

## CASE OF HOUSE SPARROW (*PASSER DOMESTICUS*) POPULATION DECLINE: ROLE OF SEMI-NOMADIC PASTORALIST COMMUNITY (VAN GUJJARS) IN THEIR CONSERVATION

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### Abstract

*The house sparrow, Passer domesticus (Linnaeus, 1758) is closely associated with human habitations and cultivation from historic times. The house sparrow is distributed all over India up to 4000m in the Himalayas. Distribution of House sparrow is not uniform in the country, and in the recent years disappearing of sparrows is also reported from various parts of the world including India. But reliable information on sparrow populations is not available. Less work has been carried out actually for counting and keeping a record of the sparrows. This article summarizes the possible decline in its population through literature review in many parts of the world including India. Several studies carried on house sparrow have cited varied reasons for their decline. So this article also summarized the possible cause and threats for the decline in population. This article compares the role of semi nomadic pastoralist community for conservation of house sparrow with secondary literature. We also tried to suggest the various activities for resolving the issues related with conservation of house sparrow.*

**Keywords:** Van Gujjar; Relocation; Settlements; House Sparrow; Conservation.

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### Introduction

The house sparrow belongs to the family Passeridae and most wide spread and abundant birds in the world [1]. Its natural range includes large parts of the world such as Europe, North Africa, parts of Asia and the Indian subcontinent. In the Indian subcontinent they are commonly found in India including introduced populations in Andaman Islands; Pakistan, Bangladesh, Sri Lanka and Maldives [2]. From these parts, it has been introduced by humans, both intentionally and accidentally, to virtually the rest of the world. Over most of its breeding range, the house sparrow occurs only in manmade habitats, such as farmland and cities [3]. The house sparrow is one of the familiar species that has followed man everywhere and is inseparable from human habitations. The evolution of house sparrows has been fairly recent than humans (*Homo sapiens*) dating back to about 25,000 to 15,000 years ago [4]. Perhaps, the transformation of human social organization influenced and is influencing the distribution of this species in many ways. Some of the ecologists believe that mentioned bird is a symbiotic species with human, hence recognizing and identified as bird species depended on human environments. It is an

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essential bird species as an equilibrant factors in ecosystems which have educational, recreational, economical and aesthetic values [5]. Since the house sparrow was associated with human habitations and was very sensitive to change in the environment, it was one of the most preferred indicator species of the urban ecosystem. They can play vital role in conservation of natural ecosystems health [6]. It has even been mentioned in most of our Mythologies and Folklores, along with the common crow, Eagles and other such birds, which used to exist in close proximity to human dwellings.

The house sparrow, locally known as 'Choria' are monogamous and long term pair bond is maintained throughout and between breeding seasons. The species breed in small colonies or in loose groups. It is omnivorous and feeds on grains, fruit buds, flower nectar, weed seeds, insects and kitchen scrap, though chicks are fed with aphids, weevils, grasshoppers, and caterpillars [7]. The nest is built in holes of structures, under the tiles or around roof area of houses. Sparrows are relatively sedentary birds and do not travel more than a kilometer or two in search of food.

This article tries to provide the overview of population decline in house sparrow around the globe. We also review the wide range of possible putative causes for changes in house sparrow populations around the globe. In this paper role of *Van Gujjars* was also compared with secondary literature which supports the conservation of house sparrow. The *Van Gujjars* ("Van" meaning "forest" in Hindi) are semi-nomadic pastoralists that live in the lower sub-Himalayan parts of Uttarakhand State. The *Van Gujjars* were located inside and adjacent forest divisions of Corbett Tiger Reserve (CTR). They are one of the most important semi-nomadic pastoral communities of the Himalaya. They speak *Gujjari* or *Gojri*, a dialect of Hindi. Many speak *Urdu*, *Kashmiri*, *Garhwali*, *Pahari* or *Dogri* as well. Milk and cornmeal are their staple food, and are strict vegetarians. The *Van Gujjars* live and move in joint family groups and set up temporary settlements.

## Methodology

The research was conducted during the month of February- June 2012 with a sample of 340 households. *Van Gujjars* formed the population of the study. The interviewed *Van Gujjars* were located inside and adjacent forest divisions of Corbett Tiger Reserve (CTR). The CTR is situated at the foothills of the Western Himalayas in the civil district of Nainital and Pauri Garhwal in Uttarakhand, India. Primary data were collected through focused group discussions, meetings with *Van Gujjars* and key informants and site level observations that were related with house sparrow population. An extensive review of the available literatures was carried out by visiting different government departments, academic institutions and various libraries. The secondary information was also collected by reviewing the literature carried out or supervised by professional ecologists and supported by recognized public or private research funding bodies, in relation to the accepted decline and its causes in the house sparrow population.

