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Sarus crane *Grus antigone* in U.P.-distribution, foraging sites, disturbance factors, threats and conservation measures

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ABSTRACT

One of an interesting behavior study in life of birds is their foraging behavior which is directly connected to the distribution and abundance of food resources in their habitat. To study the foraging behavior of Sarus Cranes we searched for papers, review, we focus on the behavioral patterns of foraging in sarus. Sarus cranes are generalists and opportunists, feeding on a remarkably wide variety of plant and animal foods. Sarus cranes mostly forage in shallow water (usually < 30 cm (1 ft) depth of water) or in fields, often seen probing in mud with their long bills. They are omnivorous, eating both plants and insects during breeding season, aquatic plants, fish (perhaps only in captivity), frogs, crustaceans and seeds. Infrequently preying larger vertebrate prey such as water snakes, in a few cases sarus crane feed on the eggs of birds and turtles also. Tubers, corms of aquatic plants, grass shoots as well as seeds and grains from cultivated crops such as groundnuts and cereal crops such as rice are the form of plants food, they intake. Sarus Crane forages in both wetlands and agricultural fields. Nowadays impact of human disturbances, cutting of trees, destruction of wetlands, food unavailability, industralisation, predators, poaching are crucial factors affecting the foraging behavior of Sarus cranes. To solve this problem, we need to re-construct wetlands develop community awareness and conduct various kinds of awareness programs.

Keywords: Foraging, wetlands, Sarus, industrialization.

INTRODUCTION

The Sarus crane is the tallest flying bird as categorized as" Vulnerable "species in the IUCN, Red List of Threatened Species. Sarus Crane scientific name *Grus antigone* is a large non-migratory crane. The name "SARUS" came from Sanskrit term "sarasa "which means (bird of Lake). They are one of the most prominent inhabitants of wetlands protection and conservation activities undertaken on their behalf thus benefiting a wide range of other of other plant and animal species. Hence it's given the title of "Icon of Wetlands."as reported by Kumar and Kanaujia (2014.)

The trumpet call of the crane has stirred admirers of the natural beauty. A majority of cranes are diminishing and the risks that they face are formable. Efforts are being made to conserve viable population of rare, endangered species, it pursue ecosystem management in reponse to local, regional and global threats to address problems associated with trade ,to re-introduce programs to anticipate and produce potential human/wildlife conflicts to develop sustainable alternatives to destruction pattern of resource use (Meine and Archibald 1996)

The Sarus is friendly to human beings and live close to them. Sarus is a social and omnivorous bird and they make congregation at a particular and pre-decided sites, preferably in wetland area and adjacent fields having adequate food and water source. Prakash *et al. (*2016a) reported many pairs and collected information about their courtship dance, mating, fertilization, nest construction, egg laying, rare occasions when a crane accidently dies; the behavior of its partner. Interestingly, authors found that the other partner stops feeding after the death of its mate ,starts crying in sorrow and ultimately dies .Thus, they are eternal symbol of unconditional love, devotion and good fortune with high degree of marital fidelity.

They are distributed in the plains of northern, northwestern and western India. In India, percentage of breeding Sarus crane is in Uttar Pradesh (Chaudhary et al 1999). The Sarus crane are most common and densely distributed in the Indian states of Uttar Pradesh, Rajasthan, Gujarat, Haryana and they are less common in Bihar and Madhya Pradesh (Gole 1989). Thus their preferred foraging sites are plains of Uttar Pradesh.

PREFERED FORAGING SITES

As reported by Jha and Mc kiley (2014) they stated, in the state' of Uttar Pradesh ISC population inhabited impounded water bodies (52%), in and around running water bodies (26%), agriculture fields (14%), and non-designated habitats (8%). The ISC were observed to select vegetative materials, food grains, insects, fish, snails, and others as food sources. from wetland areas . Insects (29%), fishes (25%), food grains (18%), snails (16%) and vegetation (9%) were reported to be preferred. The favorite food grains were paddy rice (48%) and wheat (23%) followed by maize (12%), mustard (6%), soybean (4%), and others (7%). The others category included chick pea, green pea and millet. From agricultural fields during their study which was conducted in 2010 across the entire state of UP. which lies between 23o 52'- 30o 24' N latitude and 77 o 5'- 84 o 38' E longitude.

