

Full Length Research Paper

Community knowledge, attitude and practice towards black crowned crane (*Balearica pavonina* L.) conservation in Chora Boter district of Jimma Zone, Ethiopia

Dessalegn Obsi Gameda^{1*}, Abebayehu Aticho Minstro¹, Debela Hunde Feyssa¹, Akalu Dafissa Sima² and Tariku Mekonnen Gutema¹

¹Department of Natural Resources Management, College of Agriculture and Veterinary Medicine, Jimma University, P. O. Box 307 Jimma, Ethiopia.

²Department of Agricultural Economics and Extension, College of Agriculture and Veterinary Medicine, Jimma University, P. O. Box 307 Jimma, Ethiopia.

Received 30 November, 2015; Accepted 11 March, 2016

The black crowned crane is one of the six crane species found in Africa with population declining and considered as vulnerable species. Understanding the knowledge, attitude and practices of local people is important in conservation of black crowned crane. A survey study was conducted in Jimma zone, Chora Boter district in southwestern Ethiopia between February to November 2015 with the aim to investigate knowledge, attitude and practices of the community on the conservation of black crowned cranes. Data was collected through field observation, questionnaire survey (n=105) and focus group discussions. Descriptive statistics such as frequency, percentages, Chi-square test and tabulation were employed to analyze the quantitative data. Qualitative data were analyzed and interpreted thematically. The result of the study revealed that the number of black crowned cranes in the area varies with seasons. Maximum of 273 black crowned cranes were counted in the dry season and less number in the wet season. Most of the respondents, 73% perceived that the population of black crowned crane around Chalalaki wetlands is increasing. The majority of the respondents, 93.3% confirmed that the black crowned crane is not a crop pest and only few, 6.7% claimed that they damage crops mainly maize. The results showed that community knowledge, attitudes and perception on Black Crowned crane conservation were significantly difference. The study also revealed that there is less human- crane conflict but the local community is exploiting the Chalaleki wetland, which will threaten the black crowned cranes. Therefore, to overcome the problem capacity building and awareness creations should be conducted within short period of time. Moreover, action researches should be designed to promote participatory conservation of black crowned cranes and wetland.

Key words: Black crowned crane, Chora Boter, population, vulnerable, wetland

INTRODUCTION

The role of people in any conservation action is very important. On one hand, people play a key role in the success of biodiversity conservation plans, but on the

other hand, it is the cause of many threats to biodiversity. For this reason identifying knowledge, attitudes and of local people on wildlife conservation is a pre-requisite for

conservation action (Ebua et al., 2011). Understanding local community Knowledge, Attitude and Practice (KAP) towards conservation is an important element for wildlife conservation. The success of wildlife conservation depends on the attitudes of people towards conservation (Katrina, 2000). Environmental education is very important to change the attitude of the community towards wildlife (Kahan and Ali, 2015).

Black crowned crane (*Balearica pavonina*) is a bird in the crane family of Gruidae with black legs and its head is graced with a golden crown (Figure 1).

The black crowned crane is one of the six crane species in Africa (Harris and Mirande, 2013). Home range of this species is 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). In Ethiopia, black crowned cranes are resident throughout the western parts of the country and the rift valley lakes (Nowald et al., 2007). This bird species uses open grasslands, shallow wetlands and grasslands adjacent to water bodies for feeding, breeding and resting (Williams et al., 2003; Diagana et al., 2006; IUCN, 2012). The species experience local daily and seasonal movements for searching of feeding and breeding sites (Meine and Archibald, 1996).

The black crowned crane is categorized as vulnerable species (IUCN, 2012). It's population is declining across its home range and it is even disappearing in some countries (Meine and Archibald, 1996; Williams et al., 2003; Boere et al., 2006; Beilfuss et al., 2007; Harris and Mirande, 2013). It is predicted that the population decline will continue in the future due to habitat loss and trapping of cranes for domestication (IUCN, 2012). In the countries where the species is present, wetland degradation and loss is becoming a serious threat for the survival of the species. Harris and Mirande (2013) reported that the rapid human population growth, intensive land use and different economic development with poor environmental protection that threaten the survival of black crowned cranes in sub-Saharan Africa.

