

Ravi Sankaran's ornithological contribution

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It is very difficult to write about a person who leaves this world at the prime of his career. We can only foresee his future contribution to science from the published work that he left behind, and what he would have done if he had had a full life. Ravi Sankaran's sudden death on 17 January 2009, at a young age of 46, has left a large vacuum in the Indian ornithological world. As a person who was associated with him since the start of his career in March 1985, and having spoken to him about his 'grand plan' for the Salim Ali Centre for Ornithology & Natural History (SACON), where he was the Director, on 16 January 2009, I feel privileged to write about Ravi's contribution to Indian ornithology.

Ravi joined the Bombay Natural History Society (BNHS) on 25 March 1985, and commenced working with me in the Endangered Species Project—I was in-charge of the fieldwork on the Great Indian Bustard *Ardeotis nigriceps* and florican (Otididae) species. On 1 April 1985 we went to Karera Bustard Sanctuary in Madhya Pradesh, where we had a field station, and after that we went for a one-month survey of the Bengal Florican *Houbaropsis bengalensis* in the Uttar Pradesh *terai* and the Assam valley. We saw our first Bengal Florican on 14 April 1985 in Kowaghati grassland of the Sathiana range, and he saw his first Lesser Florican *Syphotides indica*, with me, in July 1985, in Sailana Florican Sanctuary in Ratlam district. These two species 'hooked' him for the rest of his life. Although after joining SACON in 1992 he studied many other species, particularly in the Andaman & Nicobar Islands, his first 'love' was floricans. Whenever we would meet, we would talk of them.

From 1985 to 1990, we carried out extensive surveys in Rajasthan, Madhya Pradesh, Uttar Pradesh, Gujarat, and Maharashtra, in search of Great Indian Bustard and Lesser Florican. His name first appeared in our report *The Bengal Florican: Status and ecology, Annual Report 1986-87*, (Rahmani, A. R, Narayan, G., Sankaran, R. Rosalind, L. 1988). His first independent popular article was *Sitting by a desert waterhole* (Sankaran 1986), which was based on our field visit to Sudasari enclosure in the Desert National Park where we spent some wonderful days, watching bustards and other birds, sitting in a cramped 3x3 m hide.

Ravi was a keen observer, a good writer and a good photographer. Besides working for his PhD thesis on the Bengal Florican in Dudwa and Lesser Florican in Sailana, he was interested in all natural history subjects. He told me many interesting observations and the conservation problems of his study areas. As he was still doing fieldwork, we did not have sufficient data to write scientific papers, but I encouraged him to write popular articles. In 1987, he wrote three popular articles on bustard and floricans in *Sanctuary Asia*, *Frontline*, and *Hornbill*. Our first scientific publication, albeit a short note, was about an observation made in the Sam enclosure in the Desert National Park, when we saw a Large Grey Shrike *Lanius meridionalis* methodically removing ticks from a camel (Sankaran & Rahmani 1987). Our next short note was on the unusual nesting of the Purple Sunbird *Cinnyris*

asiatica (Rahmani & Sankaran 1990). Ravi was also co-author of a short note on the Black Drongo *Dicrurus macrocercus* eating a bird (D'Silva *et al.* 1990). This observation was made in Karera Bustard Sanctuary in 1988. Through these initial short notes, Ravi learnt the value of good observations, and publishing them in journals and magazines.

Under the Florican Project, we wrote many annual reports from 1987 to 1989, and the final report in 1990—but as these reports are grey literature, I will not mention them in detail (Please see Pittie 2009, for a list of Ravi's publications). The first major paper of this project, with Ravi as its first author, was published in *JBNHS* (Sankaran *et al.* 1992). That year we also published a status paper on the Bengal Florican (Rahmani *et al.* 1992). These two papers, and also his popular articles, laid the foundation for Ravi's ornithological work for the next 20 years. During the Florican Project, while Ravi, Goutam, and Lima did most of the fieldwork, I went through the published literature on these two rare birds, and pinpointed areas that required surveys. Through our joint efforts, we highlighted the deteriorating status of these birds, and also suggested conservation initiatives that were required to protect them. To gather data on the status of the Lesser Florican, Ravi conducted extensive surveys in western Madhya Pradesh, eastern Rajasthan, and Gujarat, visiting *vidis* or *bheeds*, as the grasslands are called in the local language, interacting with local people, and officials. We were helped by the earlier survey work of Paul Goriup and Z. J. Karpowicz (1985). However, Ravi found many more *bheeds* in Madhya Pradesh and Rajasthan where the Lesser Florican is found in the monsoon. He also established *Florican Watch*, involving local people. Despite his extremely busy fieldwork schedule, and distance (by 1992 Ravi had shifted to Coimbatore), Ravi made it a point to visit Lesser Florican areas every monsoon. If some people now protect floricans, it is only due to Ravi's untiring work.

