

# Conservation of the west African black-crowned crane *Balearica pavonina pavonina* (Linn 1758) in the sudano-sahelian wetlands of northern Nigeria

## Abstract

With so much crises and mystification surrounding the management of Nigeria's wildlife as a result of anthropogenic impacts occasioned by poaching, bush burning, grazing and unsustainable farming practices coupled with desert encroachment and lack of unified wildlife law, it would not be a shocking revelation that the most revered bird in Nigeria, the West African black-crowned crane is on the verge of local extinction. This paper is a review on the black-crowned crane with emphasis on present conservation status and habitat requirements of the species as well as facilities that can be used for the domestication of the bird. Understanding the species fundamental niche and the threats to its survival are essential aspects for the future conservation of the species. This review will awaken the consciousness of conservationists and other environmentalists on the conservation of the black-crowned crane, the national bird of Nigeria. The conservation of the species will further promote and increase ecotourism potentials of wetlands in the Sudano-Sahelian landscape of Northern Nigeria.

**Keywords:** wetlands, sahelian, black crowned crane, conservation, extinction

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## Introduction

The Black Crowned Crane *Balearica pavonina* is a resident of the Sahel and Sudan Savanna regions of Africa, ranging from the Senegal Basin and Guinea-Bissau Drainage in West Africa to the Western Ethiopian Highlands and South-West Rift Valley in East Africa. There are two black crowned-crane subspecies. The West African Crowned Crane, *Balearica pavonina pavonina* occupies the western part of this range, from Senegal to Chad. The Sudan Crowned Crane, *Balearica pavonina ceciliae* occurs in Eastern Africa, with its largest concentration in Sudan.<sup>1</sup> Birdlife International<sup>2</sup> classifies the species as *near threatened*. Population estimates are 15,000 for *Balearica pavonina pavonina*<sup>3</sup> and 43,000-55,000 for *Balearica pavonina ceciliae*.<sup>4</sup> Due to the rapid decrease of populations in certain areas and a lack of knowledge about status in other areas, the International Crane Foundation (ICF) and Wetlands International launched the Black Crowned Crane Programme in 1999 in order to determine the species' conservation status and to prepare an action plan for its conservation.

Cranes symbolize PEACE. It is by no accident that our founding fathers selected the crane as Nigeria's National Bird. According to Ero and Stopfords,<sup>5</sup> of the world's fifteen species of cranes, only the black-crowned crane (*Balearica pavonina*) is found in Nigeria and also among the most beautiful birds in the world. Yet not only is the general public ignorant of this unique genetic resource in our midst, but the public is also totally unaware that the crane is our national bird and not the eagle. Many sovereign states have cranes as their national birds; the Ugandans have the grey-crowned crane as their national bird, the South Africans have the blue crane as their national bird, the Japanese have the red-crowned Crane as their national bird and the Nigerians have the Black-crowned Crane as theirs.<sup>6</sup> Unlike the Nigeria National Flower (*Custus spectabilis*) which adorns the foot of the national coat-of-arms, the black-crowned Crane is not shown on the coat-of-arms. Instead, it is an eagle. The presence of an

eagle on the national coat-of-arms is merely symbolic. The founding fathers of Nigeria deliberately placed the eagle on the coat-of-arms to epitomize the might of the country in the African continent. Stopfords<sup>7</sup> highlights that the black-crowned cranes which were seen in flocks of 200 or more some years ago in the wild are hardly seen even by hard searching field ornithologists these days. The reason for the crane's fast declining population is not far-fetched. The bird inhabits one of the most important of the world's most viable environment, the wetlands including the Sudano-sahelian wetlands of Northern Nigeria. These wetlands are needed for livestock production, fishing, *sadama* farming as well as large scale irrigation projects,<sup>8</sup> and anthropogenic impacts arising from such activities may be responsible for such declining crane population. Of the African cranes, the West African black-crowned crane is the most in need of detailed field studies. This reflects not only its rapid decline and threatened status in the western portion of its range, but also the limited extent of previous research. Johnsgard<sup>9</sup> summarized available information on the two subspecies (treating them together with the two Grey Crowned Crane subspecies). No range-wide surveys of the population and very few ecological studies of the species and its habitats have been carried out in Nigeria. Therefore, the present study focuses on the conservation of the Nigeria National Bird, the West African black-crowned crane (*Balearica pavonina pavonina*), which according to IUCN<sup>10</sup> is vulnerable. The paper also highlights some domestication and habitat manipulation techniques as well as conditions that will favour the breeding of cranes in the wild.