The existences of black crowned cranes in Ethiopia were reported in Chimba, Yiganda, Gorgora and Fogera wetlands (Williams et al., 2003; Nowald et al., 2007). In 2008, 400 black crowned cranes were recorded in Chimba and Amba Giorgis wetlands around Lake Tana (Aynalem, 2008), 580 recorded in Chimba, 412 at Shesher and Wallala wetlands (Aynalem et al., 2012). It is also observed in Southern Nation Nationalities and People State, around Boyo wetlands (Nowald et al., 2013). In 2012, a total of 1,368 black crowned cranes were observed in Ethiopia (Archibald, 2012). After a year, the number is increased to 1,771, out of which about 94%

were observed around Lake Tana (Nowald et al., 2013). Black crowned cranes were also observed in Jimma Zone (Nowald et al., 2007; Mekonnen and Aticho, 2011; Archibald, 2012). Despite the observations of black crowned cranes in Jimma Zone, the community KAP is not clearly understood on the species. Understanding the status of cranes is fundamental to the success of cranes conservation efforts (Meine and Archibald, 1996). Therefore, this study aimed to assess the knowledge, attitude and practices of local communities towards black crowned cranes conservation in Chora Boter district.

MATERIALS AND METHODS

Study area descriptions

The study took place in Chora Boter, district of Jimma Zone (Figure 2), which is located in Oromia National Regional State in southwestern part of Ethiopia. Chora Boter is rich in wetlands, swamps, grasslands, forests and various wildlife including birds. Chora Boter is one of the 18 districts of Jimma zone with the total area of 1478 km² (CSA, 2012). According to the 2007 Ethiopian census, the total population of Chora Boter was around 90,695 out of which 45,916 and 44,779 are males and females respectively.

Respondents sampling and methods of data collection

Respondents were purposively sampled from Chora Boter district, Dire Mecha village due to the adjacent to Cheleleki wetlands where the black crowned cranes reside the whole year. One hundred and five (105) respondents were purposively selected from farmers, development agents, teachers, students, local merchants and religious leaders residing around the wetlands. Three focus group discussions (FGDs) each consisting 8 participants from Dire Mecha village were held in the month of October 2015 to assess the current status of black crowned cranes: its habitat, breeding, threats as well as its conflicts with humans in the area.

Field observation was carried out in both wet and dry seasons. During field observation, equipments like GPS, Bushnell binocular 10*42, digital and video camera, and notebook were used for data recording. Due to the limited number of crane individuals and their preference for open habitats, complete counts (Dowding and Greene, 2012) were conducted when the birds were active in the early morning (6.30:10.00 am) and late afternoon from 4.30: 6.00 pm (Bibby et al., 2000; Sutherland, 2000). Multiple count method of (Gregory et al., 2004) was also applied to analyze population variation over time in the study area. All observations were counted and recorded. Focus-group interview (Rabiee, 2004) was also conducted to assess people knowledge, attitudes and perception of local people towards black crowned cranes conservation in the area.

Method of data analysis

Both quantitative and qualitative techniques were used for data

*Corresponding author. E-mail: dasoobsi@gmail.com, dessalegn.obsi@ju.edu.et.



Figure 1. Pair of black crowned cranes (By Dessalegn Obsi Gemeda, September 2015).