In 1991, Ravi was awarded a PhD for his thesis on "Some aspects of the breeding behaviour of the Lesser Florican *Syphotides indica* (J. F. Miller) and the Bengal Florican *Houbaropsis bengalensis* (Gmelin)", by Mumbai University. This was the culmination of his work under the Endangered Species Project. Although he did not publish many major papers from his thesis, some short notes came out in *JBNHS* on the breeding behaviour of the two florican species (Sankaran 1996a, 1996b). His paper on the relation between bustard body size and display type (Sankaran 1997), is a very interesting piece of work wherein Ravi shows a direct correlation between body size and display type in the bustard family. "The small bustards have aerial displays, with the smallest of these having a jumping display, those species with increased body size having flight displays, and beyond this body size, all bustards have ground displays". Ravi's analysis showed that the Bengal Florican and the Black-bellied Bustard *Eupodotis melanogaster* (of Africa) are at the size threshold beyond which all bustard species have ground displays. In his other

noteworthy paper (Sankaran 1994) Ravi re-analysed the ringing and recovery data of Dharmakumarsinhji (1950), and based on his own data proved that male Lesser Floricans do not return to the same territories year after year—their arrival depends on the rainfall pattern of the area and, they show disperse lek type with small male territories while females have large range. He did not find site fidelity from year to year, but strong site fidelity within a season. This behaviour should be expected from a species that moves for breeding to the semi-arid grasslands of north-western India, where the rainfall pattern varies from year to year—so if a male florican has a strong site-fidelity for display, in some years it may land up in the area with very little rainfall (and females). Therefore it has to shift breeding areas every year and selects areas with good over-all rainfall. However, the Bengal Florican, which lives in more stable grasslands of the *terai* and the Brahmaputra plains, with regular rainfall, shows strong site fidelity.

From 1993, Ravi's main work shifted to Andaman & Nicobar Islands, where he subsequently spent 15 years and made a long-lasting impact on its people and also on Andaman ornithology. His initial studies were in collaboration with Dr Lalitha Vijayan, as principal investigator, but soon he was the principal investigator of other projects. Lalitha and Ravi worked on a major project funded by the Ministry of Environment and Forests titled, 'A study on the ecology, status and conservation perspectives of certain rare endemic avifauna of the Andaman and Nicobar Islands' (2000). Twenty species of birds are considered 'rare' on the Andaman Islands, of which the SACON team intensively studied the Andaman Teal *Anas albogularis*, now considered a full species by Rasmussen & Anderton (2005), Andaman Banded Crane *Rallina canningi*, Narcondam Hornbill *Aceros narcondami*, and Nicobar Megapode *Megapodius nicobariensis*.

Before Ravi's work on the Narcondam Hornbill, there were six visits by various ornithologists, mainly to collect specimen of this species or to study its ecology. Among his various studies, I consider his work on the Narcondam Hornbill unique, mainly due to its wonderful interpretation of field results. Unfortunately, this study has not been published in any peer-reviewed journal, although the results are given in the final report of the project from where I quote some highlights. The following description is also based on discussions with Ravi while I was collecting information for my IBA book.

