

**Successive Re-establishment of Introduced House Sparrow
(*Passer domesticus*) at a Remote Village:
Mupparthipadu, India**

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Abstract

House sparrow was once a familiar bird in human habitats. Due to various reasons like habitat loss, lack of food resources, pesticide residues in the food grains, the sparrow population declined globally. Recent surveys also revealed that the sparrow population is still under a declining trend. A status survey conducted at the West Godavari district of Andhra Pradesh, (India) revealed that the sparrow population was declined by 90% and above. In some villages, the House Sparrow is totally evanescent. The current modifications in the house design are unable to provide cavities for their nesting. The only method to perpetuate their population is Artificial Habitats, by providing Nest Boxes. Several conservational studies state that their number increased by providing artificial habitats. For a experimental study, we have introduced six couples of House Sparrow in a remote village, Mupparthipadu, in the year 2017. The entire process includes- trapping the sparrows, transportation, and releasing them into the new area by following a systemic procedure. The utmost care was taken for the released population by providing paddy, rice, and water at each house of that location. We have also installed about 20 nest boxes in the place where the sparrows were released. By 2021, their population was increased to 100+ in that village during the course of four years.

The House Sparrow (*Passer domesticus*) was once a familiar bird species that lived in and around the human habitats. It was distributed all over the world and also by anthropogenic introduction²¹. It is a man follower bird¹, migrated from the grass lands to agricultural land and then to human settlements for getting secured food resources²⁴. Thus, it became an obligatory human commensal bird^{27,28}. The Sparrow population

has declined in its natural range of distribution^{9,29} but, recent studies done by Berigan *et al.* on House Sparrow also stated their decline trend in North America⁵.

Several surveys conducted at various regions of Indian states indicated the sparrow declines^{6,13-15,22}. As per the Ornithological Survey conducted by the Indian Council of Agricultural Research (ICAR), in the year 2012, the sparrow population was declined by 80% in the state of Andhra Pradesh¹². As per the 'State of India's Birds 2020' report, though the population of House Sparrow stabilized nationwide, but still marked decrease was observed in several areas²⁶. A recent survey conducted in the West Godavari district also revealed a decline of House Sparrow by 91.35%¹⁹. The predominant cause for their rapid decline is habitat loss. The latest designs and modifications in the architecture of houses unable to provide the breeding spaces to this secondary cavity nesting bird. Government of Andhra Pradesh gave a provision and support under a housing scheme 'Integrated Novel Development in Rural Areas and Model Municipal Areas' to convert all thatched houses as permanent re-enforced cement concrete slab houses during the years 2006 to 2008²⁰. This also could be one of the reasons for sparrow decline by losing their breeding spaces.

Artificial nest boxes are the only option to fulfill the habitat loss and to attain a sustainable population of this tiny bird species^{3,6,12,13,16,23}. The conservational studies of House Sparrow by at Jangareddigudem of West Godavari District of Andhra Pradesh developed a successive and protective model

for House Sparrow. They reported that the occupancy rate of the nest boxes is about 97.6%²⁰.

Introduction of House Sparrow in to a new habitat and allowing them to quickly adapt to that habitat is one of the ways to propagate this tiny bird⁸. His observations on House Sparrow revealed that for a successful establishment, a few sparrows are sufficient and as long as the food resources are available, they do not leave that area. In the year 1851, eight pairs of House Sparrows were introduced in the New York City²¹. The studies of Moulton *et al.* have suggested that such that a smaller number of birds are sufficient to establish the species in new areas²¹. Research studies by Cassey *et al.* explained that the survival and establishment success in the new areas depends on the abundance of the mammalian predators in that introduced area². The non-native avian species expand beyond the introduced location and adopt to the novel conditions¹⁷. We are aimed to prove the adaptivity by House Sparrow to the new environment, to introduce from upland to a remote delta village, where sparrows almost disappeared.

Mupparthipadu, a remote village in the West Godavari District of Andhra Pradesh was selected to conduct an experimental study by introducing the House Sparrows. As per the survey performed by the authors in the year 2014, the sparrow population in this village was found to be declined by 92%¹⁹. During their survey in the village, the authors sighted four lonely scattered sparrows. We have done this project as a pilot project to prove that House Sparrow number can be increased by

providing artificial shelter (nest boxes) and persistent food supply.

Study Area :

Jangareddigudem (17.1223° N, 81.2923° E) is an upland area of West Godavari District of Andhra Pradesh state of India. Its altitude is 74 meters above median sea level, with 15.8 Km² area. Jangareddigudem is a semi-urban town with tropical climate consists more of open areas. In 2014, as per our observation, the sparrow population is very less in this area and now the population has risen several times with the establishment of our nest boxes¹⁹.