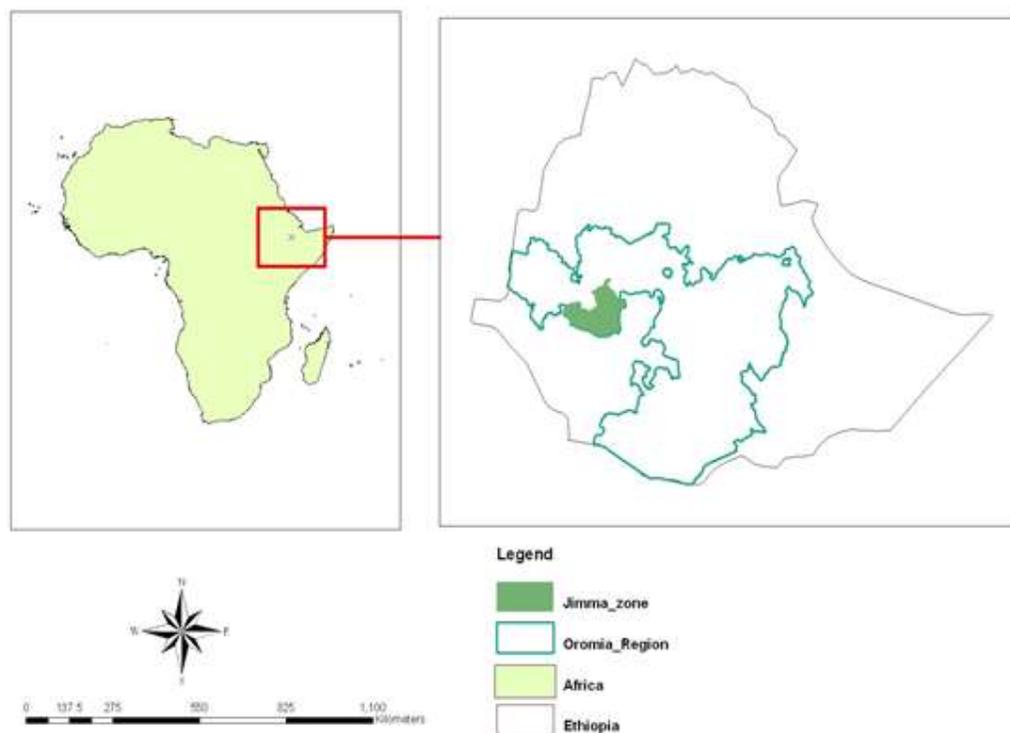


Figure 2. Map of the study area.

analysis. The quantitative data collected through the survey was analyzed by using Statistical Package for Social Sciences (SPSS). Descriptive statistics such as frequency and percentage were used to measure respondent's age and year of living in the study area and the findings were presented using tables and figures. Chi-square test was used to determine the relationship between respondent's knowledge, attitude and perceptions on Black crowned crane conservation.

RESULTS AND DISCUSSION

The demographic data of the respondents indicated that 66.7% were males and 33.3% females. The age of the respondents varies from 15 to 75 with an average age of 30.05 years and about 40.8% were between 20 to 30 years (Table 1). The majority of respondents, 96.2%

Table 1. Age of the respondents (N=105).

Age	15	17	18	20	25	30	33	39	43	51	52	75	Total
Frequency	7	9	10	17	14	15	5	6	6	4	8	4	105
Percent	6.7	8.6	9.5	16.2	13.3	14.3	4.8	5.7	5.7	3.8	7.6	3.8	100.0

Table 2. Year of living in the study area.

Year of living	2	7	15	17	18	20	25	30	33	39	43	51	52	75	Total
Frequency	2	2	7	10	11	16	12	13	5	6	5	11	1	4	105
Percent	1.9	1.9	6.7	9.5	10.5	15.2	11.4	12.4	4.8	5.7	4.8	10.5	1	3.8	100

Table 3. Demographic information of the respondents.

Educational level and occupation		Frequency	Percent
Education	Illiterate	41	39.0
	Primary	45	42.9
	Secondary	13	12.4
	Tertiary	6	5.7
Occupation	Farmer	80	76.2
	Teacher	5	4.8
	Student	13	12.4
	Development agent	3	2.9
	Religious leader	2	1.9
	Petty business	2	1.9

reported that they had lived in the study area for more than fifteen years (Table 2). People who lived for a long period of time or born there had better experiences than people who lived for a couple of days or months. With the exception of professionals persons like teachers (4.8%) and development agents (2.9%), the majority of the interviewed people (92.3%) were born in the area. Because of long residency period of the respondents, they have sufficient information on the status of black crowned cranes.

