



**Conservation  
of Heronries in  
the Districts of  
Tirunelveli and  
Thoothukudi,  
Southern  
Tamil Nadu**

## Abstract

The irrigation tanks and agricultural fields in the districts of Tirunelveli and Thoothukudi, of southern Tamil Nadu, support a large number of waterbirds and are known for their heronries. However there has been little focused work on the birds and heronries in recent years even though encroachment, spread of invasive species and poor maintenance of the tanks have only increased. In order to understand the status of waterbirds and heronries in the region, a survey of about 240 wetlands was carried out during the period from November 2008 to January 2014.

With over 3000 tanks and a network of rivers and canals in the two districts, we could authentically record around 10 active heronries. A few of them were recorded for the first time, and some of the older ones do not exist. The districts are still a potential habitat for many waterbirds and heronries but are under anthropogenic pressures. Proper management plans, using a landscape approach need to be thought of to maintain the heronries. To achieve this, it is necessary to work with the local stakeholders, and education and awareness programmes have to be a part of the conservation initiatives.

**Keywords :** *Acacia nilotica*, heronry, irrigation tanks, Spot-billed Pelican, Tamil Nadu

## Introduction

Canal-linked reservoirs play an important role in sustaining both human and bird life in the dry lands of India (Mukherjee & Wilske 2006). Man-made irrigation tanks situated in such landscapes are as important as natural wetlands in facilitating habitats for numerous floral and faunal species (Karia 2010). As water is available during most parts of the year, irrigated agriculture becomes the most important source of livelihood in an otherwise dry landscape. Paddy is often the crop most commonly grown under irrigated agriculture in many parts of south India. With their capacity to support different aquatic life forms, paddy fields provide suitable habitats for a variety of wetland birds (Kumar & Gupta 2009) that occur often in regionally or globally important numbers (Elphick *et al.* 2010). In addition, irrigation tanks also provide roosting and nesting sites for several of these waterbirds, and the heronries located in the tanks are often the primary reason for the large number of birds found in the landscape. Though heronries are important, a few have been protected by local communities and some are managed by the forest department, they continue to disappear and reappear, depending on several factors, ranging from availability of resources to local threats such as poaching and habitat destruction (T. Ganesh, pers. obs). Therefore it is important to document and monitor the heronries over periods of time to understand the dynamics of waterbird population fluctuations.

The districts of Tirunelveli and Thoothukudi, in the semi-arid landscape of southern Tamil Nadu, have many tanks irrigated by an ancient network of interconnected irrigation canals that are fed by the rivers originating in the southern Western Ghats and draining into the Bay of Bengal. These tanks provide very stable agriculture in the region despite vagaries in rainfall. The tanks and agricultural fields in the two districts support a large number of waterbirds (Abhisheka *et al.* 2013) and were also known for several heronries (Kannan & Manakadan 2005, Krishnan 1978, Nagulu & Rao 1983, Subramanya 1996, 2005). Though there was an effort to understand the status of the heronries in Tamil Nadu almost a decade ago (Subramanya 2005), there has been no attempt to update the information for Tirunelveli and Thoothukudi districts, given that these areas are coming under heavy infrastructure development, with a demand for water and a massive effort to reengineer the canal systems to spread the irrigation network to drier areas of the districts. In addition government schemes such as MNREGA are cleaning the canals and tanks by removing vegetation that could affect the waterbird populations. This paper attempts to document the existing heronries in the districts of Tirunelveli and Thoothukudi and assess the threats they currently face.

