Social dimensions of crane and wetland conservation in African rural landscapes: insights from Kenya, Uganda and Zimbabwe

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Securing the future of cranes in human-dominated landscapes in Africa: A synthesis of what works

Abstract

This chapter presents a conceptual model that can be used as a guide in the design, implementation and adaptation of crane and wetland conservation projects in rural landscapes in Africa. The model integrates five socio-institutional recommendations for community-based conservation, building on evidence of success gathered from the field and success factors identified at five study sites. Key project design considerations, field methodological approaches and contextual factors that enable and sustain social and ecological impacts (species survival and habitat protection) of projects are outlined.

6.1. Introduction

6.1.1. Looking back at research thrust and key findings

This chapter synthesises findings from the previous chapters, highlighting observed field conservation approaches and opportunities for securing the future of cranes in human-dominated landscapes in Africa. The synthesis is primarily based on field observations of human-crane interactions and lessons drawn from pioneering crane and wetland conservation projects. Five major action-oriented and practicable recommendations are grouped and presented in the form of a symbolic structure ('model'). The model summarizes how the recommendations are interlinked and can be integrated into the conservation planning process. The utility of the model is discussed, with reference being made to other conservation models developed by other researchers. It should

be noted that due to the specific focus on project- and policy-level appropriateness and practicability, recommendations to mitigate broader causal factors of crane decline such as population growth and global market shifts lie outside the scope of this chapter.

As documented in the main thesis introduction and introductory sections of the preceding chapters, the decline of cranes in East and Southern Africa is a regional environmental concern. The essence of this thesis was to analyse the direct causes and underlying drivers of the decline and discern lessons for conservation planning from pioneering crane and wetland conservation projects implemented in rural communities in Kenya, Uganda and Zimbabwe.

The first lap of this study was focused on the analysis of proximate causes and underlying drivers of the decline of cranes in human-dominated landscapes in Kenya, Uganda and Zimbabwe. Chapters 2 and 3 primarily focused on the application of an actor-oriented methodological framework to gather evidence on human-crane-wetland interactions. Habitat loss, one of the major drivers of the decline in the three study countries, is described and analysed in the two chapters. The analysis revealed how lower-level actors' (local communities in this case) decisions and actions are central in determining whether wetlands that contain crane habitats are either degraded or protected. Also documented in the same chapters were the influence of local wetland management institutions (community-based, supra-local and national) in shaping actors' wetland utilisation practices, with implications on the condition of crane habitats. At some sites, community values attached to cranes and positive attitudes towards the species were noted to influence the survival of the species.

The second lap was primarily aimed at evaluating pioneering community-based crane conservation projects implemented at wetlands that support nationally significant crane populations in the study countries. In Chapters 4 and 5, social processes and local institutional development were analysed respectively, linking them to resultant site-level conservation outcomes. Site-based narratives of how community-based conservation approaches were applied to counteract threats to cranes and wetlands in Kenya and Uganda are presented in the two chapters. Some of the notable conservation outcomes in Zimbabwe, linked to crane and wetland conservation projects, are captured in Chapter 3. The narratives reveal the interplay and influence of local actors, local institutions and national environmental policies in shaping crane and wetland conservation outcomes.

Findings from the human-crane interface analysis and evaluation of pioneering crane conservation projects represent field evidence and insights from which recommendations for conservation planning to secure crane populations in human-dominated landscapes can be discerned. The recommendations are integrated to build a general crane conservation model that can be used to guide project design, implementation and adaptation of projects. In the next section, details of how the proposed conservation model was developed and how it is grounded in contemporary conservation planning principles are presented.

6.1.2. Using field-based evidence and success factors to build a conceptual conservation model

Conservation planning can be informed by empirical evidence of successes from projects (Salafsky *et al*. 2002; Grantham *et al*. 2010) and factors enhancing species and habitat conservation success identified through analysis of social and ecological contexts in which projects are implemented (Brooks *et al*. 2013; Bennett *et al*. 2017). In that regard, the conceptual crane conservation model is essentially built upon notable conservation outcomes, acknowledging the role of the supportive social and institutional factors documented at the study sites.

The first consideration in the construction of the conceptual conservation model are lessons from project successes which can be described as 'bright spots' documented in previous chapters. 'Bright spots' comprise evidenced local conservation actions that contributed to species survival and habitat protection over time. The structuration of the model stems from the identification and piecing together of factors that contributed to the success stories, technically referred to in this chapter as bright spots. These bright spots can be described from a social perspective as individuals, households, community groups and external stakeholders that responded positively to project facilitation techniques and took concrete decisions and practical actions in support of crane and wetland conservation goals. They effectively influenced project acceptance, community participation, environmental behaviour and wetland management institutions to mitigate threats to cranes and wetlands. In ecological terms, the bright spots can be defined as patches within broader wetland landscapes where cases of crane survival and maintenance of suitable habitats were reported. Conservation projects that generate bright spots can be viewed as 'learning portfolios' that generate evidence of how, where and when conservation successes are attained. In this chapter, bright spots are the foundation of criteria to identify novel interventions that may

contribute to the desired project impacts which, in turn, provide inspiration to expand site-based project successes (Gilman 1997; Salafsky et al. 2001; McShane and Wells 2004; Noble et al. 2005).

Grounding conservation planning in data gathered from 'bright spots' is in line with the concept of evidence-based conservation (e.g., Sutherland *et al*. 2004; McShane and Wells 2004; Adams and Sandbrook 2013; Sutherland *et al*. 2015). Application of evidence-based approaches entails asking the question: What works for species and habitat conservation? Guided by this overarching question, conservation researchers and practitioners gather empirical evidence and generate knowledge on what constitutes conservation successes from field experiences and use it as the basis for conservation planning. On this basis, the crane conservation projects implemented in the three countries are treated as platforms for experiential learning, a precursor to model development.

A good understanding of contextual factors that contribute to conservation success is particularly important in projects that involve local communities (Waylen *et al*. 2010; Brooks *et al*. 2012; Muhumuza and Balkwill 2013). The factors encompass social, political, economic, institutional and cultural values, processes and conditions that act as strategic entry points in the design or enablers in the implementation and long-term sustenance of conservation projects (Knight *et al*. 2010; Moon *et al*. 2014; Raymond and Knight 2013). Identification of such factors enables the development of conservation solutions that are relevant to local contexts, acceptable to local communities, embedded in local and national environmental policy frameworks and aligned with prevailing community development discourses (Reyers *et al*. 2010; Ives and Kendal 2014). It is important to define how conservation opportunities may enable and sustain practical actions to address threats to species and habitats (Salafsky and Wollenberg 2000; Kapos *et al*. 2009; Tulloch *et al*. 2015).