Table 3 indicates the educational and occupation status of the respondents. The overall level of education in the study area is very low: 39% of the respondents have not received formal education, 42.9% primary school, 12.4% secondary school and 5.7% have tertiary education. Similar to other parts of the country, the majority of the population depends on agricultural activities. The occupation structure of the respondent's was varied which includes farmers (76.2%), students (12.4%), teachers (4.8%), development agent (2.9%), religious leaders (1.9%) and another 1.9% were petty business men. Since most of the population depends on agriculture, there is a high probability of conversions of

wetlands in to agricultural lands that will lead to crane habitat loss. During the focus group discussions at village level, the participants confirmed that conversion of wetlands to agricultural lands affect the life black crowned cranes and these activities seriously affect in the future if wetland protection and conservation is not implemented in the study area. This finding is consistent with the IUCN assessment report of 2012.

The extent of community understanding towards black crowned cranes varied from person to person based on their level of education. Respondents who had a formal education were more likely to explain the current status of black crowned cranes. Table 4 showed that 82.8% of the respondents perceived that black crowned cranes exist everywhere while 17.2% perceived that this species exist in few areas like Cheleleki wetland. A great number of respondents 93.3% agreed that black crowned crane is not a pest species and only 6.7% perceived as a pest species that can damage maize at germination stage. About 92.4% perceived that there is no conflict between human and black crowned cranes. The results showed that there is a great significant difference among the community ($p=0.001$) concerning the existence of the

Table 4. Community's Knowledge and attitude on black crowned cranes in the area.

Community knowledge and attitude on black crowned cranes	Frequency	Percent	P-value
Do you think that black crowned cranes exist in few areas?			
Yes	18	17.2	0.001
No	87	82.8	
Black crowned cranes is a pest species?			
Yes	7	6.7	0.001
No	98	93.3	
Have you had a conflict with black crowned cranes?			
Yes	8	7.6	0.001
No	97	92.4	

**Figure 3.** Black crowned cranes on feeding at Ckeleleki wetlands in Chora Boter district (By Dessalegn Obsi Gameda).

species in few areas as well as the issue of crop damage and conflicts with human being (Table 4). During the focus group discussions farmers also confirmed that black crowned cranes mostly use wetlands for feeding and there is lesser extent of damaging crops. The species forage together on wetland areas, where they can easily get insects and other invertebrates (Figure 3). Similar findings were reported by Williams et al., 2003; Diagana, 2006 concerning habitat preferences of the species.

Although, 82.8% of the respondents were familiar with the existence of black crowned cranes in the area, a great number, 83.8% of the respondents had no information concerning the breeding seasons. More than 95% of the respondents had little knowledge on the impacts of human beings on the species (Table 5). Majority of the respondents, 88.6% stated that they did not observe the eggs and only 11.4% had observed the eggs of cranes. About 67.6% of the respondents did not observe nests and only 32.4% had observed the nest of

Table 5. Local people KAP on the breeding status of black crowned cranes.

Information on black crowned crane breeding	Frequency	Percent	P-value
Do you know the breeding seasons of black crowned cranes?			
Yes	17	16.2	0.001
No	88	83.8	
Do you think that people affect the breeding success?			
Yes	5	4.8	0.001
No	100	95.2	
Do you think that human beings destroy the breeding nest?			
Yes	4	3.8	0.001
No	101	96.2	
Did you observe the nest of black crowned cranes in your area?			
Yes	34	32.4	0.001
No	71	67.6	
Did you observe the eggs of black crowned cranes in your area?			
Yes	12	11.4	0.001
No	93	88.6	

**Figure 4.** Black crowned crane feeding adjacent to maize crops in Chora Boter district (By Dessalegn Obsi Gemedda).

the species. The results indicated that there is a significance difference among the community knowledge, attitude and perception as far as the breeding season and success of Black crowned crane (Table 5). Concerning the practices of the community, 95.2 % of the respondents replied that the local community has no

acts of disturbance on the breeding of cranes and 96.2% responded that they do not destroy the breeding nests. This implies that the local community does not have practices that destroy the breeding nest. But their indirect practice of expanding agricultural land into the wetland has impact on the cranes' breeding and hence on their

Table 6. Community KAP about black crowned cranes status in the area.