The Narcondam Hornbill shows the greatest degree of endemism of any of India's avifauna, being confined to only 7.5 km² of volcanic island. Its population varies between 330–360 individuals, of which 30–45 hornbills the policemen posted there, poach every year. The total breeding population is between 68–85 pairs. On this volcanic island (700 m asl), nearly 60% of the nests are found below 100 m, and 29% between 100–200 m—and no nest was located above 400 m. Therefore, despite the rugged terrain, most of the nesting sites are accessible to people. The age of the hornbills can be assessed by counting the rings on their casques. It's not always easy to see the rings, but nevertheless a valuable tool to study the age structure of hornbills. A bird with a single ring was considered to be a year old, two rings as two years, and so on. Ravi studied 17 nests, and found that barring three, in all the nests, males were older than the females. Narcondam Hornbills mature at about four years of age, and start forming pairs, and nest when they are about five years old. That males were older than females could indicate that either the latter are short lived compared to males or they prefer older mates. Another very interesting observation, made by Ravi, was on the age-class distribution of Narcondam Hornbill at different altitudes. He found that most of the younger birds, non-breeders mainly, were found above 300 m msl. This was consistent with the presence of all nests below

300 m msl, and could be indicative of age segregation to reduce pressure on resources.

The most interesting result of this study, which Ravi discussed with me in great detail, is the impact of goats introduced in 1974 or 1976 on the tiny Narcondam Island. As Myanmar was claiming the Narcondam Island as its territory—it is closer to Myanmar than to India—the Indian Government established a police post on Narcondam in 1969, and brought in policemen from Uttar Pradesh. Being from the mainland, they were not used to seafood, though abundant all around in the form of fish, crabs, lobster, etc. So, to provide fresh meat, goats were introduced in 1976. Over the years, the goat numbers crossed over 400, forming a sizable feral population. In the late 1980s and early 1990s, on the recommendations of the Ministry of Environment and Forests, the A&N administration removed some goats to satisfy the MoEF directive. During his study in 1998, Ravi found 135–150 goats in the police camp of 50 acres, and estimated about 200 feral animals. He was shocked to notice a complete lack of vegetative regeneration, "there is virtually no herb and shrub layer, and more importantly no saplings of trees". As the island is volcanic in origin, with very high rainfall, the roots of trees hold the soil and boulders together. Hornbills nest in old trees with hollows and holes. Due to heavy rains and storms, many old trees fall every year. Once the canopy opens, new trees come up. However, if regeneration were not taking place due to domestic and feral goats, there would not be any replacement of dead and fallen trees. During his study, Ravi found that there was no dearth of nesting holes, but if regeneration of new trees does not take place and if the population of goats is not curtailed, in another 7–8 decades, there would not be many old trees left to provide nesting sites for the Narcondam Hornbill. Ravi also found that the police outpost, including houses, plantation, and kitchen gardens, already occupies about 50 acres. About 12 large trees are felled every year for fuel. All this has a great ecological impact on the long-term survival of this unique species found nowhere else in the world.

Another remarkable study for which the ornithological fraternity will remember Ravi is that of the Nicobar Megapode. Out of the 22 species of megapodes in the world, one species is found in the Nicobar group of islands. Megapodes are unique among birds as they incubate their eggs in mounds of rotting leaves, or geothermally (by the sun) heated burrows. Various species of megapodes are distributed from Nicobar Island to Australia, New Guinea, Indonesia, the Philippines, and numerous islands of the Pacific. Many species of megapodes have been studied, but detailed studies were not done on the Nicobar Megapode. This gap was ably filled by Ravi Sankaran's six-years study, 1992–1994, and 2005–2008, of the species. Ravi, and his student, K. Sivakumar, now a faculty of the Wildlife Institute of India (WII), lived in extremely primitive conditions on Great Nicobar Island to study the ecology and behaviour of this elusive bird. They surveyed 16 islands, ranging from 213 km² to 1.2 km². Ravi walked the coastline of all the 16 islands, covering nearly 687 km, and intensively surveyed 65 transects of 114 km. If you have such an intensive study, the results are expected to be good. It is a pleasure to read the results of this study in their final report (Vijayan & Sankaran 2000). The results of this study were also published in good papers (Sankaran 1995; Sivakumar & Sankaran 2003, 2005a–b) Preliminary results were published in *Zoologische Verhandelingen, Leiden* (Sankaran & Sivakumar 1999). Ravi also guided Sivakumar for his PhD on Nicobar Megapode (Sivakumar 2000). They have written many technical reports, not easily available to people (Pittie 2009). Sivakumar and Ravi read a paper "Incubation mounds and mound use patterns in the Nicobar

Megapode..." at the First Pan Asian Ornithological Congress, 1996, the proceedings of which were never published.