## Result and discussion

### *Recent scenario of decline in house sparrow population*

A small plump brownish bird, which is a widely distributed species in most parts of Europe and Asia, is slowly disappearing from urban areas [8]. The survey reports on the occurrences of house sparrow at different places have shown a considerable decline in its population along urban gradient [5, 9, 10, 11]. Throughout history house sparrows have been regarded as pest species damaging standing crops, transmitting diseases and negatively affecting native avifauna after voluntary human [1]. However, nowadays it is widely acknowledged that this species has suffered major declines, shifting its 'pest status' to a 'near threatened' one [12]. The house sparrow is already red listed in the Netherlands, where it has a

decline over 50% of its total population in the last 25 years of the 20th century. In UK, a massive decrease in the house sparrow population [7, 13] has led to almost complete extinction in some urban centers like London [14]. In 2002, the house sparrow was added to the Red List of U.K. endangered species [15]. High reduction of sparrow population in London, Glasgow and Hamburg has led to the inclusion on the UK Conservation Red List [16, 17].

Dwindling of sparrow populations along urban gradient is getting more into focus in different parts of the world including India [5, 9, 10, 18]. The overview of overall trend of house sparrow population has been given in table 1. According to Bombay Natural History society (BNHS) the population of sparrow have indeed declined and low number of nests. A survey organised by the Bombay Natural History Society (BNHS) along with the Central Ministry of Environment and Forests indicate that the Hyderabad-Ranga Reddy zone saw a steep drop in the number of house sparrows from 2005 onwards. According to Girish, et al., [19] house sparrows were found in localities that have livestock / cowsheds and in and around neighborhoods of dense and low-income housing and urban villages than that of middle or high income housing with ‘well-planned’ (or at least geometrically well-laid). A sharp decline in the sparrow population has been observed by ornithologists across Mumbai, Bangalore, Hyderabad and other cities.

**Table 1.** Overview of population trends

Place	Overall Trend	Reference
Australia	Decline	[20]
Bandel, West Bengal, India	Decline	[5]
Berlin	Stable	[21; 22]
Bristol	Decline (pre 1994)	[23]
Britain	Decline (50%)	[24]
Buckingham Palace Gardens, London,	Decline (30%)	[25]
Canada’s Maritime Provinces	Decline	[26]
Dublin	Decline	[16]
Edinburgh	Decline 90%	[27]
Germany	Decline 1989-1998, especially 1991-1995	[28; 29]
Great Britain	Decline (60%)	[30]
Hamburg	Decline 70-75%(1960-1990)	[31]
India	Decline	[9]
Kerala, Gujarat and Rajasthan, India	Decline (20%)	[32]
Lisbon	Increase	[33]
Manchester	Stable	[33]
Moscow	Decline	[33]
London	Decline 60% (1994–2004)	[34]
Netherlands	Stable 1984-1990,	[35]
North America	Decline	[36]
North America	Decline	[26]
Norwich	Decline	[37]
Paris	Stable	[38]
Poland	Decline 21% (2000-2010)	[39]
Rotterdam	Decline	[33]
South-east of England	Decline	[7]
St Peterburg	Decline	[33]
UK	Decline (60%)	[40]
Wales and Scotland	Increase	[7]
Warsaw	Decline 58% (2005-2012)	[41]
West Berlin	Decline	[42]
Western Europe	Decline	[43]

***Possible causes and threats for decline in house sparrow population***

Several studies carried on house sparrow have cited varied reasons for their decline [15]. The putative causes that could have led to the change of house sparrows were given in the table 2. According to Bergtold [44], the early phase of the decline is likely to be linked to the gradual replacement of horse-drawn transport by automobiles. However, Baker et al. [45] and Shaw