Knowledge and experiences	Frequency	Percent	P-value
Did you frequently observe Cranes on your agricultural fields?			
Yes	15	14.3	0.001
No	90	85.7	
Do you think wetlands and black crowned cranes are interrelated?			
Yes	101	96.2	0.001
No	4	3.8	
Can you estimate the number of black crowned cranes in your area?			
Yes	43	41.0	0.06
No	62	59.0	
Were you involved in any conservation action in your region?			
Yes	58	55.2	0.28
No	47	44.8	
Are you interested in environmental conservation?			
Yes	105	100	0.001
No	0	0	

status to live there (Figure 4).

Table 6 describes community knowledge and experiences on black crowned cranes and environmental conservation. The majority of the respondents, 96.2% understood that there is a strong relationship between wetlands and black crowned cranes and most of the time the cranes stay over wetlands. Because of this fact, only 14.3% of the respondents observed cranes on the agricultural fields. The respondents were also asked concerning an estimated number of black crowned cranes in the study area and about 59% of the respondents had no idea because of variation of species from month to month and season to seasons and only 41% estimated the relative number of black crowned cranes in the area. The results of community knowledge and experiences shows that no much significance difference ($p= 0.06$) on population estimation of Black crowned cranes in the area. This mainly due to population variations of the species varies from month to month and season to seasons.

Although, 39% of the respondents had no formal education, the governments of Ethiopia provide some training for the farmers, especially on soil and water conservation with less emphasis on biodiversity conservation specifically wetlands. The overall respondents showed that about 55.2% have been involved in environmental educations through district agricultural bureau and village development agents. The communities are open minded to take any capacity building specially on the environmental aspects because of the fact that they are observing some impacts of

climate change on their livelihoods. All respondents (100%) showed their interest to participate on any environmental conservation training.

Figure 5 showed that the respondents estimated the number of black crowned cranes in the area: 100 to 200 (21.9%), less than 100 (8.6%), 200 to 300 (6.7%), above 300 individuals (3.8%). The results of the complete census of 2015 in the study area shows that 273 black crowned cranes were observed in dry season (April), and 105 in June and 73 individuals in the month of October 2015. The respondents also confirmed that there is high number of black crowned cranes in the dry season. The majority of the respondents, 83% perceived that the population of black crowned cranes is high during the dry season. This is mainly due to the fact that temporary wetlands are dry in other areas and most of the cranes come to Chalalaki wetlands for feeding.

Concerning the population status, 73% of the respondents indicated that the population is increasing, 18% decreasing, 5% have no idea at all and 4% stable (Figure 6).

Conclusions

Human beings play an important role in wildlife conservations. Understanding the local community KAP has a pivotal role in the conservation planning and implementation of black crowned cranes. The results of the study showed that the local community in the study area has less knowledge and understanding about the

