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Community mobilization towards the conservation of Black-crowned Crane in Jimma Zone, South-western Ethiopia

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Abstract

Biodiversity loss is one of the global challenges that we all encounter due to over exploitation of natural resources by human beings. The Black-crowned Crane (Balearica pavonina L.) is one of the six crane species found in Africa with population declining and considered as vulnerable species. Black-crowned Crane habitat especially wetlands are declining in many regions. Because wetlands are declining in extent and areal coverage, we suggest convincing the importance's of wetlands for the local communities as one of the major ecosystem services is a pre-requisite actions for conservation. To minimize the over-exploitation of wetlands, understanding the knowledge, attitude and practices of local people is important for conservation actions. Human beings drive both threats to biodiversity and its conservation. In order to minimize the threat and loss of the species, the bottom-up and top-down conservation approaches was conducted in Jimma Zone, south-western Ethiopia. Both approaches are complementary and necessary components of conservation. A systematic survey research, field observation, and focused group discussions was conducted from March 2015 to January 2016 in the study area in order to identify the major threats of Black-crowned Crane and the way forward for practical conservation actions. The overall results show that the Black-crowned Crane is under threats because of habitat loss. To overcome the existing situations, various training and workshop was conducted for the communities, students at different levels and multi-stakeholders. Moreover, social media and mass media were frequently used for public awareness at large. Finally, the findings suggests that greater attention is needed to promote public awareness on Black-crowned Crane conservation using both bottom-up and top-down conservation approaches.

Keywords: Black-crowned Crane, conservation, wetland loss, public awareness

1. Introduction

The Black-crowned Crane is categorized under vulnerable species (IUCN, 2012). Geographically, this species is restricted to Africa continent which stretches from Senegal and Gambia on the Atlantic coast to the upper Nile River basin in Sudan and the Ethiopia highlands (Meine and Archibald, 1996; Boere *et al.*, 2006). Its population is declining across its home range and even disappearing in some countries (Boere *et al.*, 2006; Beilfuss *et al.*, 2007; IUCN, 2012; Harris and Mirande, 2013). This birds use open grasslands, shallow wetlands and grasslands adjacent to water bodies for feeding, breeding and resting (Williams *et al.*, 2003; Diagana, 2006). In addition to grasslands and wetlands, Black-crowned Cranes are also frequently observed on agricultural field for feeding purpose (Figure 1).



Figure 1: Black-crowned Cranes and Wattled Cranes on agricultural land

In the population range countries including Ethiopia, wetland degradation and lose is become serious threat for the species survival (Figure 2). For instance, a recent study by Woldemariam et al. (2018) in Alemgono and Doli wetlands in Gimbo district, Kafa Zone, Southern Nations, Nationalities, and Peoples' Region State of Ethiopia indicates that Alemgono and Doli wetlands size is declined from 1151.7 and 251.41 hectares in 2001 to 826.63 (-28.22%) and 241.21 (-4.06%) hectares in 2016.



Figure 2: Wetland buffer area degradation

In a human-altered world where biodiversity is in decline and conservation problem abound, there is an urgent need to ensure that the future generation of conservation scientists have the knowledge, skills, and training to address these problems (Chapman *et al.*, 2015).

The local communities are converting wetlands in to agricultural lands due to lack of awareness on socio-economic and ecological value of healthy, intact wetlands. Harris and Mirande (2013), report that the rapid human population growth, intensive land use and different economic development with poor environmental protection threat the survival of Black-crowned Crane in sub-Saharan Africa. Although, Black-crowned Crane use other habitats, majority of the time they use wetlands for feeding and nesting (Figure 3).



Figure 3: Black-crowned Cranes breeding ground (Jimma Zone, Ethiopia)

In Ethiopia, Black-crowned Crane habitats are being degraded due to lack of clear wetland protection and conservation rules and regulations (Aynalem *et al.*, 2012). Draining wetlands for infrastructures development and constructions of huge foil greenhouses are some of the activities that have a negative impact on crane habitats (Nowald *et al.*, 2013).

2. Methodology

The Study Area Descriptions

This study was conducted in Jimma zone in Oromia National Regional State in southwestern part of Ethiopia. Jimma zone is one of the thirteen zones of *Oromia* National Regional State (Figure 4) which geographically lies at south-western part of Ethiopia. Jimma Zone has the total population of 2,486,155 [Central Statistics of Ethiopia (CSA), 2007]. From the total, 2,204,225 (88.66%) is the rural population, which directly depends on agricultural activities for domestic use and exchange of commodities with urban residents.