After the tsunami in 2004, Ravi conducted a survey and found a total devastation of Megapodes nesting mounds on many small islands. However, he was also hopeful that if the birds were left alone, they would return and recreate the mounds. Ravi was very worried about the amount of funds poured into Andaman & Nicobar Islands in the name of tsunami relief, and the type of corrupt people who generally follow these funds. On some islands, more ecological damage was done in the name of tsunami relief than the tsunami itself!

Ravi's study on the Edible-nest swiftlet is another masterpiece. It involved basic biological work in extremely trying field conditions, understanding the conservation problems, realising the impossibility of physically protecting the nest caves on discrete islands with the limited capacity of the forest department, and knowing the potential of benefiting the local people by sustainably harvesting nests of this species. Although I have not seen nesting colonies of Edible-nest Swiftlet, I have been following Ravi and his student's work for the last decade or more. After Ravi explained to me how sustainable harvesting of nests of this species would help in its protection, I fully backed him and SACON in their request to the Government of India to de-list it from Schedule I to Schedule IV to enable the sustainable harvesting and export of its nests. Perhaps the last report submitted by Ravi, along with his student, Manchi Shirish Sheshnarayan, was to the Government of India and the Andaman & Nicobar state Government (Sankaran & Sheshnarayan 2008).

I think a little background on this issue would help the readers fully appreciate Ravi Sankaran's brilliant approach to conservation of the Edible-nest Swiftlet. The following description is based on the final report *A Study on the Ecology, Status and Conservation Perspectives of Certain Rare Endemic Avifauna of the Andaman and Nicobar Islands* (Vijayan & Sankaran 2000) his recent papers, his letters to the Government of India, and my discussion with Ravi, and his student Manchi Shirish Sheshnarayan, who has submitted a thesis on Edible-nest and Glossy swiftlets (sadly after Ravi's demise).

Four species of swiftlets are found in India: the Himalayan Swiftlet *Aerodramus brevirostris* in the Himalayas and north-eastern India; the Indian Edible-nest Swiftlet *Aerodramus unicolor*, found in the Western Ghats, Sri Lanka and coastal islands; the Edible-nest Swiftlet *Aerodramus fuciphagus*, and the Glossy or White-bellied Swiftlet *Collacalia esculenta*, the last two found only on the Andaman & Nicobar Islands in India, but widespread in South-east Asia. None of the species is globally threatened, although some populations are under threat due to unsustainable harvests of their nests by poachers.

The four species of swiftlets make nests using their saliva and feathers, vegetable matter, small leaves, and twigs—collected in flight. The Edible-nest Swiftlet is unique as it makes a nest of pure saliva, with none or very little impurity. In the 16th century the Chinese discovered the cuisine value of the nests and since then the species has been over-exploited all over its range. Other species are also exploited but their nests are of inferior quality, as they have impurities like feathers, feces, leaves, etc. Harvesting of nests of Edible-nest Swiftlets started in the 18th century in Andaman & Nicobar Islands where it was mainly an unregulated activity (Sankaran 1998). The Indian Edible-nest Swiftlet nests in the rocky caves and grottos of the Western Ghats and coastal islands such as Vengurla Rocks off the Malvan coast in Maharashtra, and Pigeon Islands off the coast of North Kanara (Ali & Ripley 1987). Its nest is full of 'impurities' such as feathers, moss, lichens, but nevertheless it is exploited in some areas. Due

to over-exploitation of nests of this species in the Vengurla Rocks and resultant protests by activists, all the species of swiftlets were brought under Schedule I of the Wildlife Protection Act, nearly ten years ago.

During his study of the avifauna of the Andaman & Nicobar Islands, Ravi Sankaran became interested in the fate of Edible-nest Swiftlet. In his 1997 survey Ravi found 6,631 breeding pairs in 291 caves (Sankaran 1998)—all the colonies were over-exploited, and nests collected irrespective of whether they contained eggs or chicks. At Port Blair, a kilogram of nests (70–125 nests) fetches between Rs 15,000 and Rs 20,000, sometimes more. He also found that it is extremely difficult to protect nesting colonies on remote islands and in remote caves—with the latter's approaches sometimes known only to poachers. He found population declines of the Edible-nest Swiftlet as evidenced from diminishing nest yields. Ravi saw an opportunity in this dire situation—instead of trying to curtail nest collection, why not regulate it and let the local people earn some additional income? Nests can be harvested after the chicks have fledged and flown away. This involves no killing and allows nests to be harvested year after year, as birds build new nests every year. In order to give scientific support to his plan, first a proper study had to be done on the Edible-nest Swiftlet and also the Glossy Swiftlet. With the collaboration of the Department of Environment and Forests, Andaman & Nicobar Islands, SACON started a study in 2001 in 29 caves. Intensive data collection took place from 2004 to 2007.