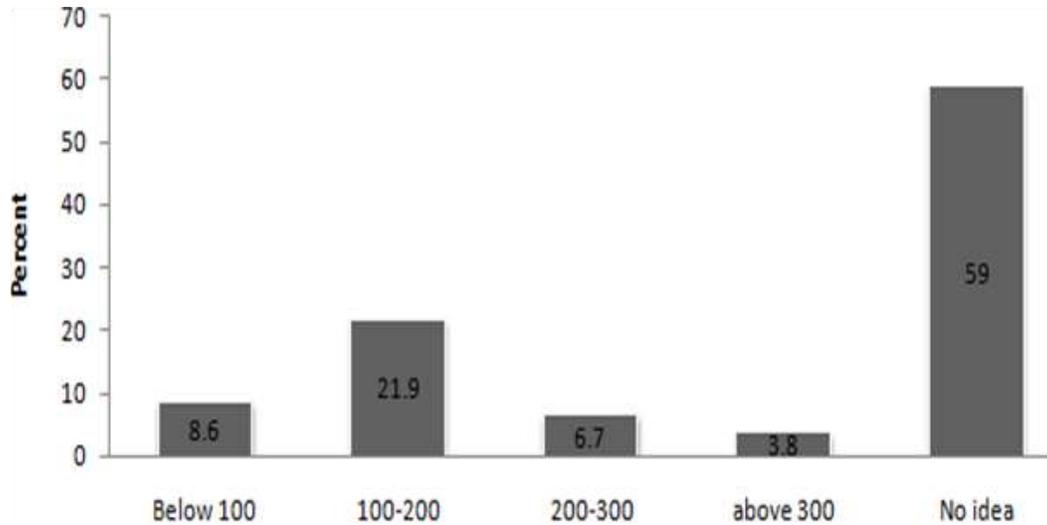


Figure 5. Population estimation of black crowned cranes by the community.

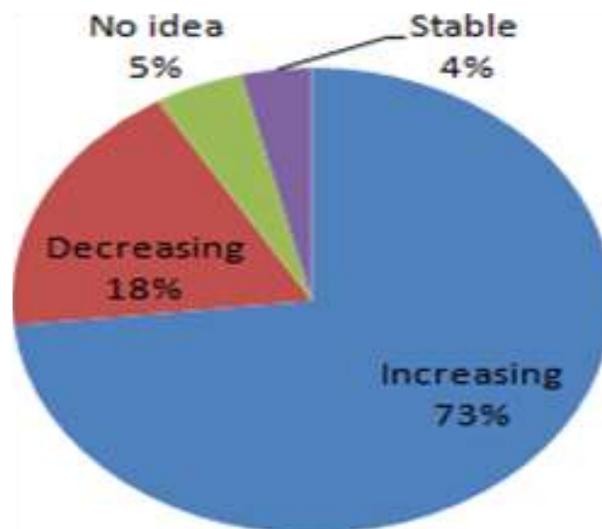


Figure 6. Perceptions of local communities' towards black crowned cranes population.

distribution and breeding status of black crowned cranes. Human-crane conflict is low and the society has a positive attitude towards black crowned cranes in the area. However, there is a conflict with few respondents due to crop damaged by cranes. The local communities are converting wetlands to agricultural fields for the sake of economic activities and this practice is threatening the breeding and nesting sites of the black crowned cranes. Although, 273 black crowned cranes were counted, more than half of the respondents were not able to estimate the population. Therefore, capacity building on wetland conservation and awareness creations is very important to change the knowledge, attitudes and practices of the

wider community towards black crowned cranes and wetland conservation.

Conflict of Interests

The authors have not declared any conflict of interests.

ACKNOWLEDGEMENTS

Firstly, the authors would like to thank Rufford Small Grants for Nature Conservation, a UK based charity

organization where this work was undertaken with the support of the Rufford Small Grants that supports projects in developing countries.

The authors are also grateful for the contributions of many people starting from the conception to finalization of the project; Mr. Stuart Paterson, executive manager of Fauna and Flora International, who provide training for the principal investigator (Mr. Dessalegn Obsi) on the project planning and proposal writing through workshop and also provided a referee statement to the donor; Dr. ir.L. (Lukas) Grus, Laboratory of Geo-information Science and remote sensing, Wageningen University, the Netherlands who recommend the project for the donor; Dr. Rene Haaroff, Head of Department of Tourism and Event Management at Central University of Technology, Free State in South Africa, for providing statement of referee to the donor; Dr. Kiteessa Hundes, Jimma University Department of Biology, for providing the recommendations letter to the donor; Mr. Melkamu Dumessa, Jimma University, who edit the proposal during application stages; Mr. Mitiku Tezera, for helping with data collection; and lastly, Jimma University College of Agriculture and Veterinary Medicine for its in-kind contribution to the project.