## Scientific classification and conservation status

Common name: West African black-crowned crane.

Scientific name: *Balearica pavonina pavonina* (Linn 1758).

Phylum: Chordata.

Class: Aves.

Order: Gruiformes.

Family: Gruidae.

Sub-family: Balearicinae.

IUCN status: Vulnerable;<sup>10</sup>

CITES status: Endangered.<sup>11</sup>

Special status: Nigeria National Bird.<sup>12</sup>

The black crowned crane as earlier stated is the National Bird of Nigeria, a status that can be reckoned with, though in some parts of Northern Nigeria, it is a taboo to associate with it. Opinions vary from one locality to another. Some people strongly believe that capturing and eating crane will likely lead to insanity. In other parts of the world, cranes are a sign of good luck and are thus accorded protection in even in areas where they are taboo. The black crowned-crane is listed on Appendix II of the Convention on International Trade in Endangered Species (CITES), which means that any trade in this species should be carefully regulated.<sup>11</sup> Black crowned-cranes are legally protected in most countries where they occur, although this protection is often ineffective.<sup>13</sup> In Nigeria, their habitats are protected within National Parks, such as Kainji Lake, Chad-Basin, Gashaka-Gumti and Kamuku National Parks as well as other game reserves.

### Description of the species

The beautiful stately black crowned-crane *Balearica pavonina* (Figure 1), gets its name from its dark slaty-grey to black plumage,<sup>14</sup> and the crown of stiff, golden feathers atop the head.<sup>15</sup> Distinctive white feathers are at the leading edge of the wing and a small pouch of red skin (*gular sac*) hangs under the chin.<sup>14,15</sup> The gular sac, which is similar to a wattle, can be inflated to enable the bird to emit a long sequence of low, booming calls.<sup>15</sup> The legs and toes are black, and the long hind toe enables the black crowned-crane to grasp to perches.<sup>15</sup> The black crowned-crane has bare cheek patches that are white and reddish.<sup>14</sup> In the West African black crowned crane (*Balearica pavonina pavonina*) the lower half of the cheek patch is red, whereas in the Sudan black crowned crane (*Balearica pavonina ceciliae*) the red extends to the upper half of the cheek patch.<sup>16</sup> Though males and females may be generally indistinguishable, adult male black crowned-cranes are often larger than females, and juveniles differ by having grey to brown plumage with a brown crown and nape<sup>16</sup> (Figure 1).



Figure 1 West African black-crowned crane *Balearica pavonina pavonina*.

At a distance cranes appear as long-legged blackish birds with much white on the wings. At close range the conspicuous straw-coloured bristly crest, black crown, and bare pink and white cheeks readily identify the bird. In flight the neck and legs are held at an angle to the body. The white wings are conspicuous. Loud cry and nuptial dance also identify the bird.<sup>17</sup> According to Stopfords,<sup>7</sup> to the layman, at first glance, the large long-legged and long-necked cranes bear a degree of similarity to stocks and herons. Yet, cranes are not related to stocks and herons; there are considerable differences between the two regarding physical structure, vocalization, molting, reproductive cycle and many other characteristics. The body length of the adult bird ranges from 100cm to 105cm, and weighs between 3 and 4kg.<sup>16</sup> The plumage (feathers) is grey, brown or white. The head of the adult bird generally has bristle-cover and usually red-skinned spots, or lacks feather altogether.<sup>18</sup> The wings are long (usually between 180 and 200cm) and form a large air-fold. In flight, cranes strain the neck and head forward in contrast to herons that fly with their necks in an s-shape. The tail is short and slightly rounded. The beak is straight, short and sturdy.