Mupparthipadu is a rural village in the delta region and is spread in 2.4 km² area. This village is located about 15 Km away from the nearest town, Tadepalligudem of West Godavari District. It is at 36 Feet altitude from the median sea level, with 1691 population (by 2020 census).

The main crop of the village is Paddy. In summer, after Rabi crop, farmers also cultivate black gram and Green Gram. Coconut and vegetables are the other minor crops. The village is famous for making 'Hand Sickle' in the entire delta of West Godavari District. Around ten families were involved in this industry.

The main reason for selecting this village for experimental procreation of House Sparrow is, it is far from major town, non-polluted area, and as well it is a village without cellular towers³. The public also showed interest towards restore of the Sparrow population.

Capturing the House sparrows :

Mist netting is one of the safe and efficient methods used to trap the small passerines, which are hidden in thickets or reed beds. Mist netting is only method used to sample small forest birds and also for migration studies². Mist nest were established on evening hours of 24/07/2017, at the Jangareddigudem town, where the House Sparrow population was increased by artificial nesting¹⁸. Eight pairs of sparrows were trapped in the mist nets, and then those were extracted carefully from the Mist nests (Fig.1). Then all the captured sparrows were kept in a cage.

All the captured 12 birds were ringed for identification (to differentiate with local birds, if any). With special research interest, we obtained rings from Bombay Natural History Society, Mumbai (India) for House Sparrows. 'A' sized rings with 2.5 mm diameter are meant for small passerines like Bulbuls (*Pycnonotus* sp.), Robins (*Saxicoloides fulicatus*), Warblers (*Acrocephalus* sp., *Prinia* sp.), Grey tits (*Parus major*) House Sparrows etc (Balachandran, 2002). House Sparrow comes under forest bird. Hence the rings have to be placed on the tarsus. Rings from 'A 279001' to 'A 279012' were used to individually identify the captured sparrows. We have collected all the data as per the method used in Bird Banding programme, which is used for bird migration studies.

All the described transport guidelines were followed to carry out for the transport of wild birds given by the bird net organization (www.birdnet.org). The captured sparrows were kept carefully overnight in a cage, provided with water and paddy and rice. On

the early hours of 25/07/2017, they were transported in an air-conditioned (to avoid direct sunlight and windblow) taxi from Jangareddigudem to Mupparthipadu (75 km). We reached the destination by two hours of journey.

The transported sparrows were kept at a secured place in the Mupparthipadu village, under a banyan tree for about half an hour to accommodate them to the new environment. The area that was selected to release the sparrows was without existing sparrows. By 8:30 hrs of 25-07-2017, they were released towards *Brāhma aveedhi* (16.688708395059297° N, 81.56129328882353°E) of Mupparthipadu (Fig. 2). As soon as the cage was opened, all the sparrows flew away as a group towards the nearest River-Tamarind Tree (*Leucaena leucocephala*) and then immediately reached the nearest electric pole. Initially they were calm for about 10 minutes and then slowly moved on the ground to collect paddy and became active. All these sparrows were roosted on the nearest Guava tree (*Psidium guajava*) on that night. With the provision of paddy grains and water, the sparrows started habituating to live in that street.

Twenty Nest boxes (from No.134 to153), were installed in that street and in the adjacent streets on 25-7-2017. The nest boxes were prepared as per the parameters specified by BTO with certain modifications to increase the protective nature of the nest box and as well acceptability by the public. The specific parameters of the nest box are as follows: Height – 250 mm, width –150 mm and breadth- 100 mm. Two wooden planks (with 6mm thickness) with 100 X 100 mm in size

are used for the roof. An entrance hole is placed in the middle of the box with 34 mm diameter. A narrow cleft with 100 x 3 mm is made at the front, towards the lower side (50 mm away from the bottom) for aeration. (Fig. 3). The nest boxes were installed on wall, below the roof and to be easily approachable by the sparrows. This model is designed for reuse. A rear window designed to remove the old abandoned nests, without disturbance to the nest box.

The point count method has been widely used for the census of bird communities²⁹. In this method, the observer stay at a point for certain period of time and record the visual sightings and calls of bird species. This method is used to determine the bird population trends, bird-environment relationships and to evaluate the impact of environmental changes on the bird populations. For urban and rural House Sparrow census, point count method is recommended¹¹. In the present study, the census was conducted by Point count method in July months of 2018, 2019, 2020, and 2021.