A summary of conservation actions that could be described as 'bright spots' and success factors are presented in Table 6.1. Conservation actions and success factors that fall into the same categories are denoted by numbers and letters respectively. Despite the differences in context across sites, the conservation actions and success factors can be clustered into distinct categories (see Box 6.1).

Cluster of conservation actions:

1) Avoidance of wetland patches to minimise disturbance to breeding pairs
2) Regulation of access to and utilisation of wetlands to secure crane breeding sites
3) Practical action to prevent degradation of crane breeding sites
4) Restoration of native plants to improve integrity of wetland ecosystems

Cluster of success factors:

a) Active leadership by local conservation champions
b) Social ties among community members, project facilitators and environmental officers
c) Local platforms for crane and wetland conservation awareness
d) Shared wetland values and benefits
e) Supportive national wetland policy
f) Community organisation for collective action to solve environmental problems
g) Prevailing land tenure system aiding habitat protection

Table 6.1. Summary of bright spots and success-enhancing factors at the study sites

	Study sites					
	Kimondi-Kingwal	**Saiwa**	**Kaku**	**Nyamuriro**	**Mitooma**	**Driefontein**
Evidenced project-initiated conservation actions contributing to crane survival and protection of wetland used by cranes (Bright spots)	No notable project-initiated conservation actions at the time of research	Purposeful avoidance of cranes to minimise disturbance during breeding season (1) Village-enforced regulations to prevent agricultural encroachment and overharvesting of wetland plants around crane sites (2) Planting trees on wetland to restore riverine forests critical for ecological integrity of wetlands (4)	Purposeful avoidance of crane sites to minimise disturbance during breeding season (1)	Purposeful avoidance of crane sites to minimise disturbance during breeding season (1) Designation of no-cultivation areas in wetlands thereby leaving space for cranes to breed (2) Re-introduction of wetland plants to improve vegetation cover and the water retention capacity of the wetland (4)	Purposeful avoidance of crane sites to minimise disturbance during breeding season (1) Protection of breeding sites by households in fenced plots by making them inaccessible to the public (3) Adoption of farming spatial patterns and temporal routines by custodians, reducing disturbance to cranes when breeding (2)	Purposeful avoidance of crane sites to minimise disturbance during breeding season (1) Establishment of community gardening sites in designated areas to curb unregulated cultivation of wetlands containing breeding sites (2) Protection of crane breeding sites as part of fire management strategy (3)
Enabling social and institutional factors enhancing conservation outcomes (Success factors)	Cultural values attached to cranes (inherent factor not linked to externally-facilitated project activities)	Active leadership by local conservation champion (a) Social ties among villagers that own plots on wetland fringes (b) Local platforms for raising awareness on crane conservation in schools and at community events (c) Shared aspirations and socio-economic benefits of restoring riverine forests (d)	Social ties between conservation organisation staff and wetland user communities (b) Local platforms for raising awareness on crane conservation in schools and at community events (c)	Active leadership by local conservation champion (a) Social ties rooted in long-standing institutions in the form of cooperatives (b) Existence of supportive policy, legitimising wetland management plans (e) Collective action platforms for addressing common environmental problems (re-introduction of wetland plants) (f) Shared aspirations of socio-economic benefits of restoring native wetland vegetation (g)	Inherent socio-economic benefits of curbing wetland degradation accruing at household level Social ties between conservation organisation staff and wetland plot owners (custodians) (b) Private land tenure system enabling households to implement pro-crane and wetland conservation activities on their plots (h)	Social ties among conservation organisation staff, environmental and agricultural extension officers, site support groups and village committees (b) Local platforms for raising awareness on crane conservation in the communities in schools and communities (c) Communal land tenure system enabling maintenance of unconverted wetlands (h) Self-organisation to address common environmental problems (firefighting) (f) Shared values attached to wetlands as grazing areas (preventing wetland clearance for crop production) (d)

The need to place social and institutional considerations at the centre in the design and implementation of community-based conservation projects is recognised (Waylen *et al*. 2010; Ban *et al*. 2013; Bennett *et al*. 2017). As noted earlier, the essence of this chapter is to draw on lessons from the site-based narratives to develop a simplified and generic model that defines how crane and wetland conservation solutions in rural landscapes can be conceptualised and applied in the field. This study generated narratives of how social and institutional factors were successfully integrated into projects and leveraged to achieve crane and wetland conservation outcomes, taking into consideration the local contexts. To this end, recommendations for social and institutional considerations in the design, implementation and adaptation of crane and wetland conservation projects were discerned from the study findings. The recommendations were drawn through a reflective process guided by five overarching considerations in the conservation planning process in line with propositions in literature. The five considerations are summarised in Table 6.2 were selected based on their relevance to crane and wetland conservation in social and ecological contexts covered in this study.

Table 6.2. Overarching conservation planning considerations used in framing recommendations

Key considerations	**Social and institutional issues explored**	**Source**
Stakeholder buy-in for acceptance and effective collaboration	Shared understanding, stakeholder interests, stakeholder relations	Sayer *et al*. 2013; Mills *et al*. 2014; Foli *et al*. 2018
Ensuring conservation processes are locally-driven	Leadership, social influence, community participation,	Seixas and Davy 2008; Brooks *et al*. 2013; Weeks *et al*. 2014
Balancing livelihoods needs and ecological requirements	Land values, land tenure, livelihood benefits	Salafsky and Wollenberg 2000; Sayer *et al*. 2013; Wittman *et al*. 2017
Community action to reduce threats species and habitats	Self-organisation, shared environmental problems, landscape values	Kapos *et al*. 2009; Tulloch *et al*. 2015; Overton *et al*. 2015
Alignment with local and national institutional frameworks	Social organisation, local governance, policy frameworks	Brooks *et al*. 2013; Mills *et al*. 2014; Waylen *et al*. 2010

Guided by the considerations presented in Table 6.2 and reflecting on evidence of impactful conservation actions and success factors across sites, five recommendations for crane and wetland conservation were drawn. They are presented in the next section.

6.2. The five recommendations

In this section, the five recommendations are presented and discussed. They are framed in an active voice mode in line with the overall gist of this chapter, to guide what crane and wetland conservation planners should prioritise and reflect on when developing crane and wetland conservation projects. References to evidence presented in preceding chapters are added.