A megapode nest in the coastal forests Great Nicobar Island (2002).

Photo: Manchi Shirish Sheshnarayan

Edible-nest Swiftlets breed and roost in dark caves as they navigate in darkness by echolocation. However the Glossy Swiftlet does not echolocate and builds nests near cave openings and even in old buildings, and under bridges. In order to engineer better *ex-situ* swiftlet houses with a view to sustainable harvesting, Ravi and his student studied nest site characteristics in 29 caves—rock texture, rock contour, inclination of walls, micro-meteorological parameters (temperature and humidity), nest orientation, and predatory pressures.

As the two species nest almost at the same time, and also feed on dipterous, hymenopterous, and hemipterous insects, caught in the air, eggs of Edible-nest Swiftlets can be transferred to Glossy Swiftlet nests to increase the population of the former, and also to develop new nesting colonies for management and sustainable harvest. Both the species raise multiple-broods, sometimes nesting four times in a year, so it was also necessary to find out which is the best time to harvest the abandoned nests without unnecessarily disturbing the birds.

During the last six to seven years Ravi had developed a team of local people who were ready to start a cooperative society, with strict rules and regulations, for the sustainable harvesting of Edible-nest Swiftlet nests. They had even collected about 28 kg of nests. But the problem was that the nests could not be exported out of the country, as the species was in Schedule I of The Indian Wildlife (Protection) Act, 1972. We both had numerous meetings

in the Ministry of Environment and Forests, Government of India, to remove Edible-nest Swiftlet from Schedule I. Finally, the Standing Committee of the National Board for Wildlife took this bold decision on 17 July 2009—sadly after Ravi's death. However, Ravi has left a very robust plan with the Department of Environment and Forests, Andaman & Nicobar Islands, which, if properly implemented, will be first of its kind, with an out-of-box approach to conservation.

According to this plan, local people will be involved in the protection of nesting caves, and nests will be harvested only after the breeding season is over. Nest harvest will be strictly regulated through cooperative societies (on different islands or groups of islands), and exported under government supervision. New Edible-nest Swiftlet colonies will be developed by foster parenting, i.e., replacing eggs of Glossy Swiftlets with eggs of Edible-nest Swiftlets, and wherever necessary, structural changes will be made in houses to provide suitable substratum for nesting and also to maintain the micro-climate of the artificial nesting colonies (light, humidity, and temperature). The scientific background for doing this is already available through the studies done by Ravi and his student. Fortunately, the administrative support of the Andaman & Nicobar government is also available.

If the population of Edible-nest Swiftlet increases, and local people benefit from benign harvest of its nests, we have only Ravi Sankaran to thank for his foresight, planning, and scientific approach in solving this conservation problem. In the Indian conservation scenario, full of bleeding heart animal right activists, we have to listen to people like Ravi Sankaran for their ecological wisdom, and species-specific conservation planning.

Ravi was a good teacher, always looking for quality students, whom he found in Sivakumar and Manchi Shirish Sheshnarayan. They have not disappointed him. Ravi has also inspired many students—some willing to continue his work on the Lesser Florican, Nicobar Megapode, Narcondam Hornbill, and Edible-nest Swiftlet.

