



# Sarus Crane Breeding Success in Uttar Pradesh

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**A**t nearly six feet, the Sarus crane is the tallest flying bird in the world. It nests in wetlands, is strongly territorial, is a slow breeder – raising one or two chicks each year if successful, and is therefore susceptible to rapid population declines. It is suspected that attrition of natural wetlands following intensifying cultivation has forced this species into suboptimal conditions and reduced its breeding success. Though primarily a wetland species, Sarus cranes have been increasingly seen to nest in flooded rice paddies, a crop field that closely resembles wetlands. Farming poses a wide array of threats to breeding birds including mortality from trampling and machinery, reduced prey availability, and increased risk of predation of young birds exposed after the harvest. There have been few comparative studies in natural

wetlands and in agricultural landscapes to ascertain how Sarus cranes are faring under current scenarios of altered land use. I carried out a study to estimate how many nests had at least one egg hatching, and how many hatched broods survived until the subsequent breeding season, and to assess what factors affect these parameters the most.

In India, the globally-threatened Sarus crane lives primarily in agricultural landscapes, especially landscapes with flooded rice paddies. The landscape in the districts of Etawah and Mainpuri in south-western Uttar Pradesh is a mosaic of agricultural croplands (with monsoonal rice and winter wheat) and wetlands that are flooded by seasonal monsoon rains and/or by leakages in irrigation canals. The area has the largest known Sarus crane population

in the world, with populations appearing to be at least stable for the last 150 years despite the change in land use and growth in human populations. Farmers here revere Sarus cranes for their long pair-bonds, and causing willful harm to cranes is tantamount to a crime. Sarus crane pairs here are unique in maintaining year-round territories, which they actively defend against neighbouring pairs. Eggs are laid and chicks are raised inside these territories, and chicks are driven out just before the subsequent breeding season. Both croplands and wetlands occur in territories to different extents, enabling an assessment of how breeding success is affected due to these two habitats. The cranes here use both croplands and wetlands to different extents, making this an ideal place to examine the effect of habitats on their breeding success.

Following the fates of Sarus crane nests at this site over two years revealed interesting patterns. Cranes nested preferentially in wetlands over rice paddies, but size of wetlands did not affect choice of nest sites. Nests were located as close as 3m and 20m to roads and villages respectively. Egg mortality was largely due to people (mostly children, and occasionally, farmers), but a relatively large number of eggs still hatched successfully. What is more, eggs in rice paddies were as likely to hatch as those in wetlands, and variables like height of vegetation or water depth at the nest site did not affect nest success. Proximity to roads, however, did limit nest success, supporting the observation that people were the most important cause of egg mortality. The lack of a habitat effect on nest success is unique to Sarus cranes in this area – it is not known for other birds that nest in agricultural fields, or even for Sarus cranes nesting in other landscapes. The success of nests in agricultural fields here is only possible due to farmers' tolerance for Sarus cranes nesting in rice paddies, despite the considerable crop damage wrought by the birds – nesting cranes use rice stalks to build their large nests.

In addition to following the fate of nests, I also followed the fate of Sarus crane broods for two years in this landscape. Most of the mortality

occurred when chicks were less than 2 weeks old, however, the reasons for this mortality could not be reliably determined. Broods that hatched later in the season had a lower probability of survival if territories were associated primarily with paddy, but not if territories had more natural wetlands. Broods that hatch later in the season are still unfledged when the crop is harvested, and this likely increases the chances of their being preyed upon in cropland. But when wetlands are present there is always some vegetation for chicks to hide in until they can begin to fly, and this can explain why brood survival improves in territories with more wetlands. The nature of these natural wetlands – whether they were perennial or seasonal – did not affect the likelihood of brood survival.

The presence of wetlands, then, did not necessarily affect the success of nests – nests fared equally well in rice paddies. The tolerant attitude of farmers was likely paramount in allowing this result. However, wetlands were very important to improve the likelihood of success of broods.

This study demonstrates that there are two vital ingredients required to improve the chances of Sarus cranes' nests and broods surviving in this landscape. The first, that farmers retain their current positive attitudes

towards cranes nesting in rice paddies. The second, that a patchwork of even very small wetlands is retained amid croplands.

It is also evident that landscapes outside strictly protected areas like national parks and wildlife sanctuaries can, in some instances, be of crucial importance for the conservation of certain species. It is unlikely that entire landscapes in densely populated Uttar Pradesh will ever become available for Sarus crane conservation, and the increase of cultivation at the cost of wetlands is imminent. Yet, some areas are still multifunctional, providing excellent crop produce while also allowing persistence of significant populations of otherwise-declining fauna like Sarus cranes. Conservation interventions in these situations must be carefully considered. Practices popular with conservation agencies, for example, cash compensation, must be avoided to ensure that existing attitudes are not eroded. Working with children and farmers to reduce unnecessary egg damage is already paying positive dividends, suggesting that simple but sustained site-specific efforts are adequate to reduce nest mortality. Attrition of wetlands continues, in part due to governmental policy that designates shallow, water-logged areas as a category of 'wastelands', and in part due to lack of formal initiatives at the village level to encourage their retention. Altering this ethos is critical to ensuring the long-term survival of species like Sarus cranes.

*Originally published as:*

Sundar, K.S.G. 2009. Are rice paddies sub-optimal breeding habitat for Sarus Cranes in Uttar Pradesh, India? *Condor* 111(4): 611-623.

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A Sarus Crane adds material to its nest from a wetland that borders a rice field



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