6.2.1. Build and sustain collective agendas with stakeholders

Presently, crane conservation is an agenda primarily driven by national and international conservation non-governmental organisations. Despite the notable community buy-in and uptake of the agenda at sites where conservation actions have been implemented, it is still largely an external agenda in the eyes of most rural communities in regions where cranes are found. Evidently, it has not been effectively institutionalised into national conservation agencies' plans, programmes and priorities as has been the case with other iconic mega-fauna in Africa. Findings of the human-crane interface analysis revealed that the survival of cranes and maintenance of suitable habitats are largely influenced by decisions and actions of individuals and community groups at the farm- and wetland landscape levels (see Chapters 2 and 3). The decisions and actions are influenced by household-level economic motivations, community-level wetland resource management institutions and national environmental policies enforced by local district/county authorities and national conservation agencies. In this vein, impactful conservation programmes to secure the future of cranes should start with local environmental actions to protect species and promoting land use practices that secure and restore habitats. These broad recommendations are based on positive experiences from Mitooma, Nyamuriro and Saiwa (See Chapter 4 and 5). As the evidence from the sites showed, this can only be achieved if the crane and wetland conservation agenda becomes a priority at interaction and information sharing platforms and environmental action events at community and local administrative authority levels.

As noted in the previous section, purposeful avoidance of breeding sites to reduce disturbance to cranes and enhance breeding success was a notable intentional conservation action across sites.

Acceptance and internalisation of the need to avoid breeding sites was a result of persuasive approaches used by project facilitators to create local interest in crane conservation, highlighting that cranes needed local community protection to survive (See Chapter 3, 4 and 5). This was achieved through protracted awareness programmes, leveraging community platforms where information could be shared and learning took place. At all sites, crane and wetland conservation awareness was achieved through the dissemination of facts on threats to cranes, referring to the local contexts and emphasising how local communities could contribute to the survival of cranes. The result was a notable internalisation of facts about cranes and commitment to take smile steps to protect the species and secure wetland patches used by the species to breed. Over time, local communities embraced roles in crane protection, including exercising restraint as went about their daily business (movements, wetland utilisation routines and environmental actions) (See Chapters 3, 4 and 5). This confirms the feasibility of inculcating positive attitudes and behaviour required for crane survival, especially at critical stages when breeding pairs and chicks are vulnerable. Notably, crane and wetland conservation awareness activities continued as projects evolved. Community attachment to and association with cranes was documented at Driefontein, Mitooma and Saiwa, reinforced as the social ties between the project facilitator and communities grew over the years. Winning the hearts of local communities in the quest to make crane and wetland conservation a local agenda should therefore start with finding the right platforms to disseminate species and habitat conservation persuasively, allowing relationships between project facilitators and communities to thrive.

At all sites targeted for crane conservation, evidence of community buy-in, ratification of project activities by community leaders and recognition of on-the-ground conservation actions by national government agencies were documented (see Chapters 3, 4 and 5). It was evident that framing crane conservation as an agenda that could be merged with local stakeholder interests, aspirations and expectations was an effective entry point to initially win the support of local communities. This became a solid foundation upon which collective agendas with local stakeholders were built and sustained over the years. Recognition of new collective agendas created the necessity for regular social interactions among community members, government officers and conservation organisation staff which, over time contributed to mutual respect, and gradually led to the social acceptability of crane conservation projects. As the evidence from the project sites show, a network of local conservation actors and supporters evolved over time, with district authorities and government agencies providing seals of approval (see Chapters 3, 4 and 5).

Experiences from the study sites showed that collective agendas were built, leveraged and sustained in different ways, depending on the local context. One approach used to merge the crane conservation with other local agendas was to identify environmental and community development programmes that were socially relevant and economically beneficial to local communities. This can be described as a socio-technical approach whereby technologies and practices that had a positive appeal to local communities, constituted long-term priorities of government environmental agencies and had the potential to effectively mitigate local environmental problems were promoted alongside crane and wetland conservation. The use of tree planting as an entry strategy to promote sustainable land management and new stewardship ethic among local communities in Kenya demonstrates how project facilitators can find common ground with local stakeholders and effectively gain a footing in the community through this socio-technical approach to building collective agendas. Giving agricultural and environmental extension officers the role of trainers and mentors as part of livelihood and sustainable wetland management interventions respectively was another innovative way of leveraging government-supported programmes for crane and wetland conservation gains. This was particularly impactful in Uganda and Zimbabwe where extension officers were actively involved in planning and technically supporting livelihood activities, introduced through the crane and wetland conservation projects (See Chapter 3 and 5). Provision of technical support to ensure the success of the livelihood activities gradually become part of their plans for routine extension support to communities around crane sites.

The second approach involved the use of social and institutional entry points and opportunities to build collective agendas with local, district and national stakeholders. Influential individuals, reputable community groups and government agencies that had a notable influence in conservation and community development decision-making were engaged strategically to enhance the acceptance of the crane and wetland conservation agenda. These reputable individuals and community groups did, as projects progressed, played a key role by supporting the inclusion of crane- and wetland-related issues into community discussions and environmental actions. In Uganda, non-conservation community-based groups (e.g., agricultural cooperatives at Nyamuriro) were engaged and a new role (to support crane and wetland conservation actions) was added to their pre-existing agendas (See Chapter 5). Identifying institutional frameworks (policies and regulations) that resonate with species and habitat conservation is another option that was used to mainstream crane conservation into a much broader conservation planning framework. The case

of community-based wetland planning in Uganda, where provisions of a national wetland policy were used as the basis for securing crane breeding sites as part of the wetland site management planning, is a notable example (See Chapter 5). In Kenya, a respected community leader and innovator were at the forefront of making crane and wetland conservation a topical issue through his engagement of the community using social events such as village meetings, weddings, national events (See Chapter 4).

In a nutshell, adopting persuasive conservation awareness approaches and identifying ways to build long-term relationships with local communities, administrative authorities and government agencies form the foundation of developing collective agendas for the acceptance of the crane and wetland conservation agenda. This is important since the reduction of threats to cranes and wetlands must start at the lowest levels where local communities are the decision-makers are embraced by stakeholders. Examples cited above show that opportunities for enhancing conservation may exist in the form of enabling national environmental policies, supportive local government administrative structures, popular development extension programmes and widely-known technical environmental standards set by national authorities. Despite the different socio-institutional contexts in the study countries, site-level experiences confirmed that leveraging these opportunities could lead to the crane and wetland conservation agenda being embraced, internalised and prioritised over time.

