants) if maize crops are protected during the short period when they are vulnerable (2-3 leaves stage). This indicates more than 80% effectiveness of the method applied in reducing maize crop damage. Small grains are not vulnerable to damage by Cranes. However, most villagers are not yet convinced to go for small grains mainly due to its associated labor intensiveness when processing these type of crops. Attempts to influence policy and gain support of project was essential in backing-up the management system for resolving the human-crane conflict in the Driefontein Grasslands.

### 3.2. Problems encountered and lessons learnt

Encouraging people to grow small grains crops was a challenge. This has been overcome by linking the idea more with climate change than vulnerability to Cranes. Monitoring in sampling plots paused a bit of a challenge as monitoring happened at the same time when farmers wanted to work in the fields. This was solved by kindly requesting villagers to delay to go their fields, and maximize their field work from mid-morning to late afternoon to pave way for monitoring. Field monitoring was done in the mornings and evenings.

The activity of using scarecrows to prevent damage of crops was well received by the villagers. Most people acknowledged the efforts made in reducing crop damage and at the same time promote conservation of Cranes. Prior to the project there were different perceptions from farmers on rate of damage by Cranes. Activity of quantifying crop damage by Cranes was therefore interesting as additional information was even gathered from the farmers.

Key lessons learnt were that; consensus on issues can be reached if the right information is delivered to communities at the right time. Promoting a new management system should be

inclusive of stakeholder's needs and participation. Collaboration among all stakeholders is essential in conflict resolution. Since we cannot address today's problems with yesterday solutions, new ideas to address current challenges are therefore required.

## 3.3. In the future

The project team will continue providing technical support to members of the SSGs who will take a lead in driving the project beyond the grant period. In addition, the project team will help apply for more funding on behalf of the SSGs to address the remaining gaps. We will also maintain the already established networks with the local field extension Officers, authorities and civil society organizations and lobby for more support of this work. The team, through the Project Team Leader who seats in the National Wetlands Committee, will use this platform to influence action towards our work.

There is need to develop a long-term plan for improved management of wetlands and Cranes in this area. Monitoring of the Cranes, which are flagship species, should be a continuous process. Measuring and valuing ecosystem services using participatory tools would be useful. This would generate information which is essential in influencing policy and action towards wetland and biodiversity conservation.

## 3.4. Financial report

| Itemized expenses | Total CLP requested (USD) | Total CLP used (USD) | % Percentage |
|---|---|---|---|
| **PROJECT PREPARATION** | | | |
| | | | |
| Communications (telephone/internet/postage) | 300.00 | 298.05 | -1% |
| Field guide book, maps, journal & other printed material | 200.00 | 240.00 | 20% |
| Books and printing journal articles/materials | | | |
| Insurance | | | |
| Team training (Please detail: ) | 200.00 | 197.00 | -2% |
| Project Developments | | | |
| Field Assistant | 1,440.00 | 1,440.00 | 0% |
| **EQUIPMENT** | | | |
| | | | |
| Scientific/field equipment and supplies (Please detail: | 5,830.00 | 5,632.25 | -3% |
| Photographic equipment (Please detail: camera) | 400.00 | 375.00 | -6% |
| Camping equipment (Please detail main items: batteries, lighting) | 500.00 | 229.36 | -54% |
| Boat/engine/truck | | | |
| Other (Please detail: Laptop ) | 800.00 | 950.00 | 19% |
| **PROJECT- IMPLEMENTATION EXPENSES** | | | |
| | | | |
| Accommodation for team members and local guides | 2,500.00 | 2,720.21 | 9% |
| Food for team members and local guides | 1,250.00 | 1,312.77 | 5% |
| Travel & Local Transportation ( Local travelling, Fuel, Vehicle maintenance) | 3,580.00 | 3,537.81 | -1% |
| Customs and port duties | | | |
| Workshops | 1,400.00 | 1974.27 | 41% |
| Outreach/education activities and materials (brochures, posters, video, t-shirts, etc.) | 2,400.00 | 2,278.55 | -5% |
| Other (Please detail: Time spent ) | 2,100.00 | 1,920.00 | -9% |
| **POST-PROJECT EXPENSES** | | | |
| **0** | | | |
| Administration | 1,500.00 | 1,521.00 | 1% |
| Report production and results dissemination | 600.00 | 375.00 | -38% |
| **Total** | **25,000.00** | **25,001.27** | 0% |