All the introduced sparrows were survived and were habituated to live. In one month of duration by the end of the August 2017, the introduced flock gathered the other locally scatted birds of that village and formed a colony. Then the colony of the birds become 16. After three months, *i.e.* October onwards, they slowly occupied the installed nest boxes and started breeding.

Survey was conducted in every July from 2018 to 2021, to study the occupancy of the Nests and for the population status. To get the status for nest box occupancy, we visited each nest box by two days interval. To attract

the sparrows towards the nest boxes, we have hanged the paddy spikes near to the Nest boxes (Fig. 4). Census was conducted by Point count method in July months of 2018, 2019, 2020 and 2021. The sparrow number gradually increased in the study area. By the completion of one calendar *i.e.* in July 2018, six nest boxes were occupied (Fig. 5). By the next year, four more boxes were occupied. By the end of the third year of installation, 16 boxes were in use. All the boxes were occupied by January 2020. Then onwards, the new generations started building their nests in the clefts of tiled-roof houses.

Occupancy rate of the nest boxes also indicates the increased population. The Pearson value $R=0.7971$. it shows there was a strong positive correlation occupancy of the nest boxes and breeding output (population). As per the latest census in July 2021, the total numbers of house sparrows were found to be 116 (Fig 6). Such an increase happened from 16 sparrows to 116 in a span of four years. The population has increased up to seven times in a span of four years. The continuous food supply and secured area are the main reasons for their successive establishment⁷.

The observational studies by Craggs⁸ in Hilbre island of England reported the dependence of House Sparrow on man and his dependent animals for a regular food supply. As long as the food resources are available continuously, the sparrows can establish successfully in the new areas. The introduced sparrows were given special care in secured area with continuous food supply, resulted in the increase their population. Seress *et al.*²⁵ found that the growth of rural fledglings in

terms of size was more than sub-urbans and it was remained same for the period of two years study. It increased their survival rate. As we introduced sparrows in rural area reflected the successive rate to establish the population.

The House Sparrow usually breed twice annually, occasionally trice¹⁸. As per their studies on breeding behaviour of House Sparrow in Faroe Islands, the average breeding success was 3.7, 3.4 and 3.1 in first, second and third attempt respectively. It is a predictable cause for the success in the raise of House Sparrow population in Mupparthipadu (Fig. 7 & 8). We have introduced 12 sparrows, among them 6 were females and two females of locally added birds. On an average, in one year of duration, by those eight females, with one successive breeding attempt, with minimum two fledglings from each couple, sixteen youngones might brought up. (Second breeding attempt is not considered for this hypothetic calculation). By the end of first year (July, 2018) after introduction the sparrow population was increased to 32. Among these 16 could be the females, of these with one breeding attempt, by the end of second year (July, 2019), with two successive fledglings further 32 young birds were added. Now the population might have raised to 64. By the end of the third year (July, 2020), if only the young generations reproduce two per one breeding attempt, the population might have reached to 128. In the fourth year (August 2020 to July 2021), if one breeding attempt done by the latest two generations (excluding the old, introduced generations) 108 furthermore youngones were added, then results 236. But the census gave only 116 sparrows in July 2021.



Fig. 1. Extraction of a female Sparrow from Mist net by the Author.