Modern, objective, and scientific thinking were Ravi Sankaran's forte. In many conservation approaches he was ahead of his time. I have seen his growth from being a pure field biologist interested only in the ecology, behaviour, and conservation of a species, into a practical conservationist—where involvement of people, particularly local communities, became a defining paradigm for him. Besides his approach to conservation of Edible-nest Swiftlet, lately, he was also involved in a major project *Strengthening community conservation efforts in Nagaland: a programme to impart technical support on biodiversity conservation and livelihood options to communities*. It is a collaborative programme between the Nagaland Empowerment of People through Economic Development, Kohima (NEPED), and SACON, funded by Sir Dorabji Tata Trust, Mumbai. He was executing this project in collaboration with some other organisations such as Kalpavriksh, Pune; Ecosystems India, Guwahati; Aranayak, Assam; ATREE, Bangalore; and Nature Conservation Foundation, Mysore. The aim of the project is "To develop mechanisms by which the existing community conservation efforts in Nagaland are strengthened, expanded and lead to livelihood benefits since some local communities have by their own volition set aside areas within their village lands for the preservation of wildlife. The approach will be that of training a core group of individuals from different tribes who will facilitate a resource group with expertise in biodiversity conservation and livelihood options." Fortunately, SACON has taken responsibility to complete this project.

In a research career of 23 years, Ravi wrote 21 full papers, 12 short notes in peer-reviewed journals, nine scientific articles in magazines and 37 project reports. Most of these reports are

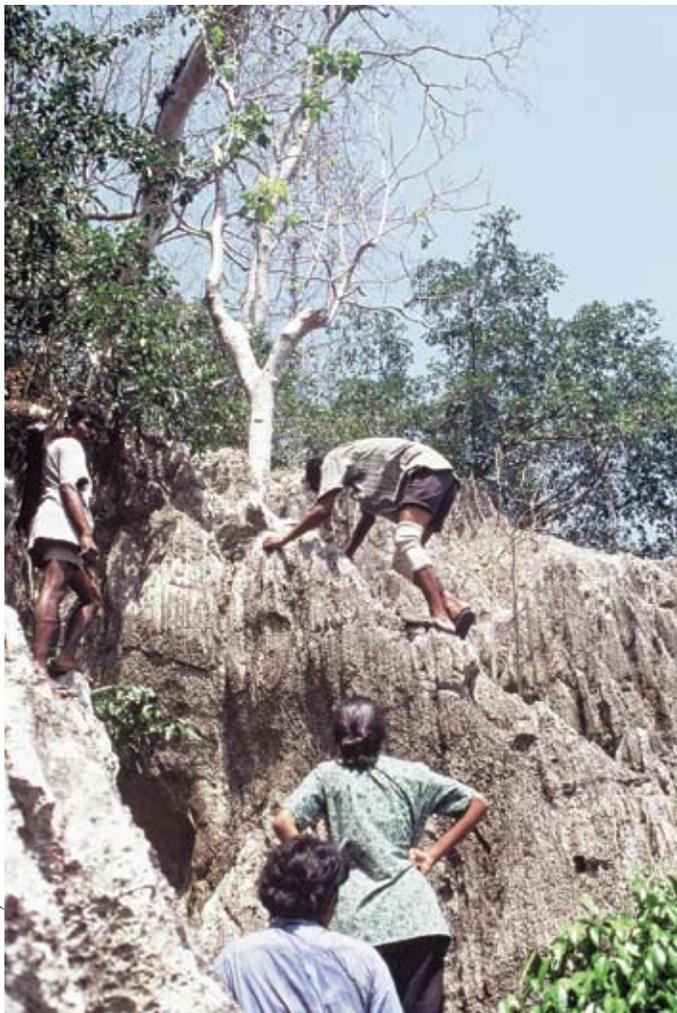


Photo: Pankaj Sekhisaria

Climbing the rocky Challis Ek complex. Ravi (with strapped knees) and his wife Deepa (hands of hips)

available in the libraries of BNHS and SACON. A bibliography was published by Pittie (2009).

Long walks in the rain in Sailana, sitting for an entire day in cramped and damp hides to watch the display of the Lesser Florican, perching on a 20 m *machan* in Sathiana grassland in Dudwa to study the behaviour of the Bengal Florican, all gave Ravi the initial strength to become one of the finest field biologists of India. His inquisitiveness to learn, incisive questioning ability, writing and speaking skills further added to his character, including his signature pipe!

I think the best tribute to Ravi Sankaran by us would be to see that the Lesser Florican continues to display in the grassland of Sailana, chicks come out from the nest mounds of Nicobar Megapodes, the goats of Narcondam Island are totally removed, a nest harvesting cooperative systems is put in place to benefit local people and the Edible-nest Swiftlet, and people of Nagaland manage more biodiversity areas for the benefit of wildlife and their welfare.

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