# Section 4:

## Appendices

**Appendix 4.1**. CLP M & E measures

| Output | Number | Additional Information |
|---|---|---|
| Number of CLP Partner Staff involved in mentoring the Project | 2 | |
| Number of species assessments contributed to (E.g. IUCN assessments) | 3 | Grey Crowned Crane, Wattled Crane, and Secretary bird. |
| Number of site assessments contributed to (E.g. IBA assessments) | | |
| Number of NGOs established | | |
| Amount of extra funding leveraged ($) | | |
| Number of species discovered/rediscovered | | |
| Number of sites designated as important for biodiversity (e.g. IBA/Ramsar designation) | 1 | Project area was designated a Ramsar site in 2013. |
| Number of species/sites legally protected for biodiversity | 24 | 24 species of birds in this area are 'Specially Protected' under the Zimbabwe Parks and Wildlife Act. Three of them are Vulnerable and one is Endangered (Grey Crowned Crane) under the IUCN Red List of Threatened Species. |
| Number of stakeholders actively engaged in species/site conservation management | 4 | |
| Number of species/site management plans/strategies developed | | |
| Number of stakeholders reached | 15 | These include environmental department, agricultural department, local schools, Driefontein Mission, local communities, traditional leaders, civil society organizations and local authority. |
| Examples of stakeholder behaviour change brought about by the project. | | Improved participation of many stakeholders including decision makers in events that promotes Crane and wetland conservation. |
| Examples of policy change brought about by the project | | |
| Number of jobs created | | |
| Number of academic papers published | | |
| Number of conferences where project results have been presented | | |

Appendix 4.1 CLP M&E measures

**Appendix 4.2. Field summary data and analysis**

**Table 4.1:** Total crop damage and seed disposal recorded in 8 sample plots guarded by scarecrows.

| | Total crop damage (plants) | Total seed disposal (seeds) | Average number of plants | Damage expressed as a percentage of total plants | Seed disposal expressed as a percentage of total seeds planted |
|---|---|---|---|---|---|
| Dry Season 2013 | 273 | 84 | 7197 | 3.8 % | 1.2 % |
| Wet Season 2013 | 43 | 25 | 17142 | 0.3 % | 0.1 % |
| Dry Season 2014 | 13 | 1 | 4459 | 0.3 | 0 |
| Wet Season 2014 | 141 | 57 | 16890 | 0.8 | 0.3 |

**Table 4. 2:** Total crop damage and seed dispersal recoded from 8 control plots.

| | Total crop damage (plants) | Total seed disposal (seeds) | Average number of plants | Damage expressed as a percentage of total plants | Seed disposal expressed as a percentage of total seeds planted |
|---|---|---|---|---|---|
| Dry Season 2013 | 558 | 228 | 5793 | 10 % | 4 % |
| Wet Season 2013 | 113 | 44 | 13617 | 0.8 % | 0.3 % |
| Dry Season 2014 | 604 | 199 | 7070 | 9 % | 3 % |
| Wet Season 2014 | 376 | 86 | 18338 | 2.1 % | 0.5 % |

**Table 4.3.** t-Test: Two-Sample Assuming Unequal Variances.

| | *Guarded plots* | *Control plots* |
|---|---|---|
| Mean | 18.46875 | 51.59375 |
| Variance | 320.3216 | 1301.991 |
| Observations | 32 | 32 |
| Hypothesized Mean Difference | 0 | |
| df | 45 | |
| t Stat | -4.65226 | |
| P(T<=t) one-tail | 1.45E-05 | |
| t Critical one-tail | 1.679427 | |
| P(T<=t) two-tail | 2.9E-05 | |
| t Critical two-tail | 2.014103 | |