## Study Area

The districts of Tirunelveli (8° 08' to 9° 23' N and 77° 09' to 77° 54' E) and Thoothukudi (8° 20' to 8° 49' N and 77° 22' to 78° 40' E) are encompassed by the Western Ghats, on the west, and the Bay of Bengal, on the east. Tirunelveli District has about 2449 tanks (Nellai 2014), while there are about 634 tanks (ACPD 2011) in Thoothukudi District. The tanks fill up during the north-east monsoon, in October and November, and most of them dry out completely during the hot season, by May. The water levels are almost entirely dependent on the extent of the monsoon rains, although a few tanks receive some water from irrigation canals during the dry seasons (Abhisheka et al. 2012). The source of water for all the tanks and reservoirs is the Agasthyamalai hill range, which is a critical watershed. Perennial rivers such as the Tamiraparani and its tributaries, viz. Manimuthar, Pachaiyar, Kodumudiyar, Gadananathi, Ramanathi and Nambiar, provide water for irrigation and sustain the socio-cultural aspects of the people living in the region.

## Methods and Materials

A systematic survey of about 240 medium to large tanks was carried out in the districts of Tirunelveli and Thoothukudi during the period from November 2008 to January 2014. During a preliminary survey, 177 tanks along the foothills of Kalakad Mundanthurai Tiger Reserve, spread over a distance of 65 km, were surveyed from November 2008 to February 2009. This was followed by a survey of 36 tanks along the river Tamiraparani in both Tirunelveli and Thoothukudi districts in September 2010. A mid-winter waterfowl census was conducted in the districts of Tirunelveli and Thoothukudi for four consecutive years, from 2011 to 2014, in January, for two days. Potential tanks that had better chances of harbouring large congregations of waterbirds were chosen for the waterfowl census. In addition to these, we documented roosting and nesting sites in the two districts during all our travels in the last five years.

Google Earth images and maps from the Survey of India were used to identify and locate tanks/heronries. In each of the tanks, the number of bird species and the number of individuals were recorded through direct observation. The geographic coordinates (latitude and longitude) were obtained for each tank using a Garmin hand-held Global Positioning System (GPS).

## Results and Discussion

Over five years, covering 240 tanks, we recorded about 10 heronries (Table 1).

**Table 1 :** List of heronries recorded in Tirunelveli and Thoothukudi districts, Tamil Nadu

Name of Heronry	Major Species	Trees Used for Nesting	Approximate No. of Birds	Remarks/Threats
Vagaikulam (Alwarkurchi)	BHI, LC, IC, OD NH, LE, PH	<i>Acacia nilotica</i>	2000-3000	Can be cut under social forestry scheme but currently stopped. Trees ageing
Tirupadaimarathur	PS, LC, SBP, BHI	<i>Tamarindus indica</i> , <i>Madhuca longifolia</i> , <i>Azadirachta indica</i> , <i>Prosopis juliflora</i>	500+	Under protection by villagers and forest department
Saralkulam	GH	<i>Borassus flabellifer</i>	40	Ageing trees
Kallidaikurchi	BI	<i>Borassus flabellifer</i>	25	Ageing trees
Manimuthar	GI	<i>Albizia sp.</i>	5	
Tirupanichettikulam	AOB, LC, BHI, IC, OD	<i>Prosopis juliflora</i>	4000+	Poaching & tree cutting
Perinbapuram	LC, OD, AOB	<i>Acacia nilotica</i>	500+	
Koonthankulam	PS, SBP, BI, BHI, AOB, GI, LC, IC, GC, OD, NH, LE, GE, IE, CE, ESB	<i>Ficus sp.</i> , <i>Acacia nilotica</i> , <i>Prosopis juliflora</i>	5000+	Under protection
Singampatti	LC	<i>Ficus benghalensis</i>	10	Within paddy fields. Was partly cut once
Arumugamangalam	SBP	<i>Borassus flabellifer</i>	10	Ageing trees
Mannur*	Egrets, Ibis, cormorants	<i>Acacia nilotica</i>	1500	May be cut under social forestry scheme

\*Seasonal and heronry is not active in all years.