6.2.2. Identify and empower local conservation champions

From the communities around wetlands targeted for conservation action emerged individuals that stood out from the rest and significantly contributed to the attainment projects' social and environmental outcomes. They voluntarily made personal commitments to complement project facilitators' efforts in promoting the crane and wetland conservation agenda. They developed a keen interest in cranes and grasped overall project thrust faster than other community members. Some assumed leadership roles and took unprecedented personal initiative to lead in the implementation of collective actions to protect and restore wetlands (See Chapters 4 and 5) and leading exemplary household-based custodianship of cranes and wetlands (Chapter 5). Other actions they undertook included disseminating information about cranes and demonstrating the tangible roles communities could play in conserving the species (Chapter 3, 4 and 5), monitoring crane breeding events and reporting mortality incidents (See Chapter 4) and encouraging adherence to village-level wetland resource management by-laws (See Chapters 4 and 5). As the projects progressed, they assumed new social status in their communities as local conservation champions, with their roles and influence increasingly becoming prolific as they became the local flag-bearers of crane conservation (Chapter 3 and 5).

Through their active leadership and support to project facilitators, local conservation champions managed to build social capital needed to motivate fellow community members to perform environmental actions voluntarily and sustain the actions beyond donor-defined implementation timeframes (See Chapter 4 and 5). Whilst some played key leadership roles in encouraging community self-organisation (e.g., collective action for wetland restoration at Nyamuriro and village-enforced regulations for wetland utilisation at Saiwa), others demonstrated good practices for species and habitat conservation. The outcomes of the local conservation champions' actions varied across sites. They included a broad spectrum of conservation impacts (e.g., enhanced breeding success, the rescue of chicks, prevention of wetland encroachment, regulation of wetland resource use to secure breeding habitats; restoration of native wetland vegetation). Their work, therefore, represents local stewardship actions that cumulatively contribute to improved land management required to protect habitats increasingly under threat in human-dominated landscapes.

Local champions fell into two main categories: respected community leaders whose reputation and influence preceded the crane conservation projects and individuals that gained prominence through their active and consistent involvement in project activities. Whilst some champions played their positive roles in an individual capacity, others acted on behalf of collective community groups. Leaders of cooperatives that led wetland management planning and restoration activities at Nyamuriro Wetland in Uganda and the leader of the Kipsaina Crane and Wetland Conservation Group (Kenya) fall into the first category. These are examples of community leaders, already acknowledged and recognised in their communities, who were prepared to risk their reputation by ratifying pragmatic decisions that were initially not popular with some wetland users (e.g., regulation of wetland utilisation to improve vegetation cover at Nyamuriro). In the Driefontein Grasslands, Zimbabwe, Site Support Group members who developed a keen interest in cranes and became carriers of conservation messages typify the second category of individuals that gained prominence through their dedicated involvement in project activities. At Mitooma Wetlands in Uganda, families (described as crane custodians in Chapter 4), became champions by adjusting

their farm utilisation routines to create space for and allow cranes to crane breed pairs without disturbance while protecting chicks. They fall into the second category too.

Having described the personal attributes and exemplary actions of local conservation champions, it is important to highlight community engagement processes that enabled the emergence of champions during the various stages of the projects. It is also worthwhile to define some of the intrinsic motivations that drove the champions to perform tasks and platforms that represented enabling environments for champions to act and be accepted by the community. Crane and wetland conservation projects created new community interaction platforms (meetings, workshops, celebratory events) for discussing environmental problems in tandem with day-to-day community issues. Although project facilitators generally organised most of the interactions, there was a need for local leadership structures to be leveraged or evolve gradually, inspired by the quest to localise the crane and wetland conservation agenda. Evidence from the sites shows that the interaction platforms become entry points and opportunities for enterprising individuals to step forward and assume leadership roles in conservation activities. The project created an environment that encouraged champions to gain confidence and be ambassadors of crane and wetland conservation, knowing that they had the support of the project facilitators. This gave them legitimacy, paving way for acceptance of decisions and actions they made on matters related to the project by other community members. It is also important to note the most common motivation for conservation champions was predominantly rooted in the quest to fulfil social obligations. This is exemplified by the village committees in Driefontein, Kipsaina Crane and Wetland Conservation Group leader and cooperative leaders at Nyamuriro. A general lesson from the emergence of local conservation champions is the feasibility of adding new conservation-related roles to local leaders, transformation of pre-existing leadership roles to align them with conservation agendas and nurturing innovative leadership roles responding to the need for self-organisation for conservation action.

6.2.3. Build on local socio-economic values to secure wetlands for the benefit of cranes

Conversion of wetlands into agricultural fields was a common threat to wetlands containing crane breeding sites across all sites covered in this study. The common challenge that confronted project facilitators across the sites pertained ways to maintain the hydrological functions and vegetation characteristics of wetlands (important for maintaining wetlands as suitable crane habitats) without comprising the wetlands' socio-economic values (typified by the livelihoods benefits derived by local communities). Given that a protectionist approach, excluding people and their interests in the quest to secure habitats, would not be readily accepted by households and community groups, it was important to ensure that habitat management actions were compatible with prevailing management institutions governing ownership, access and utilisation of wetland resources. Insights on key social and institutional considerations for balancing socioeconomic and ecological values of wetlands can be discerned from project experiences. These insights represent general options for securing crane habitats in cases when there is shared access and utilisation of wetlands, in addition to cases when wetland patches targeted for conservation are enclosed within privately owned farmlands. Practical examples of "conservation with use", which could inspire the stewardship of cranes and wetlands are presented below.

A general finding from this study was that household-based wetland management and community collective wetland management systems could contribute to the maintenance of suitable crane breeding habitats (See Chapter 2). Cases of breeding success were reported in wetlands that fall under two main categories: expansive and contiguous wetland landscapes (collectively managed as commons) and small and scattered wetland patches located within a mosaic of agricultural fields (privately managed by individual households). Some patches within these wetlands remained unconverted or action was taken to regulate their utilisation because they were essentially valued by specific households or community groups owing to the key ecosystem services; including livestock grazing (Chapter 3) and sources of plant materials for crafts and construction (Chapter 5) they provided. These values were sustained through land tenure systems and, to a less extent, state-based environmental regulations. On private household-owned plots, the unconverted patches could be described as micro-environments that meet the ecological requirements for cranes to breed successfully. Some of the micro-environments were in areas that families had decided not to reclaim for crop production either because they were perennially waterlogged or were reserved as livestock grazing zones. Essentially, most of the crane populations targeted for conservation, with notable successes documented in this study, depended on these two categories of wetlands for breeding space. It, therefore, makes sense to build on local socio-economic values attached to micro-environments within wetlands to protect and secure crane breeding sites.