### Distribution

Cranes inhabit all parts of the world with the exception of South America, the Malayan Islands, Polynesia, New Zealand and the Antarctic.<sup>6</sup> Cranes have been raised in the northern tropics of West Africa. The grey subspecies group, the Southern Crown Crane (*Balearica pavonina regulorum*) and the Eastern Crown Crane (*Balearica pavonina gibberifrons*) have been raised successfully in South and South-East Africa respectively. In Nigeria, cranes are found in Kano, Niger, Borno and Jigawa States. These states constitute part of the Sudano-Sahelian region of Nigeria<sup>19</sup> (Figure 2).

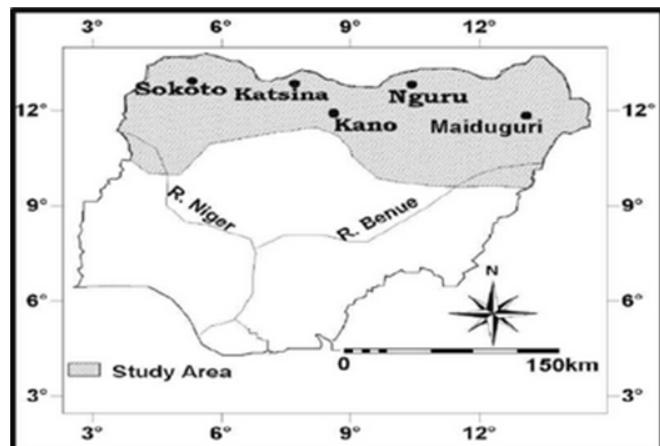


Figure 2 Map of Nigeria showing Sudano-Sahelian region.

### Black crowned-crane habitat and breeding sites

The preferred habitats of the black crowned-crane are freshwater marshes, wet grasslands and the edges of lakes, ponds and rivers.<sup>20,21</sup> They also forage in rice fields and wet cropland, or on dry land close to wetlands.<sup>20,22</sup> However, the species can be found in areas with water up to 1metre in depth and knee-high to hip-high vegetation dominated by *Cyperus*, *Eleocharis*, *Scirpus*, *Setaria*, and *Cynodon* species as well as leguminous and rosaceous plants.<sup>9</sup> Cranes remain near wetlands, but are deeply associated with deep, open water.<sup>16</sup> Cranes sometimes prefer to forage on dry ground short grass. In Northern Nigeria and other West African nations, cranes will sometimes forage and nest in upland areas, rice fields and wet crop fields as well as wastelands.<sup>16</sup>

In Hadejia Nguru Wetlands and around the Lake Chad-Basin, large trees, but sometimes smaller ones or shallow water are used as roosting sites. During the non-breeding season, cranes congregate in larger but permanent wetland, and forages near herds of livestock, or even in waste dumps.

### Feeding habits

All cranes are omnivorous. Principal foods of the Black Crowned Crane include tips of grasses, seeds, insects, and other invertebrates, and small vertebrates. In the wild, crane feed on grasshoppers, locusts, flies, millipedes, crabs, amphibians and reptiles as reported by Crick H.<sup>16,18</sup> They tend to forage in upland areas frequently near herds of domestic livestock where invertebrates occur in greater abundance. They hunt by stamping their feet on the ground, startling and disturbing their prey, so that they become easy prey. Seeds from agricultural crops are a most important food source. Grasshoppers, molluscs, millipedes and crustaceans constitute part of the invertebrates cranes feed on. They also feed on vertebrates like fish, amphibians and reptiles.<sup>20</sup> Unlike Grey Crowned Cranes, farmers do not seem to consider Black Crowned Cranes as agricultural pests. It also consumes grass seeds and sometimes grain, and may do some crop damage through its feeding habits.<sup>20</sup> Cranes diet in captivity may include crane pellets, vegetables and fruits, though invertebrates may be occasionally provided as protein supplement.