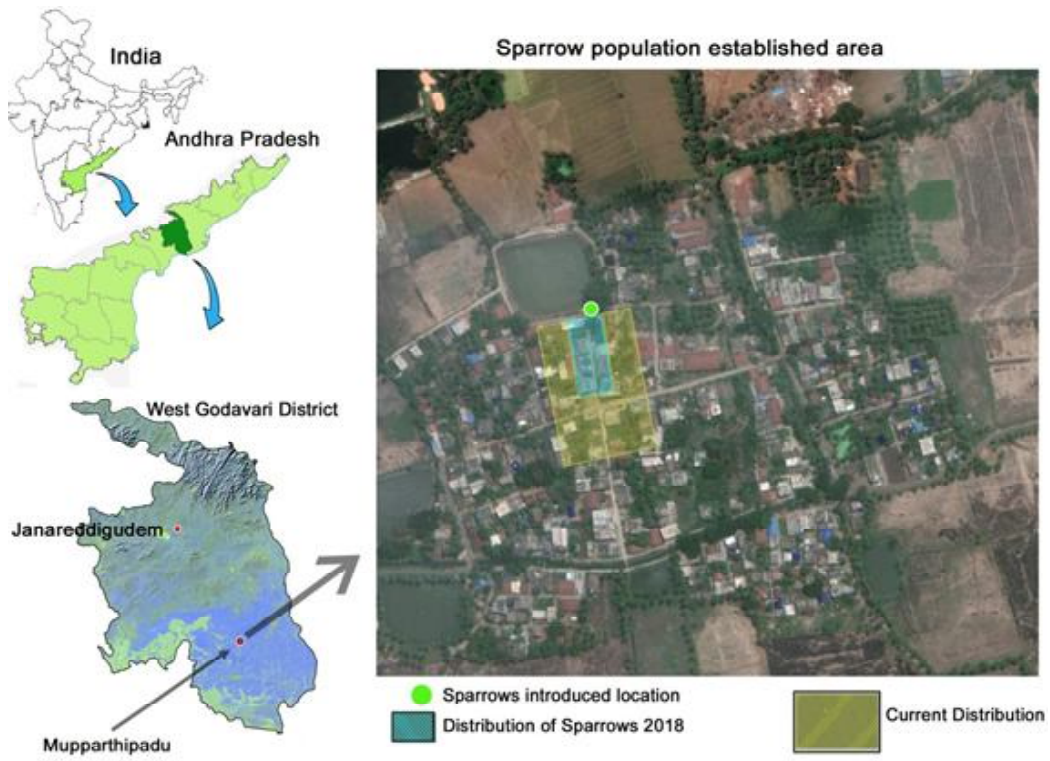


Fig. 2. Establishment of Sparrow population in Mupparthipadu

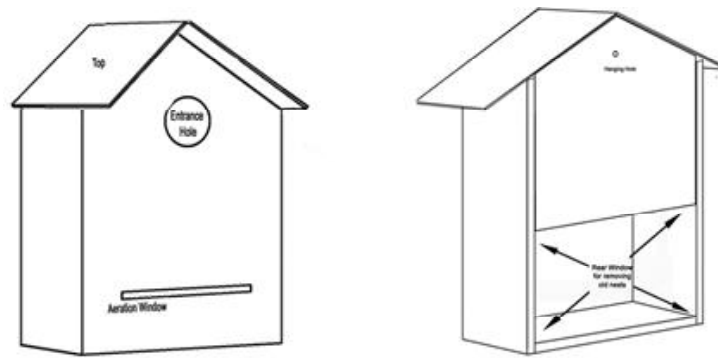


Fig. 3. Nest box design Front view and Rear view



Fig. 4. Male sparrow feeding on paddy spike



Fig. 5. Nest box (No. 152) occupied by Sparrow couple.

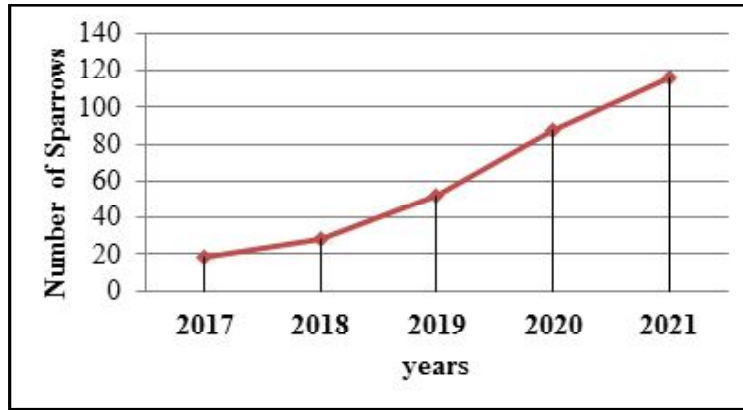


Fig. 6. Sparrow population growth in Mupparthipadu village from 2017 to 2021



Fig.7. Colonial dust bath of House Sparrows.



Fig. 8. Insect Food collection on a tiled- roof house.

The nest boxes also provided secured nesting grounds for their breeding activity. The design of the nest box is a protective model with 97% occupancy rate was observed at Jangareddigudem²⁰.

Our experimental studies revealed their quick adaptive behaviour to new habitat, as the sparrows were shifted from a semi-urban town habitat, Jangareddigudem to Mupparthipadu, a rural delta habitat. As the House Sparrow is an adaptive avian species, it can perpetuate in any secured zones. The persistent food supply, lack of avian predators, made them to settle in the new habitat. The optimum design of the nest back helped to reproduce to re-establish the House Sparrow population. By this study we state that the introduction of House Sparrow to any new and secured location can bring back from their declined state. We also suggest that one can follow the methods to raise the sparrow population.

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