To maintain crane breeding habitat suitability and curb further habitat loss, persuasive community engagement approaches were used. These approaches were premised on maintaining the local socioeconomic values of wetlands by introducing and strengthening local institutions to prevent

human-induced threats. This is exemplified by regulations to curb agricultural encroachment at Saiwa (See Chapter 4), rules to curb unsustainable harvesting at Nyamuriro (See Chapter 5), and designation of zones for community gardening away from crane breeding sites at Driefontein (See Chapter 3). At the initial stages, this was predominantly opportunistic conservation whereby wetland users were persuaded to simply avoid degrading remnant patches within transformed wetlands. However, as projects evolved, this was used to effectively demonstrate that crane habitat protection was compatible with local communities' wetland-based livelihood practices. By so doing, the projects also demonstrated that crane habitat protection and wetland conservation principles could be integrated into community-based wetland management planning and protection processes under common access regimes. During awareness meetings, reference was made to these tangible compatibilities between conservation and livelihoods to motivate and inspire households and community groups behind the conservation successes.

Background knowledge of communities' and individual farmers' reasons for leaving some wetlands unconverted was used to inform designing farm-level, village-based and community-enforced mechanisms for protecting crane nesting sites. For instance, an innovative wetland zoning process to protect crane breeding sites implemented in the Driefontein Grasslands, Zimbabwe, endorsed by the village leaders, was based on the clear demarcation of crop production (in the uplands) and grazing zones (on grassed and seasonally flooded riverine wetlands). Households were allocated plots in a consolidated community garden located in the uplands and the community agreed that individual gardens in wetland patches used by both Grey Crowned and Wattled Cranes for breeding would not be tolerated. This option worked because expansive wetlands that were relatively undisturbed still existed. The introduction of the custodianship concept in the Mitooma Wetlands in Uganda provides hope for securing breeding habitats in cases where wetlands may have been subdivided and privatised by individual households already. Engaging households owning fenced plots containing wetlands where cranes bred and actively persuading them to protect the breeding sites and pairs yielded the desired results in the form of improved breeding success. These households were encouraged to alter their grazing routines to allow recovery of grasses on patches that provided suitable nesting space for cranes. At another site in Uganda, Nyamuriro Wetland, community members reintroduced native wetland grass to areas to restore natural vegetation and flooding regimes to restore crane habitat and create shared socioeconomic values (papyrus and fodder grass). This case demonstrated how ecosystem services that had been lost could be reintroduced through practical community action. In Kenya, habitat protection and sustainable utilisation were attained through the development of community-enforced by-laws to regulate temporal and spatial access to wetlands for grazing and plant harvesting, specifically targeting sections provided suitable breeding habitat for cranes.

In planning ways to build on local socio-economic values to secure wetlands for the benefit of cranes, it is important to start by understanding why certain large wetlands and patches that contain crane breeding sites remain unconverted despite the high demand for arable land, water and plant materials. This makes it possible to discern some of the inherent success factors (values, institutions) that must be maintained or promoted to secure crane habitats. The temporal and spatial utilisation patterns at smaller patches lying within already converted wetland systems and how these patterns contribute to the maintenance of breeding habitats is another critical consideration that should also be well understood. This forms the basis upon appropriate patch- or landscape-level management practices that could be identified and promoted to maintain suitable habitat conditions. Practical action to improve or maintain wetland flooding patterns and allow recovery of native vegetation played a major role in creating suitable breeding conditions as evidence from Saiwa (See Chapter 4) and Nyamuriro (See Chapter 5) showed. This confirms the practicality of active and passive wetland restoration, rooted in community actions, and how it can lead to tangible conservation outcomes.

6.2.4. Harness the power of grassroots communities to solve environmental problems

Experiences across the study sites provided insights into ways in which crane and wetland conservation projects can be used as platforms for harnessing the power of grassroots communities to address environmental problems and promote learning among community members. This was achieved interventions meant to demonstrate the threats to cranes and wetlands did not manifest themselves in isolation but were part of broader problems affecting the environment and community livelihoods. Notably, crane and wetland conservation projects created interest and platforms for experiential learning in the quest to answer questions on the feasibility of conserving cranes in habitats that were increasingly being threatened by human activities. Sentiments of doubts on how cranes could coexist with people in rural landscapes (not to relocate them to safe sanctuaries elsewhere) were expressed by community members in Driefontein (See Chapter 3). The Nyamuriro case highlights the enormity of the challenge of securing space for cranes in wetlands located in densely-populated areas where local people are desperately in need of arable land (See Chapter 5). However, answers to these insurmountable challenges, in the eyes of local

communities, were generated as community members participated in project activities in different ways and capacities. Although the nature and levels of participation varied across sites, community members were exposed to practical steps for environmental problem solving and had opportunities to celebrate the successes of solutions they tried to solve environmental problems. The logic behind the problem-solving interventions was to identify common problems around project sites (e.g., cutting of trees in riverine forests at Saiwa, unsustainable harvesting of wetland plants at Nyamuriro) and define actions, implementable by local communities collectively, to address the problems. By so doing, the communities addressed environmental problems affecting ecosystems to improve the ecological integrity of crane habitats contained thereof.

One method used to encourage local community participation was the promotion of field interventions that necessitated collective decision-making, investment of labour and time, commitment and ownership, and shared benefits and pride in outcomes of the environmental actions. Two interventions stand out in this regard. First, at Saiwa in Kenya, the propagation and reintroduction of indigenous tree species that used to occur on riverine wetland fringes did not only recreate desired ecological characteristics of wetland ecosystems (tree cover) but also generated tangible benefits for the community (timber). Collective action to reintroduce papyrus to degraded wetland patches and designation of no-cultivation wetland buffer zones created at project sites in Uganda are other examples. These are exemplary interventions that communities could undertake to restore and improve the integrity of wetland ecosystems. Since collective action was involved, these action-oriented interventions did not only build social capital for wetland restoration but answered the question of how local actions could indirectly contribute to the enhancement of desired hydrological and ecological conditions for maintaining crane habitat suitability. They also signify feasible environmental action pathways that communities could follow as they move away from management systems that degrade wetlands and decimated crane habitats.