Sarus cranes prefer shallow area and avoid deep reservoirs and other wetlands for habitation (Borad *et. al*., 2001), it prefers nesting in marshland and paddy rice (Sundar 2009) of water depth varying between 25 and 65 cm (Mukherjee *et al.,* 2000), population fluctuations across habitats by Sarus is extremely season dependent (Mukherjee 1999). According to study conducted by Kumar and Kanaujia (2017). The sighting of the population of sarus cranes in study area of Unnao around Lucknow region, it was documented that, the density of sarus crane in agriculture habitat greater than wetlands. The abundance of sarus crane in agriculture was less with compared to the wetlands habitat. It was also observed that, the density of sarus crane was more in agriculture habitat in comparison to the wetlands. The analysis of the data on various distance classes from the premeditated transects indicate that, the maximum number of individuals of sarus crane recorded within 40 to 50 m in wetlands habitat in the study area

Sarus Cranes has been studied at different sites in district Mainpuri *viz*, Markandeshwar, Bhamwat, Saman Bird Sanctuary and Krithua. Mainpuri lies about 135 km from Agra, Uttar Pradesh. Study on activity patterns of the Indian Sarus Crane was carried out at different sites in Mainpuri district from October 2011-February 2012 by Amita Sarkar , Archana Sharma

FORAGING BEHAVIOUR

Foraging is the process of searching food and exploiting food resources by the adult sarus cranes and feeding the same to their young ones Cranes feed more on animal proteins during the egg-production period and for rearing offspring and more on plant foods during the non-breeding periods. The daily food requirements of birds depend on time budget, activity level, assimilation efficiency and energy content of food (Kushlan 1978). Availability of prey may vary with season i.e. wet or dry, but this depends on the fluctuation in water level conditions (Kushlan 1976, 1986). Many wading birds nest when the prey is most abundant and available during the rains (Kushlan 1978). When many sarus cranes congregate in a particular place, competition increases between species and the chances of an individual getting food

reduces. Partitioning of foraging resources is generally thought to be the result of past competition among co-occurring species with similar life history strategies (Roughgarden 1976; Pacala and Roughgarden 1982a, b. An aggressively dominant species could exclude other aggressively subordinate species, forcing them into inferior habitats (Kent 1986). Depending on the availability of food, cranes feed for extended periods in the early morning. Then they move to loafing areas to drink, preen, and engage in social displays. If temperatures are unusually hot, cranes may escape the heat by spiraling skyward on rising thermals or seeking shade under trees. Later during the day they return to feeding areas for foraging before moving into the roost sites at night. Cranes swallow food items by bobbing the head, which can be used to determine what they are feeding on in agricultural fields. If cranes forage on seeds in newly sown fields, the birds bob the head regularly due to the equal distribution of the seeds. But if they forage on invertebrates they bob the head irregularly (Nowald 1994). In India and Vietnam, flocks of the non-migratory Sarus Cranes forage in rice fields, which largely have replaced natural wetlands (Sundar and Subramanya 2010; Sundar 2018), where they feed on aquatic plants such as tubers of sedges (like *Eleocharis* spp.), grains, invertebrates, and small vertebrates.

Fig 1 : Pair of Sarus foraging in wetlands

Fig 2: Pair of Sarus foraging in agricultural field

DISTURBANCES

Human activities on agricultural fields and wetlands can directly impact on foraging activities of sarus crane. Many studies have addressed the effects of human disturbance on its populations. Cayford (1993) argued that in studies of effects of human disturbance on bird behavior, disturbance should be controlled in an experimental manner. Experimental methods are usually the only way to elucidate causal relationships (Underwood 1997).Cayford (1993) also proposed that workers adopt an unambiguous definition of disturbance. In almost all studies, disturbance has been defined as that which causes the organisms, usually birds, to disperse from the site of disturbance (Burger 1994; Gill *et al.,*1996; Verhulst *et al.,* 2001), i.e. to leave that particular foraging site. Frequently, studies have tried to understand how disturbance by humans modifies the total foraging times or net intake rates of individuals (Urfi *et al.* 1996; Verhulst *et .al,* 2001) percentage of flock feeding (e.g. Burger 1991). The extension of foraging periods, movement away from disturbance agents and increased time spent by them at foraging sites. By experimentally disturbing it was possible to directly quantify the effect that the most frequently encountered human activities have on aspects of foraging behavior, namely movement, vigilance and foraging success. Disturbance can cause birds to spend energy flying away and to lose feeding time while relocating to different feeding areas, where the increased bird densities may intensify competition from interference and, if of sufficient duration, from prey depletion. Until now, there has been no method for establishing how frequently birds can be put to flight before their fitness is reduced.