Figure 4: Map of the study area

Various capacity building and awareness creation was conducted in Jimma zone in order to minimize the threats of Black-crowned Crane in the region. Besides capacity building population monitoring was conducted on Cheleleki wetland, Jimma zone, for the sake of investigating the population variation of Black-crowned Crane in the dry and wet season (Table 1).

Number of individuals	Month	Date of record
56	June	June 7, 2016
28	June	June 10, 2016
70	June	June 17, 2016
74	June	June 25, 2016
62	July	July 2, 2016
34	July	July 9, 2016
45	July	July 23, 2016
18	July	July 29, 2016
18	August	August 7, 2016
20	August	August 13, 2016
14	August	August 20, 2016
18	August	August 28, 2016
20	September	September 5, 2016
30	September	September 18, 2016
58	September	September 27, 2016
72	October	October 5, 2016
68	October	October 19, 2016
50	October	October 25, 2016
50	October	October 31, 2016
28	November	November 4, 2016
32	November	November 18, 2016
53	November	November 25, 2016
58	December	December 1, 2016
67	December	December 8, 2016
86	December	December 15, 2016
72	December	December 25, 2016
88	December	December 28, 2016
94	January	January 5, 2017
108	January	January 12, 2017
130	January	January 19, 2017
153	January	January 26, 2017
125	February	February 10, 2017
140	February	February 12, 2017
250	February	February 17, 2017

Table 1: Number of Black-crowned Crane recorded from June 7, 2016 to February 17, 2017

As indicated in table 1, population monitoring of Black-crowned Crane was conducted starting from June 7, 2016 onwards. The minimum and maximum record was 14 and 250 individuals respectively. The minimum record (14 individuals) was observed in the month of August 2016 while the maximum (250 individuals) was in the month of February 2017.

Bottom-up and top-down conservation approach

For public capacity building and awareness creations we used the combination of bottom-up and top-down approaches. Conservation campaign is not a simple task that accomplished over a couple of months or years, but it has several challenges (Chapman et al., 2015) from the communities' sides since they are dependent on natural resources. Vogt et al. (2013) recognized that humans are an integral part of most ecosystems, and will likely influence the accomplishments of the designed projects. Thus, it is important to engage practitioners, policy makers, and stakeholders to overcome the existing challenges in conservation. No single strategy is sufficient to address the issue of conservation. The combination of bottom-up and top-down approach should be considered to established effective and acceptable conservation plan. The bottom-up approach refers to changing the attitude and perceptions of local communities towards conservation at the grassroots level; enhancing the capacity of the local communities to change their understanding on the use of conservation practices. A bottom-up approach performed through a participatory process with the relevant stakeholders and experts (Girard et al., 2015). The other mechanisms is the top-down approaches which involves conservation interventions with the support of governmental organization that have the capacity to mobilize and change the society on a large scale (Musengezi, 2015). In both approaches environmental education is a critical component of conservation actions. Various capacity building was conducted in Jimma Zone in order to minimize the threats of Black-crowned Crane (Figure 5).





Figure 5: Public capacity building and awareness creation towards the conservation of black crowned crane in Jimma Zone, Ethiopia

Minimizing the threats of Black-crowned Crane through environmental conservation

Conservation is an evidence-based problem solving science. If a species or their habitats are under threat we have to work our best to safe from loss. Black-crowned Crane threats is not associated with single problems but it is due to a very complex mixture of land use changes, including wetland deterioration and intensified agriculture, deforestation and potential changes as a results of human activities which leads to climate change and species extinctions. Conservation activities can help us to work together and we can think about new ways to overcome the problems. If human activities are the main problems, we have the key to solve the problems. Similar to wetland loss, forest and land degradation is another serious problem in Jimma zone. There is a strong linkage between forest cover and flooding, which directly affects the wetland ecosystem. Forest has the capacity to trap and reduced flood incidence especially in high land areas like Ethiopia. Forest cover played an important role in reducing the extent of flood damage and hence has the ability to protect human lives and other species during flood events. So, it is better to invest our resources on plantation activities in order to protect all natural habitats and its associated species to ensure their sustainability in the future. In order to minimize the threats of Black- crowned Cranes, we mobilize the stakeholders including the local communities to rehabilitate the degraded land through planting trees (Figure 6).



Figure 6: Rehabilitation of the degraded land

Conclusions and recommendation

The Black-crowned Cranes are under threats because of habitat loss and degradation. The local communities are converting wetlands in to agricultural lands due to lack of awareness on socio-economic and ecological value of healthy, intact wetlands. Thus, public awareness is crucial to minimize the pressure of human beings on nature specifically wetlands. Awareness creations are strongly important on the value of wetlands. Moreover, population monitoring and national crane population census is important to estimate the status of the species for further conservation actions. Finally, the conservation of Black-crowned Crane is an essential activity not optional.

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