Community participation in informal crane monitoring provided opportunities to create a dialogue between project facilitators and local communities. Before projects were initiated, the idea of systematically tracking flock movements, breeding events and mortality incidents was alien to communities as cranes were generally viewed as ordinary birds that did not warrant such attention and scrutiny. Messages disseminated during awareness meetings were meant to encourage local communities to observe crane behaviour thereby motivating them to learn about how their practices impacted crane survival and habitat suitability. Local ecological knowledge gained through these informal and experiential observations was merged with formal scientific knowledge during awareness workshops and face-to-face interactions. This approach yielded the desired results in Uganda and Zimbabwe where communities took pride in their knowledge, were motivated to continue observations over time and developed notable attachment to cranes (See Chapters 3 and 5). This demonstrates that encouraging participation could generate community interest in species monitoring. In all three countries, facilitators motivated community members to observe cranes by acknowledging data on cranes collected through daily informal observations by community members. A much more structured and systematic model for community participation in crane monitoring emerged in Kenya where teams comprising community members, teachers and learners collected data on breeding events as volunteers. Data collected through their monitoring activities were effectively used to generate a distribution map of breeding pairs across three major wetland systems (See Chapter 4).

Apart from the community efforts in securing patches used for breeding and restoring wetlands, actions by the Mitooma crane custodians in protecting breeding pairs and chicks on their plots is a promising practice that could be promoted in areas where wetlands have been privatised. Apart from making sure that the breeding sites were not disturbed, the custodians monitored the pairs from the egg-laying stage till the chicks fledged, providing informal updates to the project facilitator (See Chapter 5). What made it possible to protect the sites and the pairs is the clear demarcation and fencing of plots owned by specific households, giving custodians a sense of ownership and control over what they could do on their properties. One general lesson can be drawn from one publicised incident when chicks that had been captured for domestication were reported (by a custodian on whose property the chicks had been bred), leading to action to recover and rehabilitate the chicks in 2010. The action taken by the custodian when the chicks were captured shows that promoting custodianship ethics can lead to personal concern about and attachment to species targeted for conservation, prompting decisive action to protect the species. It also created a defensible space where households could ensure the security of breeding pairs, eggs and chicks. Given that cases of cranes breeding on household-owned properties are common in Uganda and Kenya, there is potential for promoting and adapting the custodianship approach to suit local contexts to ensure that cranes are protected, especially when they are breeding.

6.2.5. Build effective local institutions for sustained conservation actions

The central role of local institutions in averting the agricultural encroachment and other forms of wetland resource utilisation that would have compromised the conditions of crane breeding habitats was documented. Developing and supporting local institutions prevented agricultural encroachment into wetlands which could have led to the reduction in the size of patches containing crane sites, with negative implications on habitat quality (See Chapters 3, 4 and 5). Without the effective locally acceptable institutional mechanisms to curb agricultural encroachment, unsustainable plant harvesting, drainage, the ecological integrity of the wetlands would have been compromised, with negative impacts on crane breeding success. With customary regulations governing wetland utilisation having been eroded at most of the wetlands targeted for conservation and enforcement of state-based regulations weak, the solution, as experiences from the project sites showed, lay in facilitating the development of alternative local institutions governing wetland access and plant resource harvesting routines. Ultimately, the development of local institutions to regulate the management of wetlands empowered local communities to define defensive spaces in wetlands for the benefit of cranes.

Diverse site-based wetland management institutions that were promoted across the target sites reinforced collective stakes in wetlands thereby motivating community members to address wetland degradation. These institutions addressed the need to gaps where there were limited opportunities for the design, evolution and enforcement of wetland resource management institutions. Although there were variations in the way local institutions were developed and supported, the site-based experiences provide lessons on innovative ways to shape local institutions to avert the tragedy of the commons in wetlands critical in securing crane habitats. A general recommendation, building on the field observations, is that institutional analysis at the initial phases of the project is critical to identify acceptable and active community groups that can lead in the development and enforcement of institutions to prevent wetland degradation.

Actionable lessons on institutional development can be discerned from the project interventions at the various sites. First, as experiences from all Kenya and Uganda show, grounding the formation of community-based groups in already-existing and reputable institutions is an effective way of gaining trust and achieving voluntary participation in addressing threats to wetlands. This is typified by the engagement of politically aligned community leadership units such as village committees in Zimbabwe, group-based production entities such as agricultural cooperatives in Uganda and government-backed community development cooperatives in Kenya. These local community groups endorsed project activities and actively participated in activities meant to protect wetlands to secure crane habitats. The second lesson is that routine community practices, customary obligations for collective action and locally enforceable regulatory measures could also be carefully nurtured so that they become institutional arrangements in support of crane and wetland conservation. Examples of obligatory collective action arrangements include the village-based fire management system that evolved in Zimbabwe, which was turned into a routine action that benefitted Wattled Cranes as the communities committed themselves to protect crane breeding sites located in the riverine wetlands. The case of regulated papyrus harvesting in Uganda is another example of how community-enforced measures for managing a resource in high demand were incorporated as an institutional intervention to allow crane habitat recovery. The third lesson relates to the creation of collective stakes as an incentive to focus the community's attention on the ecosystem service they had already lost or risked losing. Reintroduction of papyrus to enhance values attached to wetlands in Uganda and supporting a land use zoning system that helped keep gardening and grazing areas in wetlands intact are typical examples. A key point to note is that the approach of creating and maintaining collective values is that it prevented the degradation of the wetland landscapes and resources thereby sustaining the tangible motivation for the community to invest in the protection of the resource.

Enabling opportunities that existed in the external environment also played a role in the process of shaping local institutions to secure crane habitats. For instance, the existence of a national wetland policy in Uganda provided entry points and a supportive policy framework for the formation of wetland management committees and formulation of community-enforced by-laws for wetland utilisation. In the Driefontein Grasslands, though defined loosely, wetland zoning process provided government-backed delineation criteria and acceptable land use. The wetland and stream buffers, in which cranes nested, were also acknowledged as predominantly livestock grazing and no-cultivation areas. This example demonstrates the intersectionality between local land management regulations and shared benefits and how they can be integrated to secure crane habitats.

6.3. Elaborating the model

In this section, the structural elements of the model (depicted by the temple figure) are discussed. In addition to highlighting the logic behind having the five recommendations connected to form the structure, the discussion also covers conditions for effective application of the model and opportunities for its improvement. Reference is made to general guiding principles and key considerations in the development of conservation models, drawn from literature.

An analogous visual which depicts the conservation model as a structure comprising the foundation, supporting pillars and the roof is presented in Fig 6.1.