**Table 4.4.** Two way ANOVA

ANOVA

| *Source of Variation* | *SS* | *df* | *MS* | *F* | *P-value* | *F crit* |
|---|---|---|---|---|---|---|
| Rows | 3553.93 | 31 | 114.6429 | 1.434209 | 0.095443 | 1.574698 |
| Columns | 4906.336 | 3 | 1635.445 | 20.4598 | 2.89E-10 | 2.702509 |
| Error | 7433.914 | 93 | 79.93456 | | | |
| | | | | | | |
| Total | 15894.18 | 127 | | | | |

**Table 4.5:** Crane sightings inside and outside of both guarded and control plots.

| Planting season | Inside Guarded plots | | Outside Guarded plots | | Inside Control plots | | Outside Control plots | |
|---|---|---|---|---|---|---|---|---|
| | GCC | WC | GCC | WC | GCC | WC | GCC | WC |
| 2013 dry season | 48 | 24 | 222 | 161 | 218 | 184 | 133 | 115 |
| 2013 wet season | 31 | 15 | 85 | 66 | 108 | 71 | 96 | 91 |
| 2014 dry season | 45 | 28 | 257 | 95 | 219 | 130 | 123 | 71 |
| 2014 wet season | 50 | 29 | 83 | 79 | 141 | 99 | 94 | 65 |

*GCC- Grey Crowned Crane

* WC- Wattled Crane

**Appendix 4.3.** Project photos.

**Plate 1:** Innocent Magunje and Learnmore Dune (Field assistant) discussing about Crane sightings during one of the ground crane surveys. (Photo by Togarasei Fakarayi)

**Plate 2:** Grey Crowned Crane flying over a planted maize field. (Photo by Togarasei Fakarayi)

**Plate 3:** A flock of Grey Crowned Cranes in Driefontein Grasslands; August 2014 sighting. (Photo by Togarasei Fakarayi).

**Plate 4:** A Secretary Bird sighted in Driefontein Grasslands; August 2014. (Photo by Togarasei Fakarayi).

**Plate 5.** Wattled Cranes foraging in a newly ploughed field, Driefontein Grasslands. (Photo by Togarasei Fakarayi).

**Plate 6**: Veldt fires threatening a wetland in Driefontein. (Photo By Togarasei Fakarayi)

**Plate 7**: Chinyaure Site Support Group members listens to their colleague during a meeting on by-laws in Chinyaure Village, Driefontein. (Photo by Togarasei Fakarayi)

**Plate 8.** Chinyaure Site Support Group members. (Photo by Togarasei Fakarayi).

**Plate 9**: Chipisa Site Support Group holding cranes fact sheets. (Photo by Togarasei Fakarayi).

**Plate 10:** Togarasei Fakarayi, a CLP Team Leader taking GPS coordinates during a ground survey of cranes in Driefontein Grasslands. (Photo by Innocent Magunje)

**Plate 11:**Crane breeding habitat in Driefontein Grasslands. (photo by Togarasei Fakarayi)

**Plate 12**: Human model scarecrows. (Photo by Togarasei Fakarayi)

**Plate 13:** Togarasei Fakarayi giving a talk on crane conservation to the boys and girls in Driefontein during community outreach visits. (Photo by Innocent Magunje)

**Plate 14**: One of the sampling plots fenced off in preparation for planting season. (photo by Togarasei Fakarayi)

**Plate 15**: Human model scarecrow guarding a field with germinating maize plants, and beans. (photo by Togarasei Fakarayi).

