Mascot of Wetland: Cranes

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The Cranes are among the most ancient and distinctive families of bird on earth. At present there are approximately 15 species of Cranes whereas the fossil record includes at least 17 extinct species. No Crane's species has been extinct within record history since 1600. For thousands of years the Hindu people of India have revered Cranes. The length positioning of the trachea are critical features of Cranes anatomy and shape the distinctive voices of the various species. All species of Crane dance. Wary residents of wetlands and grasslands, Cranes have also long symbolised natural grandeur and the special quality of wild places. Like many other species of wild life, Cranes have also been subjected to pressure of human population growth and development. The population is declined for various species of Crane have been attributed mainly to loss of habitats and persecution by humans. Under the new categories eleven of the fifteen species are likely to be listed as Threatened (which includes the categories Critically Endangered, Endangered and Vulnerable) by the International Union Conservation of Nature and Natural resources (IUCN). A number of captive breeding centres are being established in various countries for the endangered Cranes.

Keywords: Cranes, trachea, Wetland, International Union Conservation of Nature and Natural resources (IUCN).

1. INTRODUCTION

For centuries, Cranes have evoked strong emotional response in people. Their size, behaviour, social relations, unique calls, graceful movements and stately appearance have inspired expression through human art, artifacts, mythology and cultures around the world [1]. The world's tallest flying bird the Indian Sarus (*Grus antigone*) is the member of the crane family.

The Cranes are probably evolved when most of the sub-continent was covered with marshes. Krajewski (1988) however believes that Cranes originated in Europe near the end of the Paleocene Epoch [2]. The fossil record includes at least 17 extinct species, many of which were closely related to African Crowned Cranes [3]. Cranes live on all continents except Antartica and South America [4]. The Crane family *Gruidae*, includes fifteen species of long-legged, long-necked birds found in marshland area of all continents except South America. The Crane family (*Gruidae*) is divided into two subfamily, Crowned Cranes (*Balearicinae*) and the Typical Cranes (*Gruinae*). The two species of African Crowned Cranes are placed in the subfamily *Balearicinae*. The subfamily *Gruinae* is divided into three genera: *Bugeranus, Anthropoides*, and *Grus* and it include 13 species. The five species of the subfamily *Gruinea* found in India are Siberian Crane (*Grus leucogeranus*), Demoiselle Crane (*Grus virgo*), Black-necked-

Crane (*Grus nigricollis*), Common Crane (*Grus grus*) and Sarus Crane (*Grus antigone*) [5]. The keeping of Cranes in capitivity, either as pets or as animals to be fattened for the pot, is evidently a very old practice. According to Ali (1927), a diary of the Mughal Emperor Jahanger (1605-1627) mentions the breeding of Sarus Crane in captivity [6]. One remarkable longevity record of captive Crane is a wild trapped Siberian Crane which survived 82 years in captivity, evidenced the longest known life-span of any bird [7]. Like many other species of wildlife, Cranes have also been subjected to the pressures of human population growth and development. Sarus Crane is a State Bird of Uttar Pràdesh as shown in Figure 1 and probably 60% of the global population of this species is found in this state.

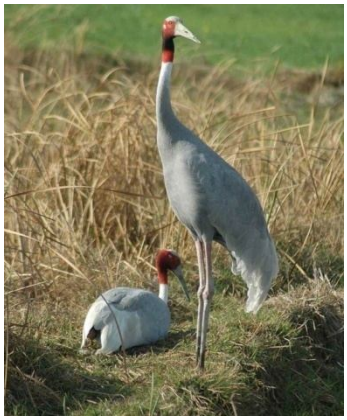

Fig. 1: Sarus Cranes (*Grus antigone*) (world tallest bird) state bird of Utter Pradesh.

It has suffered a rapid population decline, which is projected to continue; as a result of widespread reduction in the extent and quality of its wetland habitats, exploitation and the effects of pollutants. Black-necked is the state bird Jammu and Kashmir as shown in Figure 2.

Fig. 2: Black-necked Crane (*Grus nigricollis*) state bird of J & K.

2. CLASSIFICATION OF CRANES

Kingdom	-	Animalia
Phylum	-	Chordata
Class	-	Aves
Order	-	Gruiformes
Family	-	Gruidae
Genus Species	-	Approximately 15 species

3. DISTRIBUTION OF CRANES

Cranes are found in five continents. There is no evidence that Cranes ever inhabitated Antarctica and South America. The current concentration of Crane species in Asia and Africa suggests an old World origin of *Gruinae* with a more recent colonization of Australia and North America. Most fossil species however, have been found in North America, reflecting both the proportionately greater amount of paleorinthological work in North America and the possible origins of cranes in the west.