**BHI**, Black-headed Ibis *Threskiornis melanocephalus* Latham; **LC**, Little Cormorant *Phalacrocorax niger* Vieillot; **IC**, Indian Cormorant *Phalacrocorax fuscicollis* Stephens; **GC**, Great Cormorant *Phalacrocorax carbo* Linnaeus; **OD**, Oriental Darter *Anhinga melanogaster* Pennant; **GH**, Grey Heron *Ardea cinerea* Linnaeus; **NH**, Night Heron *Nycticorax nycticorax* Linnaeus; **PH**, Indian Pond Heron *Ardeola grayii* Sykes; **PS**, Painted Stork *Mycteria leucocephala* Pennant; **SBP**, Spot-billed Pelican *Pelecanus philippensis* Gmelin; **BI**, Black Ibis *Pseudibis papillosa* Temminck; **GI**, Glossy Ibis; **AOB**, Asian Openbill; **LE**, Little Egret *Egretta garzetta* Linnaeus; **IE**, Intermediate Egret *Egretta intermedia* Wagler; **GE**, Great Egret *Ardea alba* Linnaeus; **CE**, Cattle Egret *Bubulcus ibis* Linnaeus; **ESB**, Eurasian Spoonbill *Plata lealeucorodia* Linnaeus.

**Common and scientific names of birds** : Gill & Donsker (eds). 2014. IOC World Bird Names (v 4.2).

## Heronries

Vagaikulam (Figure 1), situated near Alwarkurchi, is an important nesting site for several species of bird such as the Black-crowned Night Heron *Nycticorax nycticorax* (Linnaeus), Black-headed Ibis *Threskiornis melanocephalus* (Latham), Little Cormorant *Phalacrocorax niger* Vieillot, Little Egret *Egretta garzetta* (Linnaeus) and Indian Pond Heron *Ardeola grayii* (Sykes), all of which nest on semi-submerged *Acacia nilotica* (Linnaeus) trees. The tank also supported other roosting and foraging birds such as the Glossy Ibis *Plegadis falcinellus* (Linnaeus), Spot-billed Pelican *Pelecanus philippensis* (Gmelin), storks and other bird species. The other important heronry is at Tirupudaimaruthur, which is a well known Painted Stork *Mycteria leucocephala* (Pennant) breeding place on the bank of the Tamiraparni River. Several roosting sites for storks, ibises, egrets, herons and cormorants were seen at other places such as Puthukulam, near Ulangankulam village, in Nanguneri Taluk, and Manimuthar, Singampatti and others in Ambasamudram Taluk. Most villages with large trees had some flocks of roosting or even nesting birds, depending on the season. It was not always that roosting sites became nesting sites.



**Figure 1** : Heronry at Vagaikulam, near Alwarkurchi, Tirunelveli (Photo credit: Samuel Jacob)

During the waterbird census in January 2011, nesting of the Globally Threatened Spot-billed Pelican was observed at Arumugamangalam tank, which is situated on the Srivaikuntam-Eral road in Thoothukudi District. This is an extremely important tank for migratory ducks. The *Borassus flabellifer* (Linnaeus) palm trees planted around the tank were used for nesting by a small population of Spot-billed Pelicans. The breeding seems to be infrequent and has not been seen in recent years. Mannur, 30 km north-west of Tirunelveli, is a large tank planted with *A. nilotica* in the foreshore. The tank used to receive water from the Tamiraparani River, but the connection has been severed by encroachments for long and so is entirely dependent on the rains and is therefore prone to remain dry for several years, depending on the monsoons. It also lies in a very arid landscape with not many perennial sources of water and therefore is an important heronry during good monsoon years, when the trees come under water and many species breed.

Saralkulam, next to the River Tamiraparani and near the temple of Tirupadaimarathur, is a regular nesting site for Grey Herons *Ardea cinerea* Linnaeus. The birds nest on *B. flabellifer* along the bund of the tank. Nesting was observed in January and February in 2013, and about 30 nests were counted on the trees. Perinbapuram, near Moondraiadipu, is a heronry mostly for cormorants and a few Asian Openbill Storks *Anastomus oscitans* (Boddaert), which nest on submerged *A. nilotica*. Since the tank is large and shallow, in the event of a bad monsoon and poor irrigation, it dries up fast.