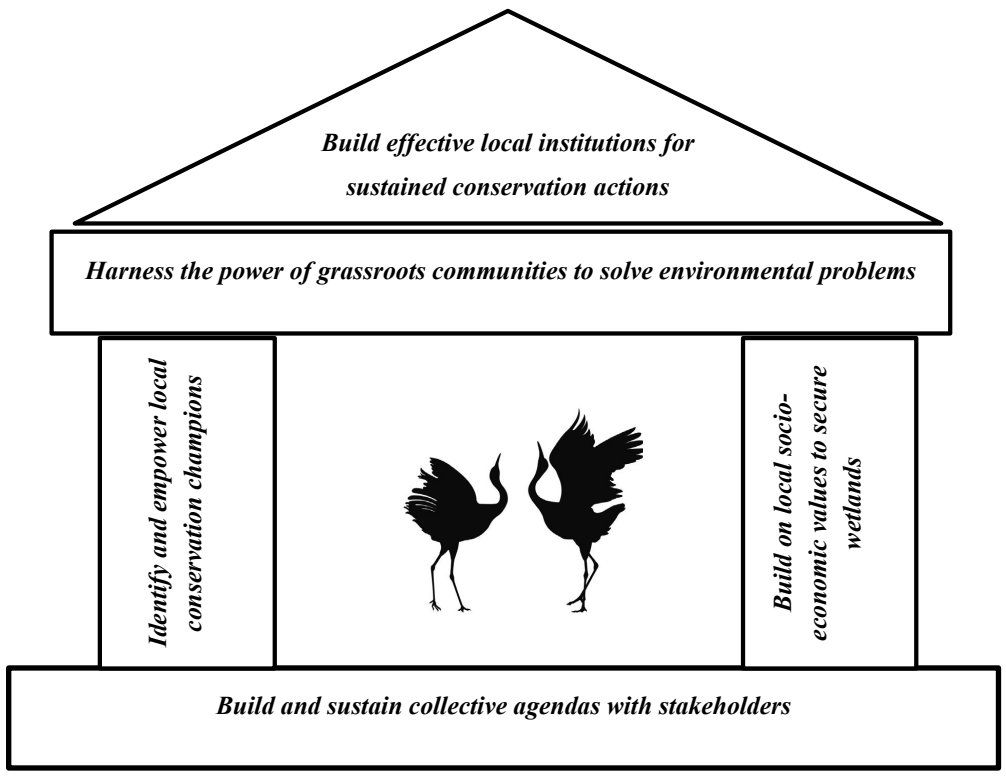

Fig 6.1. Conceptual conservation model for securing the future of cranes in human-dominated landscapes

6.3.1. Structuration of the conservation model

The conceptual model for crane and wetland conservation in a rural landscape presented in this chapter supports the notion of people-centred conservation. As shown in the visual, it integrates findings on the human dimensions of crane and wetland conservation, placing local communities are at the centre of the conservation planning process. Combined, elements of the temple figure, conceptually depict key interventions to secure the future of cranes in human-dominated landscapes based on insights from Kenya, Uganda and Zimbabwe.

As is the case in physical structures, the figure in its totality can only serve the intended purpose if the constituent elements are joined and viewed as parts contributing to the whole. Viewed holistically, it analogically represents three aspects: the foundation that should be established first, pillars of equal height that strengthen the structure, and the roof elements that are stabilised and supported by the pillars. As shown in Fig. 6.1, the five recommendations are joined together in a way that typifies how crane protection can be achieved – cranes are in a safe and secure place inside the temple. "Building and sustaining collective agendas with stakeholders" is the foundation upon which crane conservation projects should be grounded. The starts at project inception and should continue to ensure the agendas remain relevant and provide mutually acceptable justification for collaboration. Without the foundation, the other parts of the structure would irrevocably sink away or crumble. "Identifying and supporting local conservation champions" and "Building on socio-economic values to secure wetlands" are the pillars that support heavy roof elements. Without local conservation champions leading the crane protection agenda and in the absence of habitat management approaches compatible with local livelihoods, it would be a challenge to solve problems (address threats effectively). The basic purpose of a roof is to protect items (human or non-human) inside a structure. When applied to this conservation model, it is necessary to "Harness the power of community action to solve environmental problems" to deal with direct and indirect threats to cranes. Ultimately, long-term protection to cranes can be achieved if supportive and resilient institutions are developed and supported over time. Referring to the temple figure, "Build appropriate and responsive local institutions" is analogous to a roof that provides shelter against various weather elements for years.

The essence of this chapter was to consolidate site-based narratives of stakeholder engagement and institutional development successes that translated into notable conservation impacts at sites where

pioneering crane conservation projects in Africa were implemented. Inherent factors (prevailing social systems and stakeholder agendas, wetland ecosystem values, social and environmental programs) and community engagement approaches (effective ways to engage, motivate and empower stakeholders for them to take actions to address threats to cranes and wetlands) were integrated into a conceptual conservation model, which is actionable and adaptable to suit local conditions.

Founded on the concept of informed opportunism for effective conservation (Bryan *et al*. 2010; Game *et al*. 2011; Whitehead *et al*. 2014), the model guides the conservation planner and implementer to prioritise inherent social structures, institutional arrangements, collective action platforms, land tenure, leadership and resource value systems. It highlights foundational aspects of conservation, including inherent community attributes and their motivations, which provide insight into appropriate project entry points (influential individuals, popular social platforms, collective values and rallying points). It points to the community engagement and field conservation methodologies for effective crane and wetland conservation. Fundamentally, it guides conservation planners to prioritise institutional development at local and supra-local levels, creating an enabling framework for securing community commitment work together and secure project impacts in the long term. The model should be viewed as an adaptable decision-making tool that aids project conservation planning, with emphasis being placed on careful identification of site- and context-specific attributes that define each of the five structural elements of the model.

This study revealed the central role of local communities in ensuring the long-term survival of cranes in wetlands that are increasingly threatened by human activities. As the experiences from the project target sites show, community-focused approaches used to promote crane and wetland conservation in the three countries contributed to the attainment of various social conditions for project success, which form the basis of the model. These conditions, also acknowledged by Pomeroy *et al*. (2001), Knight *et al*. (2006), Gruber 2011 and Brooks *et al*. (2013), include local community participation, social acceptance of project goals, social learning, leveraging institutional networks, sustaining socio-economic benefits from ecosystems and building human and social capital for conservation action. The multiple roles of local communities as conservation supporters, monitors, evaluators, participants, collaborators and catalysts should therefore be acknowledged in crane conservation planning. This also highlights the importance of mainstreaming social processes (interactions, decisions, actions, social influence and ratification of each other's objectives by stakeholders) into conservation planning. The crane conservation model, therefore, addresses the need, acknowledged in conservation circles, for incorporating and valuing human welfare and decision making in conservation planning (Salafsky and Wollenberg 2000; Manfredo and Dayer 2004; Le Cornu *et al*. 2014).