Asia is the centre of Crane diversity with eight breeding species. Two of these the Demoiselle and Common Cranes also extend into Europe as breeding species. There is also a small isolated breeding population of the Demoiselle Crane in north-eastern Africa. Australia has two breeding species, one of which, the Sarus Crane is shared with Asia [8]. North America is inhabited by two breeding species, the Whooping and Sandhill Cranes. The breeding range of the Sandhill Cranes extends into northeastern Siberia and therefore it could be considered as the ninth Asian breeding species. Sub-Saharan Africa supports four breeding species, the Black Crowned, Grey Crowned, Blue and Wattled Cranes. In adition, Demoiselle and Common Cranes are non breeding migrants to northeastern sub-Saharan Africa as shown in Figure 3.

(a) **(b)**

Fig. 3: (a) Demoiselle Cranes (*Grus vigro*), **(b)** Common Cranes (*Grus grus*).

The Indian subcontinent support five species of Cranes, three being migratory and two being resident. Of these, India receives the Siberian Crane as shown in Figure 4,

Demoisille Crane and the Common Crane as migratory species. The Indian Sarus Crane is a resident of India as the name indicates and the Black-necked Crane breeds in Laddakh.

Fig. 4: Siberian Crane (*Grus leucogeranus*).

4. HABIT OF CRANES

Cranes are basically diurnal in their habits. During the day they forage, rest and preen, attend to their young (during the breeding season), and socialize within flocks (in the non-breeding season). At the night during the breeding season, most crane stay on or near their nests, brooding their chicks and standing guard against predators and other source of disturbance. In the non breeding season they roost at night in more or less flocks at traditional roosting sites. Crowned Cranes roost in trees, whereas the other species usually roost in shallow water, but occasionally use dry ground, mudflats and sandbars. Cranes rest on one leg during the night, with the head and neck tucked on or under a shoulder. Though during the course of a night they may switch from one leg to the other several time.

Cranes are opportunistic feeders they change their diet according to the season and their own nutrient requirements. Cranes are omnivorus and some species rely heavily on aquatic foods [9]. Sandhill Cranes feed primarily on small grains (corns, wheat, barley and sorghum) in fall, winter, and spring, but during the nesting season (when they associate more with wetlands), the greater part of the diet consists of cray fish, plant tubers, chufa, rodents, frogs, berries, birds eggs and nestling. Summer foods of the Whooping Crane include frogs, minnows, berries and large nymphal and larval forms of insects.

Cranes have a wide variety of vocal and visual displays. Cranes calls includes low, purr-like Contact Calls, slightly louder Pre-flight Calls, purr-like or shrill Pre-copulatory Calls, groan-like or scream-like Distress Calls, scream-like plaintive Location Calls, abrupt Alarm Calls and loud Flight Calls and Guard Calls. Crane calls also include loud, complex dutes called Unison Calls which have both sexual and threat functions. Other social displays includes rigid threat posturing rigid Strutting, Ritualized preening of the back or thigh, feather ruffling, Stampling, Flapping, tail fluttering, Crouching, Growling, and Hissing. Behavioural studies of Cranes have revealed some 90 or more specific

behavioural patterns within these categories. One of all forms of behaviour exhibited by Cranes, none is as spectaular as their elobrate and enthusiastic dancing. All species of Crane dance. Dance is an activity involving most agonistic displays, all elements of attack and some unique action patterns. The pattern and intensity of dancing vary somewhat among the crane species, but the dances of all cranes consists of long, intricate sequences of co-ordinate bows, leap, runs and short flights. Dancing trends to be most energetic in the smaller species, such as Demoisells and the two Crowned Cranes. In the *Grus* Cranes dancing is slightly more deliberate, and is punctuated frequently with high flapping leaps.

5. CRANES ARE MONOGAMOUS

Maited birds stay together throughout the year and generally remain paired until one bird dies. Sandhill Cranes, whose breeding biology has been most extensively studied, it has been shown that pairs that are unsuccessful in their first attempts to breed often dissolve, while successful pairs remain together In terms of their movements, Cranes can be divided in two groups, migratory and non migratory. Many species (Demoiselle, Siberian, White-naped, Eurasian, Hooded, Black-necked, Red-crowned, Whooping and three migratory subspecies of Sandhill Cranes) migrate hundreds, or even thousands, of kilometer between breeding and wintering grounds. Excepts for Wattled Cranes which remain on nesting territories throughout the years. All Cranes become more gregarious during the non-breeding period and move to regions where food is abundant. Migratory cranes spend several days or weeks at premigration staging areas building up their fat reserves and integrating in to life as a flock. Whooping Crane have been shown to migrate as much as 800 kilometer in a single day, although 300 km is more typical. A review of Sandhill Crane migration data showed average flight lengths of 267km/day, with individual flight of up to 740km.