**Plate 16**: Human model scarecrows (in white) guarding a field with germinating maize plants. Walking in the middle is one of the field owner. (photo by Togarasei Fakarayi)

**Plate 17**: Small grain demonstrative plot in Widgeon Village. (photo by Togarasei Fakarayi)

**Plate 18**: Typical Crane breeding and foraging habitat in Driefontein Grassalnds (Photo by Togarasei Fakarayi).



**Plate 19**. Some of the awareness materials produced and distributed to the communities.

**Appendix 4.4.** Bird Checklist.

**Table 4.6: Atlassing checklist 1920 3040 pentad**

| | | | | |
|---|---|---|---|---|
| 1 | 214 | Grey Crowned-(Crowned) Crane | 2-0a | |
| | 2 | 89 | Egyptian Goose | 2-0a |
| | 3 | 245 | Blacksmith Lapwing (Plover) | 2-0a |
| | 4 | 316 | Cape Turtle (Ring-necked) Dove | 1-0 |
| | 5 | 318 | Namaqua Dove | 2-0a |
| | 6 | 418 | African Hoopoe | 2-0a |
| | 7 | 844 | African Quailfinch | 2-0a |
| | 8 | 568 | Capped Wheatear | 2-0a |
| | 9 | 215 | Wattled Crane | 2-0a |
| | 10 | 58 | Great Egret | 2-0a |
| | 11 | 88 | Spur-winged Goose | 2-0a |
| | 12 | 97 | Red-billed Teal (Duck) | 2-0a |
| | 13 | 247 | African Wattled Lapwing (Plover) | 2-0a |
| | 14 | 104 | White-backed Duck | 2-0a |
| | 15 | 488 | Red-capped Lark | 2-0a |
| | 16 | 242 | Crowned Lapwing (Plover) | 2-0a |
| | 17 | 75 | Saddle-billed Stork | 2-0a |
| | 18 | 712 | Black-backed (Southern) Puffback | 2-0a |
| | 19 | 314 | Red-eyed Dove | 2-0a |
| | 20 | 228 | African Jacana | 2-0a |
| | 21 | 521 | Black-headed (Eastern) Oriole | 2-0a |
| | 22 | 788 | Yellow-throated Petronia (Sparrow) | 2-0a |
| | 23 | 431 | Black-collared Barbet | 2-0a |
| | 24 | 839 | Blue Waxbill | 2-0a |
| | 25 | 413 | Lilac-breasted Roller | 2-0a |
| | 26 | 105 | Secretarybird | 2-0a |
| | 27 | 664 | Southern Black-Flycatcher | 2-0a |
| | 28 | 867 | Streaky-headed Seedeater (Canary) | 2-0a |
| | 29 | 440 | Greater Honeyguide | 2-0a |
| | 30 | 621 | Long-billed (Cape) Crombec | 2-0a |
| | 31 | 727 | White-crested Helmet-Shrike | 2-0a |
| | 32 | 731 | Brubru | 2-0a |
| | 33 | 545 | Dark-capped (Black-eyed) Bulbul | 2-0a |
| | 34 | 673 | Chinspot Batis | 2-0a |
| | 35 | 355 | Senegal Coucal | 2-0a |
| | 36 | 527 | Southern Black Tit | 2-0a |
| | 37 | 552 | Kurrichane Thrush | 2-0a |
| | 38 | 522 | Pied Crow | 2-0a |
| | 39 | 415 | Purple (Rufous-crowned) Roller | 2-0a |
| | 40 | 763 | White-bellied (breasted) Sunbird | 2-0a |
| | 41 | 411 | Swallow-tailed Bee-eater | 2-0a |
| | 42 | 163 | Dark Chanting-Goshawk | 2-0a |
| | 43 | 146 | Black-chested (Breasted) Snake-Eagle | |

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**Address list and web links**

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www.birdlifezimbabwe.co.zw

**Distribution list**

- Agricultural Technical and Extension Services (AGRITEX)
- Environmental Management Agency
- Gutu Rural District Council
- Driefontein Mission
- Zimbabwe Parks and Wildlife Management Authority
- BirdLife Zimbabwe
- Shashe Village
- Chinyaure 1 Village
- Chinyaure 2 Village
- Widgeon 1 Village
- Markdale 1
- Markdale 2
- Headon Village
- Chinu Village
- Local Schools (Shashe Primary, Shashe Secondary, Chipesa Primary, Chivake Primary, Taigara Primary, Taigara Secondary, Driefontein Mission Primary and Secondary, Good Hope Dekete Primary).