## Nesting

Nesting depends on the availability of water in the tanks. The recent drought (in 2013) in the districts led to failure of nesting in all the heronries (T. Ganesh, pers. obs.). This was partly due to the suitability of the habitat being compromised as the nesting sites, which are mostly on half-submerged *A. nilotica* trees, became unsafe for nesting due to the lack of water. This was the case in Koonthankulam and Vagaikulam. The second factor was the availability of food, which plummeted, especially for large birds such as storks and pelicans, as most of the wetlands went dry. However, there may be other factors at a larger landscape level that may be affecting nesting. For instance, the usual nesting of storks in

March 2014 did not take place in Tirupadaimarathur and Koonthankulam even though the rains were normal and tanks had water (T. Ganesh, pers. obs.). This emphasises the need to monitor heronries on a regular basis.

## Threats

Even though there were over 3000 tanks and a network of rivers and canals, we could authentically record only 10 active heronries between 2008 and 2014. Our survey showed that very few tanks had trees within that would serve as safe nesting sites. About 30% of the tanks had trees that consisted of *A. nilotica* planted by the Forest Department or panchayat for harvesting under a social forestry scheme. Most of these trees were young and not suitable for nesting. The mature trees, used for nesting and roosting, are usually harvested, thereby threatening the birds with severe habitat loss. For instance, breeding of pelicans was observed a decade back at KadambaKulam, situated close to Srivaikuntam, in Thoothukudi District (Kannan & Manakadan 2005), but no such sighting has been observed in the last five years. Felling of trees may have destroyed many such known breeding sites. From enquiries with locals, at least two other sites, one in Chettikulam (Kadayam Taluk) and another at Vellur (Srivaikuntam Taluk) were destroyed due to harvesting of trees. In a few heronries such as Saralkulam and Arumugamangalam, the trees are ageing, and unless planting is taken up, many places will cease to exist soon.

The other significant threat is poaching. In almost all the heronries with large congregation of birds, hunting was present in one form or the other. In Vagaikulam, the local kids regularly chase people who try to catch birds. Moondradaippu was lost to poaching and then the trees were cut. Poaching is a cause of concern in little known heronries, and some authors have seen birds being caught in noose traps and being bundled into sacks to be carried away. Subsequently the heronry was abandoned (K. Abhisheka, T. Ganesh, pers. obs.).

There also exists a gulf between present-day farmers and the waterbirds. These farmers mistakenly blame the birds for damage to crops. The pest control services of species such as egrets are not valued. It was not uncommon to see farmers bursting crackers to chase the birds away from their agricultural fields.

## Conservation of Heronries

The planting of *A. nilotica* stands as part of social forestry schemes has helped in the formation of heronries to such an extent that it has partly caused the birds to shift from nesting within villages to tanks, as in the case of Koonthankulam (Subramanya 2005). This has shown that there is a possibility of creating habitats for birds for nesting. But at the same time, felling of *Acacia* stands used by nesting birds on a regular basis has destroyed active heronries. Vagaikulam is facing such a threat at present. Though there are tanks such as Puthukulam, Kesavaneri, Ulagankulam, Padmaneri and Periyakulam with a good amount of *A. nilotica*, they have only been used as roosting sites and may occasionally be used for nesting, depending on the water and disturbance around.