6. HABITAT OF CRANES

Cranes inhibit open landscape and primarily live in marshy areas, low moors, rifts, bogs and the landfills along the shores of lakes and ponds. Some species are encountered in the steppes too. Most species nest in shallow wetlends, where the Cranes meet both their feeding and nest-building needs. The degree to which Cranes use and require wetlands varies widely among and within species. The wetland and the fields of food grains are the most favoured habitates of the Crane. All Cranes are known to breed on the ground, specifically the wet ground, with an exception of the Crowned Cranes which occasionally breed on low trees. In the parts of Kazakhstan and Ukraine, the Demoiselle Crane has been able to continue breeding in steppes that have been converted to agriculture as long as farming operations are timed so as to minimize disturbance. The *Anthropoides* species usually nest, and almost invariably feed on expanse of open grassland, but they tend to roost in wetland. Crowend Cranes are the only Cranes which roost in trees. The black-necked Crane is the only high altitude Crane among the 15 species in the world. The high altitude marshes and the lakes of the Qinghai-Tibetan Plateau (Tibet, Qinghai, Xinjang, Gansu, Sinchuan; China and eastern Laddakh; India) are known breeding ground of Black-necked Crane [10].

7. MORPHOLOGY AND UNIQUE CHARCTERSTIC

The body of the Cranes are streamlined, with long necked and legs, powerful straight sharp bill and rounded wings. Cranes are among the world's tallest birds, ranging in length from 90 to more than 150 cm. The Indian Sarus Crane is the world's tallest flying bird which can stand as high as 176 cm. The shortest is the Demoiselle Crane (90-100 cm). The Red-crowned Crane is the heaviest crane, weighing up to 12 kg and the lightest is the Demoiselle crane (1.8 to 3.1kg). Male and female Cranes of all species are identical in their external features, although males are usually larger than females. The sex can be identify from the unison call of adult Crane pairs. Crowned Cranes have a long, prenhensile hallux, or hind toe that allows them to roost in trees. All the other Cranes legs display adaptation to more aquatic conditions: long bare legs, broader feet, toes short and unwebbed, and hind toe raised (contra-strokes). The Siberian Crane, the most aquatic of all Cranes, has the longs bill and toes, adaptations for probing and walking in mud.

The varied features on the heads of the fifteen species are distinctive and diagnostic. Crowned Cranes have elobrate tawny crests, bare cheeks and a gular, Wattle, Demoiselle and Blue Cranes have completely feathered heads, Wattled and Siberian Crane face and forecrown is red, the Brolga and Sarus Crane also have red skin, while in the Sarus Crane it covers the sides and back of the head and continues several centimeters down the neck. Once unique feature of Crans is their lengthened wind pipe by coiling within the breast bone. The length and position of the trachea are critical features of the Crane, and shape the distinctive voices of the various Cranes [11]. In the two Crowned Crane the trachea is shorter and only slightly impressed upon the bone of the sternum. The trachea of *Grunae* Cranes coils within, and fuses with, the sternum to varying degree in each species. Tracheal development is greatest in the Whooping Crane species group, and the pitch of the calls in these species is higher than in most other Cranes. If the trachea of a Whooping Crane is straightened out it would measure 1.5m (5ft) in length. The trachea and sternum amplify the calls produced in the larynx. The thin plates created by the fusion of bony rings of trachea and sternum, amplifies the Crane's calls, which can carry several kilometers.

The plumage of the Cranes varies from white to various shades of grey with red bare skin or elaborate plumage on head. Juvenile Cranes are either predominantly reddish brown (Crowned Siberian, White-naped, Sandhill, Red-crowned and Whooping Cranes) or gray (Demoiselle, Blue, Wattled, Sarus, Eurasian, Hooded and Black-necked Cranes and Brolgas).

Cranes nostril is covered by a membrane on the posterior side and placed above half way of the mandible. Cranes have 10 functional feather, and in most species a vestigial eleventh and 18-25 secondaries. The inner secondaries of many species are elongated, and when the wings are folded produce the impression of a prominent "tail" or "bustle". Their tail is short with twelve feathers. Cranes fly with their necks extended forward. During flight the legs are usually stretched straight beyond the short, stubby tail but in cold weather flying cranes sometimes pull their legs in against their bodies.