6.3.2. The conceptual conservation model is not a blueprint

While the conceptual conservation model provides hope in that it is an empirically-derived and strategic framework to plan for action to address threats contributing to the decline of cranes, it is not a blueprint that should be applied as is. As noted by Knight *et al*. (2006), Margules and Pressey (2010) and Sayer *et al*. (2013), conceptual conservation models provide guidance on strategic ways to achieve the desired conservation impacts but users should be aware of some of the inherent limitations of the models.

The main limitation of the model primarily emanates from the fact that it was derived using field experiences from a small number of project sites. This was unavoidable given the projects considered in this study represented the only fully-fledged projects where community-based approaches have been used to mitigate threats to cranes and wetlands in East and Southern Africa at the time of the research. This implies that the model itself may need to be adapted and revised by incorporating relevant and complementary insights through gathering fresh evidence of success from other project sites in future. This adaptation process will make the model more representative and therefore applicable under diverse social, economic, biophysical and policy settings. Possibly, new pillars and supporting evidence for the already-included pillars could be added to the conceptual model through a consideration of evidence from other sites. For instance, experiences at other sites may point to the need to focus on strengthening private (household-based) interventions rather than collective community action. In the same vein, insights on ways to effectively focus conservation action on direct species protection may also emerge. This may include approaches for incentivizing direct species protections and methods of building flagship status for cranes among communities, a central issue that is glaringly not well-integrated in the current model.

Like any other conceptual model, its utility and effectiveness largely depend on the technical capacity and experience of the conservation project designer and implementer. The ability of the practitioner to connect, track and document field developments and understand how they fit into the model is crucial. Despite the human capacity barriers that may limit the effective operationalization of the model, it should be acknowledged that applying the model could be a

learning process within the adaptive project management realm. In practice, the model will require frequent revision as project impacts evolve and follow defined pathways, with stakeholder consultation and field observations playing a significant role in the adaptation process as proposed by Game *et al*. (2011), Halliday and Glaser (2011) and Sayer *et al*. (2011). The process of adapting the model may involve a deeper analysis of operational linkages between the different pillars. For instance, this could involve research aimed at understanding how local conservation champions can play a role in efforts to balance socio-economic and ecological values of wetlands. In the same vein, determining how the social networks among stakeholders would add operational value and strength to the model. Efforts to improve the model could therefore involve, research aimed at understanding the factors that could make the model fail in practice (e.g., social costs of conservation) and how to navigate the challenges under different situations. With growing calls for incorporating resilience thinking in the conservation and development sector (Walker *et al*. 2004; Dixon 2008; van Oudenhoven *et al*. 2011; Bush and Marschke 2014), it is worthwhile to also factor in how shared wetland values, opportunities for participation, social learning and collective action and resource governance institutions can be sustained over time as part of the adaptive management process.

Lastly, the crane conservation model described here is an element in the contemporary evidence-based and community-based paradigm in conservation. It aims to make the design and application of these approaches in the field more focused, adaptable and efficient. It also provides a social-scientific basis and an avenue for untangling complexity associated with defining linkages between social interventions and conservation impacts in community-based projects. In this regard, it eliminates operational challenges associated with putting conceptual models into practice. Because the model makes abstract visions such as community-based more concrete and therewith more accessible to a broad number of practitioners, it may also help to inspire conservation professionals to include community-based actions in their work. Given that in contemporary conservation, the need to come up with measurable indicators of project impacts is increasingly being recognized, the model provides insights on starting points in defining social domains and parameters of monitoring and evaluation frameworks for projects. These include community-level assessments of socio-economic attributes, resource management institutions, values and perceptions and participation and technical capacity issues. Measurement of these social parameters is not beneficial for understanding project impacts and pathways but also allows conservation organizations to incorporate and understand ethical and other human welfare issues as required by donors of conservation projects, especially in Africa.

6.4. Final remarks

This study represents the first attempt to collate evidence of the social dimensions of crane and wetland conservation from landscapes and sites that support globally significant populations of cranes. As noted in this and the previous chapters, some promising interventions, described as bright spots, that inspire optimism in the quest to ensure the long-term survival of cranes in human-dominated landscapes, were documented. While the bright spots have been acknowledged and used to develop the conceptual conservation model to secure the future of cranes, the inherent context-specific challenges and site-focused interventions that did not yield the desired conservation outcomes should not be ignored since lessons can also be drawn conservation failures.

This study demonstrated that adaptable methodological frameworks can be applied across sites to generate knowledge on human-crane interactions, highlighting the commonalities and peculiarities in social causes and drivers. Key successes of conservation projects and success factors, from social and institutional perspectives, can be also drawn through evaluative studies at the sites. Findings of these strands of research can be used as the basis for linking conservation science, practice and policy. Defining these linkages is not only important in the design of quality conservation programmes but provides a sound basis upon which national governments, global organisations and treaties managing data on species and habitats and sponsors of conservation programmes can be engaged. As much as the conceptual model presented in this chapter provides guidelines for practitioners, successful operationalisation of the model requires that issues around credible evidence of social and ecological impacts of crane and wetland conservation projects and packaging of as fundable initiatives should be prioritised. The projects' fundability depends on the successful articulation of the linkages between conservation actions and the welfare of local communities. This necessitates the systematic collation of evidence from project sites at national levels and integrating them across nations to inspire policies that are required to secure the future of cranes responding to national and regional needs and challenges.

In today's world, the notion of saving threatened species against extinction invokes mental constructs portraying human welfare as being perpetually at odds with the survival of wildlife and maintenance of ecosystem functions. This gloom and doom mindset, rooted in contemporary global environmental crises affecting biodiversity and humans, should not stifle innovations for effective conservation. This thesis is a narrative of the social dimensions of a crisis affecting vulnerable and elegant species (cranes) that depends on fragile ecosystems (wetlands) in East and Southern Africa. On a positive note, however, and most importantly, it is also documentation of a glimmer of hope for the species. This hope emanates from encouraging wide-ranging field experiences that should inspire positive thinking among conservationists, local communities, national governments and project donors. Securing the future of cranes in human-dominated landscapes in Africa hinges upon nurturing the environmental motivations, commitments and actions of local communities, within a supportive framework of local administrative and national policies, priorities and plans.

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