Considering the rarity of heronries in the area, it becomes very important to protect the remaining habitats, which are critical to birds. *A. nilotica* trees do not last more than 15-20 years, and planting of suitable trees for nesting should be undertaken. Examples of heronries such as Tirupadaimarathur, in Tirunelveli, Kokkarebellur, in Karnataka, and Veerapura, in Andhra Pradesh, where heronries are found within human habitations and nesting happens on local tree species, can be thought of for planting. Peepal *Ficus religiosa* (Linnaeus), Tamarind *Tamarindus indica* (Linnaeus) and *Madhuca longifolia* (J. König ex L). are mostly used by large birds such as Painted Storks and Spot-billed Pelicans. Earlier, these species were planted within villages and close to temples, and waterbirds used them for breeding. However, in places such large trees are dying and there is a need to plant samplings within the villages. In places such as Koonthankulam, Tirupadaimarathur, Kokkarebellur and Veerapura, birds are beginning to nest on *Prosopis juliflora* (Sw.) DC and *Subabul leucaena* sp., which are not really optimal nesting sites as branches break or are prone to be attacked by predators (because of the low height of *Prosopis*), but they do so since these species have replaced the larger trees in their nesting habitat. Water-tolerant species such as *Barringtonia acutangula* (Linnaeus) Gaertn. could be planted in tanks that are more perennial, as in Vedanthangal. Birds have been observed nesting on trees such as *Terminalia bellerica* (Gaertner) Roxb and Jamun *Syzygium cumini* (Linnaeus) in Karungulam tank, at Kallidaikurichi (Krishnan 1978), but these have not been observed in recent times since the trees have been cut. As seen, heronries have come and gone largely because of human threats and habitat loss.

One major aspect of heronry conservation, as in the case of other waterbird habitats, is to take a landscape approach. The success and persistence of heronries depend on the larger landscape in which they are situated, apart from proximate threats. The loss of Moondradaippu is supposed to have led to an increase in birds at Koonthankulam according to many old people who still remember Moondradaippu. Near Vagaikulam, cutting of trees in a neighbouring tank (Chettikulam) where birds nested earlier led many to move to Vagaikulam. During droughts, when most of the nesting trees do not have water and cannot support roosting and nesting birds, the birds make repeated visits to the place early in the breeding

season and leave to roost or nest elsewhere (T. Ganesh, pers. obs.). It is possible that some birds such as Painted Storks, Spot-billed Pelicans and others may be moving to other districts/states to nest or roost. The occurrence of Spot-billed Pelicans in neighbouring Trivandrum District during droughts and persistent dry conditions in Tirunelveli and Thoothukudi districts, where they were seen in low numbers, may be an outcome of one such situation (New Indian Express 2013, 2014). One needs large-scale monitoring of heronries in the districts and state because in a changing human-dominated landscape, heronries may appear and disappear and what leads to such dynamics can only be determined by long-term systematic monitoring.

Local communities in the region have been protecting birds for centuries, as shown in Koonthankulam and now at Tirupadamarathur. This tradition needs to be encouraged and fostered. Creating islands in tanks to promote bird roosting and nesting has been done in several places. This could be done creatively by involving local communities, as was done in Vairavikulam, near Kalladaikurchi. A small island was created and planted with *Terminalia arjuna* and now birds such as Little Cormorants and herons have started to roost on them. However, communities need to be legally empowered to do this or else heronries could be wiped out, as in the case of Moondradaippu, which was a thriving heronry on the Tirunelveli-Kanyakumari highway until about 1992, when people decided to take the birds for the pot and the community at large could not stop it. To prevent such acts of vandalism, community-based conservation initiatives such as community conservation reserves and heritage sites, provided for by the Wildlife Act, need to be explored. However, for all these to gel together, the community stake needs to be built for the birds by demonstrating the ecosystem services provided by the roosting and nesting birds, such as enriching water and soil with nitrogenous guano for agriculture (Dhanapal 2010, Subramanya 2005) and appreciating intangible services such as being harbingers of rain and prosperity.

In order to achieve these objectives, co-operation between the local stakeholders, who include villagers, panchayat members, the PWD, water committee members and the Forest Department, is necessary. Educating the old and the young about the need to conserve birds is also important. Therefore education and awareness programmes have to be part of the conservation initiatives designed for different age groups. Success stories of communities living with birds can be used to motivate local people. Conducting participative bird censuses, encouraging groups and individuals to watch birds and monitor them and encouraging students from local schools and colleges to carry out ecological and environmental studies on heronries are needed. Children need to be actively engaged in all these as they can be effective in changing the attitudes of adults towards protection. They can also be physically involved in monitoring heronries for any form of disturbance, including poaching and damage to trees utilized for nesting, as was done in Vagaikulam (Ganesh 2010).

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