Cranes almost invariably lay two eggs. The exceptions are the Crowned Cranes, which regularly lay three and sometimes four eggs and the Wattled Crane, which usually lays

only one. Eggs are ovule-pointed and in most species are highly pigmented. The species that inhibit tropical and subtropical areas lay either bluish eggs, as in the case of Crowned Cranes, or white eggs, as in the case of Sarus and Brolga. In contrast, those inhabiting the coldest regions, the Siberian, Blacked-necked and Lesser Sandhill Cranes, produce darker eggs.

8. SIGNIFICANCE

Cranes require large territories and are among the most prominent inhabitants of wetlands, they have served as important symbols for wetland protection and conservation activities undertaken on their behalf have benefitted a wide range of other plants and animal species. Wallted Cranes are a flagship species for conserving wetland biodiversity and subsistence production system that also depend on naturally functioning wetlands. Consequently the decline in Wattled Cranes throughout the region over the past decades has implications for the status of Wetland and biodiversity, as well as for human welfare in southern Africa. Cranes are waterbirds, they influence the wetland development and community structure in different ways. The first major ways that cranes affect wetlands as users. Sandhill Cranes eat sedge tubers in meadows during migration and breeding. Sarus Cranes are omnivorous and have been recorded eating seeds, grains and small fruit of various kinds, vegetable matter including shoots of grasses, the roots of aquatic plants and the pods of ground nuts, amphibians (mainly frogs), reptiles (mainly lizards, but also water snakes), insect and molluscs. In all cases, their flock size and density at feeding sites suggest that they must have measurable consequences on the density and distribution of plant propagules and on the removal of major biomass from wetland.

Cranes deepen the basin of wetland by diging out tubers. Less direct but perhaps more widespread influence of waterbirds on wetland occurs through nutrients added to the water column from defecation and sometimes from carcasses of flocking birds in breeding colonies and roosting sites [12].

9. HABITAT LOSS AND CRANE ENDANGERMENT

The reason for the decline of Cranes all over the world are multiple, but the destruction of habitat is the most serious cause. Declines in habitat availability and quantity affect the distribution movement and breeding success of Cranes and involve all habitat types-breeding grounds migration stopover points and staging areas wintering grounds, resident habitat and roosting areas. In particular, the drainage and conversion of wetlands to agriculture and other human uses has deprived the birds of extensive positions of their ancestral habitat. Because of the loss of wetland habitats in many parts of the world, Cranes that are more heavily depended on wetland areas tend to be the most endangered. These include the Siberian Crane and the Whooping Crane. Crane species that use grassland habitats more frequently, especially those that have learned to hunt for food in agricultural fields, have tended to thrive. These include the Demosiselle, Sandhill and Eurasian Cranes.

10. CONSERVATION STATUS

The Cranes are among the most severely threatened of the all bird families. Under the new categories eleven of the fifteen species are likely to be listed as threatened (which includes the categories Critically Endangered, Endangered and Vulnerable) by the International Union for Conservation of Nature and Natural resource (IUCN). The Whooping Crane is listed as critically endangered with between 70–400 mature individuals, but conservation status of the species is improving with not only increase in natural wild population but also establishment of two reintroduced flocks that may become self-sustaining [13]. The Red–Crowned Crane with about 1700 birds is the second rarest Crane in the world, after the Whooping Crane, although the population in Japan is stable, the main land Asian population continues to decline [14]. The Siberian Crane is the third rarest species after the Whooping and Red–Crowned Cranes. The total population is estimated 3,500-4,000 (mature individuals) and declining [15]. Of the fifteen species of Cranes only Sandhill Crane (*Grus canadensis*) [16], Brolga (*Grus rubicunda*) [17], Demoiselle Crane (*Anthropoides virgo*) [18] and Common Crane (*Grus grus*) [19] are not listed as vulnerable, endangered or critically endangered.

11. STATUS IN UTTAR PRADESH

Sarus Crane (*Grus antigone*) is the state bird of Uttar Pradesh. It also has the distinction of being tallest flying bird of the world. The standing height of an adult male bird is approximately 156cm. It is the only Crane species that breeds south of the Himalayas and is the only resident crane of India. Sarus plays a very important role in maintaining ecological balance. They are very important indicator species, indicating at a given point of time the health of wetland on which their very existence depends.