### Reproduction, life span and predators

The nest of the black crowned-crane is usually a haphazard pile of nearby vegetation.<sup>14</sup> The nests consist of a circular, but loosely constructed platform of reeds and grasses placed in short grass marsh in several centimetres of water, or occasionally on dry land. Except for the crowned-crane which builds its nests occasionally on low trees,<sup>23</sup> all other cranes breed on the ground.<sup>17</sup> The nesting period generally extends from July to September<sup>6</sup> and sometimes October,<sup>16</sup> when clutches of two to five long oval-shaped eggs are laid. Ero and Stopfords<sup>5</sup> further highlighted that eggs are laid at intervals of forty-eight hours with an incubation period of 28 to 31 days. According to Ero and Stopfords,<sup>5</sup> the eggs of the crown-crane are bluish-white with a dull white lime patina and no design. The nest is prepared by the male and female while nesting territory is jealously guarded closely by the parents. Both the male and female chase away any other birds that dare enter their breeding territory.<sup>13</sup> Shortly after hatching the chicks forage with the parents, and fledge after 60 to 100 days.<sup>16</sup> The black crowned-crane does not apparently breed until four years of age and they bird molts once a year. Though there is no available record of the species' life span in the wild, in captivity, the bird can live up to 25-40 years. The eggs and chicks of the bird are highly susceptible to predators like snakes, carnivorous birds and fox. Adult cranes are not as susceptible to predators because of their large size, aggression ability to fly.

### Black crowned-crane threats

Prohibited capturing and trade for the pet is the major threat to Black Crowned Cranes. Over the years in West Africa there is this primordial tradition of Africans keeping domesticated Black Crowned Cranes as pet and this is also responsible for accelerated decline in the subspecies due to international trade in the sub region.<sup>21</sup> Apart from that, habitat destruction and degradation<sup>24,25</sup> also accounted for their rapid decrease in population. In the last ten years in Africa, wetlands and grasslands that are usually considered as home range for cranes have been distraught by drought,<sup>24</sup> the advancement and rapid growth

of monocropping, construction of large scale dam, drainage and irrigation projects.<sup>26</sup> Rapidly growing human population coupled with drought has stimulated the populace to encroach into habitat<sup>27</sup> that are conducive for survival of crane, leading to draining of wetland to stimulate large scale farming, coupled with application of pesticides to boost food production for the teeming population thereby resulting to bioaccumulation of toxin in cranes in addition to decrease in the amount of prey available to them.<sup>28</sup> While, the threat of habitat loss which is complicated by hunting<sup>29</sup> are basically responsible for total or near extirpation of this species in West Africa, a small population of black crowned-crane still remain in Nigeria. Walkinshaw<sup>14</sup> reported locals capture black crowned-crane chicks, eggs taken and young rise in captivity and the trapped birds are sold illegally.<sup>10</sup> This is mainly a serious threat in developing countries where there are more domesticated black crowned-crane than wild population for instance in Mali black crowned-crane in captivity are more in number compared to free living cranes in the wild. In Chad, Nigeria and other countries, this bird is considered as very rich delicacy therefore they are also captured for food.<sup>30</sup>

### Breeding requirements

Williams<sup>20</sup> black crowned-crane working group was established in 1992, which propelled the first ever range-wide surveys of the species being undertaken in 2000-2002. However this was coordinated in collaboration with 20 African nations. Though a number of black crowned-crane are still kept in confinement globally, unfortunately these avian species falls into the category of bird species that are moderately difficult to keep in captivity due to unpredictable breeding proceedings. Officially one experimental release took place in Nigeria in 1992<sup>13</sup> at the end of the discussion of the potential for reintroduction programmes initiatives leading to the suspension of captive breeding on the said species. Since then no documented release has been recorded. However, captive breeding may include requirements for capture techniques, habitat manipulation and domestication of the said species to promote conservation of cranes for generations yet unborn.

### Capture techniques and habitat manipulation for ranching

Drop nets are usually used to capture the bird alive from the wild. The net length should range between 25m to 50m, and height between 3m and 5m. The trapping net ought to be hung using weak twines. This breaks when the bird hits the net ensuring that the bird is successfully ensnared in loose netting.<sup>21</sup> The habitat manipulated is very essential to stimulate reproduction and breeding of the species, Prospective breeder should be mindful of the size of land required since crane is a ranger. However, a minimum 50km<sup>2</sup> of land is required for its ranching because it has affinity for open landscapes, and their habitat should be erected within widespread marshes.<sup>8</sup> For instance, along drainage systems, low moors, rifts, bogs and landfills along the shores of lakes and ponds). Shrubs or short trees should be incorporated into the planned ranch to provide shade, shelter and perform reproductive purposes for the said species. The prospective ranch should contain sufficient grasses, serges and herbs to attract insects which are considered to be good source of food for crane. The trees species such as *Combretum micranthum*, *Capparis carymbosa*, *Guiera senegalensis*, *Acacia ataxacantha* and *Calotropis procera* are highly essential and should be planted.<sup>31</sup> The ranch should also contain the following grasses like *Aristida stipoides*, *Chloris sp*, and other grass species of the area. Partially constructed huts should be incorporated to serve as artificial shade and at least seven birds should