REFERENCES

- Archibald GW (2012). International Crane Foundation (ICF) Co-founder, Travels in Ethiopia-International Crane Foundation (Online), Available from: <https://www.savingcranes.org/travels-in-ethiopia/> (Assesses on November 8, 2015).
- Aynalem S (2008). Crane Survey around Lake Tana. Conservationist at Lake Tana, Bahir Dar, Ethiopian Wildlife and Natural History Society. African Cranes, Wetlands and Communities, Newsletter 3, Parkview, South Africa.
- Aynalem S, Archibald GW, Branch J, Geiler D (2012). Survey of Wattled Cranes, black crowned cranes and Eurasian cranes in Ethiopia. (ed.) Mabhachi, O., 2012. Community Project Coordinator African.
- Beilfuss RD, Dodman T, Urban EK (2007). The Status of Cranes in Africa in 2005. Ostrich: J. Afr. Ornithol. 78 (2):175-184.
- Bibby CJ, Burgess ND, Hill DA, Mustoe SH (2000). Bird Census Techniques, 2nd edition.
- Birdlife International (2012). *Balearica pavonina*. The IUCN Red List of Threatened Species 2012. <http://www.iucnredlist.org/details/22692039/0> (Assessed on November 8, 2015).
- Boere GC, Galbraith CA, Stroud DA (2006). Water birds around the World. The Stationary office, Edinburgh, UK. P 960.
- CSA, Central Statistical Agency (2012). Federal Democratic Republic of Ethiopia Central Statistical Agency, Agricultural Sample survey, 2012/2013, Volume II, Report on Livestock and Livestock Characteristics. pp. 1-54.
- Diagana CH, Dodman T, Sylla SI (2006). Conservation action plans for the black crowned crane (*Balearica pavonina*) and Black Stock (*Ciconia nigra*) in Africa. Waterbirds around the world. (ed.) G.C. Boere, C. A. Galbraith and D.A. Stroud. The Stationery Office, Edinburgh, UK. pp. 608-612.
- Dowding J, Greene T (2012). Birds: Complete counts-true census version 1.0. Department of Conservation, Te papa Atawhai.
- Ebua VB, Agwafo TE, Fonkwo SN (2011). Attitudes and Perceptions as threats to wildlife conservation in Bokssi area, south west Cameroon. Int. J. Biodivers. Conserv. 3(12):631-636.
- Gregory RD, Gibbons DW, Donald PF (2004). Bird Census and Survey techniques. Bird Ecol. Conserv. pp. 17-56.
- Harris J, Mirarande C (2013). A global overview of Cranes: Status, threats and conservation priorities, International Crane Foundation, Baraboo, USA. Chinese Birds. 4(3):189-209.
- Kahan BN, Ali Z (2015). Socio-Ecological Assessment and Local Community perception towards wildlife conservation around Mangla Dam, AJK. J. Anim. Plant Sci. 25(3):334-340.
- Katrina B (2000). People, Parks, Forests or fields: A realistic view of tropical forest conservation. Published by Elsevier Science Ltd.
- Meine CD, Archibald GW (1996). The Cranes: Status Survey and Conservation Action plan. IUCN, Gland, Switzerland, and Cambridge, UK, P 294.
- Mekonnen T, Aticho A (2011). The Driving forces of Boye wetland degradations and its bird species composition, Jimma South western Ethiopia: J. Ecol. Nat. Environ. 3(11):365-369.
- Nowald G, Gunther V, Walter B, Beisenherz W, Schroder W (2013). Crane Monitoring 2013 in Ethiopia 1st result of the survey 2013, Journal of der Arbeitsgemeinschaft Kranichschutz Deutschland. Das Kranichjahr 2013/2014.
- Nowald G, Schröder W, Wilhelmi F (2007). First survey of Eurasian Cranes (*Grus grus*) in Ethiopia. Unpublished Report by Crane Conservation Germany Crane Information Center GroßMohrdorf.
- Rabiee F (2004). Focus-group interview and data analysis. Proceeding of the Nutrition Society, 63(4):655-660.
- Sutherland WJ (2000). The Conservation Handbook Research, Management and Policy, Blackwell Science Ltd., London.
- Williams ETC, Beilfuss RD, Dodman T (2003). Status Survey and Conservation Action plan for black crowned cranes *Balearica pavonina*. Wetlands International, Dakar, Senegal and International Crane Foundation, Baraboo, Wisconsin, USA.