Sarus Crane is distributed in plains of India, Pakistan, Bangladesh, Myanmar, Nepal. On the basis of early reports it seems likely that 150 years ago the Indian population of this species was in the order of hundreds of thousands of birds. A survey in the 1980s, however, suggested that only 10,000-12,000 survived [20]. Further declines took place during the 1990s leading to a sense of unease about the status of the species in India. Although its range contracted markebly during the course of twentieth century, particularly at the eastern and southern fringes it remains widely distributed in northern India, occuring in parts of Jammu and Kashmir, Himanchal Pradesh, Maharashtra, Bihar, West Bengal, Meghalaya and Manipur, but principally in Rajasthan, Uttar Pradesh, Gujrat and Madhya Pradesh [21]. Slowly and gradually its number has declined considerably and it has become threatened species. Of the estimated 8000 to 10000 birds in the Indian subcontinent, 2500 to 3000 are found in Utter Pradesh. The maximum number is encountered in the district Mainpuri, Etawah, Etah, Aligarh, Philibhit, Lakhimpur-Kheri and Bahraich. Presence of the bird is also reported from Bundelkhand of Utter Pradesh.

Sarus Cranes pair of life and considered as a symbol of loyalty and fidelity. This could be the reason why people have attributed religious and cultural values to them and have traditionally protected them. Many farmers consider the presence of Sarus Cranes in their fields as auspicious and a sign of well being. The locals have attributed several religious qualities to the bird due to their habit of pairing for life-when one bird dies the other is known to die in grief.

Sarus inhabit open, cultivated, well-watered plains, marshalands, jheels and are well known for their ability to live in association with human habitation. The primary threat to the Sarus Crane is the conversion of wetlands to agricultural use, a factor that reduces the number and extent of sites suitable for feeding and breeding. During the 1999 Sarus Crane census throughout India, the major threat listed by participants was the spread of agriculture to the shores of wetlands. Deaths due to collisions/electrocution with supply wires and power lines are known [22]. Destruction of Sarus nests by dogs and small carnivores stealing of eggs [23], occasional hunting, decline in wetland habitats and conversion of wetlands into other land use practices appears to be the major threats of Sarus Cranes in Utter Pradesh.

12. SOME ACTIVE GROUPS FOR CRANE CONSERVATION IN INDIA

12.1. Indian Crane and Wetland Working Group

The Indian Crane and Wetland Working Group (ICWWG) was started in December 2002 as an independent project of the Wildlife Protection Society of India, Delhi and supported by the International Crane Foundation. ICWWG work to improve understanding, cooperation and conservation of Cranes, wetlands and the various aspects that surround the wetlands, to ensure their long–term conservation.

12.2. Marwar Crane Foundation (MCF)

Kheechan is a village in the western Indian state of Rajasthan. Demoiselle Cranes are the winter migrant to the place. These birds reach their destination after long and arduos migration from Southern Europe, North Africa and parts of Russia. To feed the birds villagers have converted a small patch of the land at the edge of the village into Pakshi Chugga Ghar (bird feeding place). To protect the Cranes, the villagers formed the Marwar Crane Foundation (MCF). The MCF helps to protect the cranes and monitor tourist movement to see that they do not disturb the birds and their habitat.

12.3. Sarus Protection Society (U.P.)

The Uttar Pradesh government has set up the Sarus Protection Society for conservation and management of Sarus Crane, the state birds of Uttar Pradesh. As a part of implementation of the Sarus Conservation/Recovery Action Plan the Sarus Protection Society tends to engage an institution/Organization/NGO/NGI for developing and implementing a community involved field base Sarus Crane Conservation/Recovery related activities through education and awareness programs.

13. RECOMMENDATIONS

Literature revealed that the three out of five crane species found in India show decrease in population except Common Crane and Demoiselle Crane. The last time a pair of Siberian Cranes visited India in 2002. Sarus Crane and Black-necked Crane come under the category of Vulnerable. Following recommendations can be considered regarding the present status of Cranes-

1. Ecological studies should be strongly recommended for better understanding of the status and economic value of species as well as to provide justification Cranes in national legislation.

2. Some research recommendation include life history studies; taxonomic studies, genetic studies and population and habitat viability analysis.

3. Management recommendation should be focused on the need for periodic monitoring, habitat management and public awareness.

4. Threatened Crane species should be recommended for captive breeding programs.

5. Measures for preventing wetland loss which is the major source of their habitat.

6. To tackle the negative attitudes towards Crane through a variety of educational activities, items and projects aimed at audiences of different ages and in different strata of society.

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