Birds of prey (raptors) not only eat eggs or chicks of these birds but also disturb them on the frequent occasions when attacks fail. These birds are put to flight by raptors or disturbed by people may spend significant amounts of energy flying away and those that had been foraging when disturbed also lose feeding time while moving to alternative feeding areas (Quinn, 1997), where interference competition may be immediately intensified because of the increased density at which birds then forage. Most studies of disturbance and wading birds have focused on measuring the effect of disturbance on the observable behavior and sometimes the underlying physiology, of the birds and have not been able to measure its impact on a component of their fitness, the real measure of how disturbance (or any other change in the environment) affects birds (Goss-Custard *et. al.*, 2002; Goss-Custard, 2003). The threats to bird fitness can be exacerbated by disturbance arising from both natural and human sources.

THREATS

The leveling of wetlands for agriculture purposes, use of pesticides, excessive fish and water chestnut cultivation, excessive irrigation and annual fire in wetlands are the main threat factors which are responsible for the gradual decline of wetlands. Electricity wires and towers set up adjacent to agricultural fields are raising threat to sarus cranes. Most of the reasons are inter related with each other and collectively act as threats for its survival. The low rainfall in its habitat and foraging areas, is one of main reason, behind this change in crop pattern. Ingestion of pesticides in crop fields, hunting of adults and collection of eggs for trade, food and medicine adds to threats for this crane. Further high rate of human usage of wetlands results in a high rate of disturbance to them. Removal of eggs by farmers in crop fields or by children playing nearby nests or migrant labourers for food and sometimes egg collection during trips by forest officials may add to cause egg mortality. Thus, to cope up with these threats there is need for adopting conservation measures.

CONSERVATION MEASURES

Excessive use of pesticides and chemical fertilizers in fields next to the wetlands.) should be avoided. To prevent the over exploitation and promote sustainable use of wetlands for fish and water chestnut cultivation and irrigation purposes. The practice of soil digging from wetlands should be avoided. There are many dead Pisces, birds and reptiles found in wetlands so it should be necessary to test water quality of all wetlands. Regular water quality assessment should be done. Total ban on use of wetlands as a dustbin for dumping of polluted water and garbage of city. Regular monitoring for soil erosion or filling of wetlands. Fish seeds should be applied in the wetlands with prior consult of fisheries department. Regulated use of water for irrigation uses. Preventing the more drainage for agriculture and construction work.) Measure to prevent soil erosion and siltation.

Wetlands should be restored and recreated. In most wetland reserves, vegetation (e.g. *Paspalum distichum, Vetiveria zizanoides,* etc.) needs to be cleared periodically and moderate grazing should be encouraged. Some wetlands require digging or dredging in the dry season, and encroaching *Prosopis juliflora* annually removed. Efforts are needed to control hunting, by regular patrolling in wetland protected areas and intercepting illegal hunters, by monitoring and controlling the sale of water birds.

Various studies recommend conservational measures with the involvement of Government organization, Non-Government organizations and the local people. Co- ordination and understanding between various departments such as forest department (for surveying and monitoring of wetlands), fisheries department (to check the excessive fish cultivation), tourism department (preventing disturbance by tourists), agriculture department (avoiding use of harmful pesticides and drugs) and education department (for awareness among local people, students, villagers, and forest officials) will play an important role in wetlands conservation, and saving our state bird ,the Sarus crane.

CONCLUSION

The Sarus Cranes are wetlands birds. They play important role to maintain ecosystem. Therefore, their presence is the need for healthy environment. Their need to us is not just to maintain existence in the environment, a part of that they are regarded as “Icons of Wetlands “that’s why there is need to work for the conservation of sarus cranes in their natural habitat. They choose their habitat on the basis of good availability of water (as unpolluted), food, roosting, nesting and foraging sites. In these area anthropogenic activities should be restricted. But in present scenario

due to increasing anthropogenic activities and wood cutting, browsing, lopping, grazing, fishing, mining, presence of road etc. are the main factors that are affecting, the decline of sarus crane population. The other anthropogenic activities such as destruction of wetlands and industrialization cause the loss of nesting and foraging habitat sites. Fishing is also factor affecting the sarus habitat due to human interference or interaction increase and cause the habitat degradation of sarus crane survival in this area. So there is need to protect sarus in their natural habitat and aware the farmers about their importance and develop new methods for its conservation.

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