be introduced, which comprises of minimum of two males and five females per hectare (10,000m<sup>2</sup>) of the farmland. Fencing is highly recommended using wire gauze to restrict animals' free movement out of the boundaries of the ranch.

### Requirements and facilities for domestication

Chick rearing facilities:

1. Hand rearing facilities service room: the service room for the chick-rearing facilities should be an insulated and heated room

### Conclusion and recommendations

It is imperative for well meaning Nigerians, the government and non-governmental organizations of environmental concern to initiate this project. Although, the project may be demanding financially due to high cost of materials for habitat construction this may definitely discourage an average Nigerian. Therefore, it is basically a government's project and also a project for conservationists and non-governmental organizations mainly to conserve crane for generations yet unborn. The basic steps involve are as follows: establishment of a coordinating unit to promote research and conservation projects on Black Crowned Crane in Nigeria. This may be achieved by integrating some Non-governmental organizations such as the Royal Society for the Protection of Birds, the Nigerian Conservation Foundation and Bird Life International into the project to work with Nigerian government at the national level. A National Management Plan Project for the Black Crowned Crane can also be drawn by the Federal Government of Nigeria through the Federal Ministry of Environment with the following objectives.

1. To set up a central survey center that is saddle with coordinating and contact cooperating individuals and institutions within a given locality.
2. To established the conservation status through a sub-region-wide survey
3. To develop and attract fund for the implementation management plan for the subspecies.

Priority Conservation Measures for the West Africa black-crowned crane therefore, should include the following:

### Legal and cultural protection

There is need for formulation of new laws and review of already existing laws towards wetland protection at the state and national level throughout the species range in Nigeria. This is essential to reduce the rate of over-exploitation of wetland and also prevent indiscriminate use of pesticides and other harmful agricultural practices with the main habitat of crane to reduce habitat encroachment.

Enforcement of already existing laws prohibiting hunting and live-trapping of cranes and safeguarding cranes within protected areas should be strengthened with severe penalty.

### Protected areas

- a. Existing protected areas that are essential for Black Crowned Cranes should be strengthen through proper funding, equipment, staffing, and training to promote effective functioning of the areas.
- b. An assessment should be carried out to know where large population of Black Crowned Cranes concentrate, core and

buffer zone should be identified and mapped to promote conservation. Apart from that, breeding area should be designated to enhance their breeding performance.

### Habitat protection and management

- a. National-level inventories of wetlands, as well as all sites capable of sustaining cranes should be carried out.
- b. Integrated land management and development should be incorporated in conservation programs.
- c. High conservation value assessments for all large-scale development schemes affecting Black Crowned Crane habitat.

### Community conservation programs

Community conservation projects are usually considered to be the fundament way of ensuring the long-term survival of the Black-Crowned Crane and other wetland species in the species' range through local communities, non-governmental and government partnership. This will enable the local communities to see Black-Crowned Crane as the property of the state and protecting them attracts benefits.

### Education and training

Development of comprehensive conservation education and awareness creation programs with keen emphasis on Black Crowned Cranes and their wetland habitats. These should be focus at the general public and communities that depends completely on wetlands.

### Captive propagation and reintroduction

Captive breeding and management of Black-Crowned Crane should be initiated to promote sustainable development. Training and retraining of expertise in crane breeding in captivity and reintroduction techniques should be encouraged.

### Monitoring

Continuous monitoring should be encouraged to be able to establish the actual wild population, distribution and size of the said species. Apart from that it also enable us to know the habitat utilization and foraging behaviors to stimulate proper breeding in captivity.

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None.

### Conflict of interest

The author declares no conflict of interest.

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