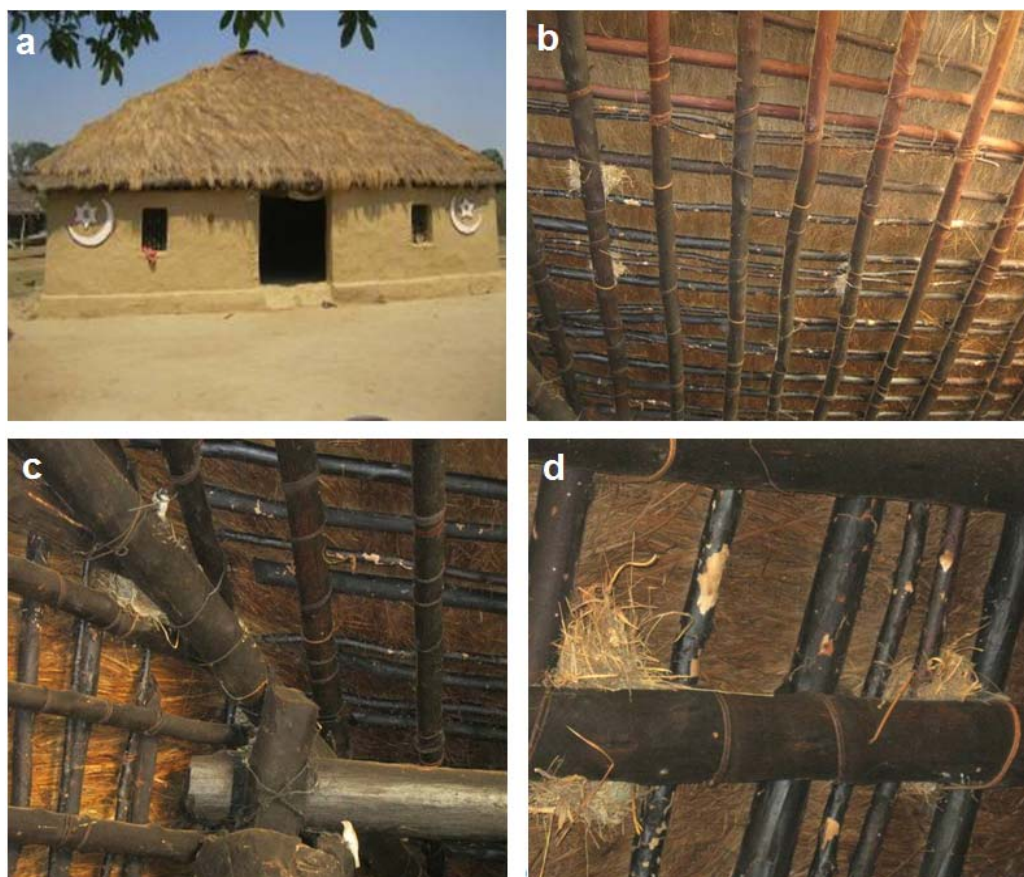
[46], stated that any population under stress, when affected by detrimental factors in the environment, would badly affect the populations to cause local extinctions and this would have lead to the large scale decline of the house sparrow. Some studies have demonstrated a number of relationships between density of house sparrows and human population density [47], conditions of buildings and hence availability of nest-sites [48], food supply [49], and amount of vegetation (green space) on breeding grounds [48]. The consensus emerging from these studies on the cause of urban sparrow declines was summarised by Shaw et al. [33], who reasoned that variation in the development and maintenance of urban landscapes explains the evidence that sparrows have declined less in areas with lower socio-economic status. Fuller *et al.* [50], stated that decline in population is due to changes are related to the increasing intensification of agriculture, can be attributed to a decrease in resource availability, primarily weed seeds and cereal grain. According to Green, [51], cereal, and other crop, seeds are increasingly sown with seed-dressings, which is likely to decrease the palatability of the seed to birds. Robinson et al. [30] revealed that populations have declined in urban and suburban since the mid 1970's due to the drastic alterations to the quality and composition of the urban landscapes. Several studies have shown that the availability of insectivorous food for nestlings during the breeding season influences the breeding success of the sparrows [52].

**Table 2.** Putative causes of the house sparrow decline

Causes	References
Predator	[26; 53; 54; 55; 56; 57]
Human socio-economic status	[33; 53; 58]
Urbanization	[16; 24; 26; 27; 54; 59; 60]
Pesticides	[53; 60]
Lack of nest site	[61; 62]
Depleting food resource	[7; 30; 53; 63;64]
Pollution	[7; 30; 53]
Electromagnetic radiation	[65; 66; 67; 68; 69; 70]
Decline in survival rate	[7; 52; 63; 71]
Intensification of agricultural practices	[72; 73; 74; 75]

### ***Role of Van Gujjars in house sparrow conservation***

A total of 37 settlements of Van Gujjars were visited for group discussion related with house sparrow. *Van Gujjars* may be regarded as more of an exception than as a rule among pastoralists of the world, as they rely almost entirely on their herds for their livelihood. The members stay in traditional huts, which are locally known as *deras*, which were built from the forest material on a clearing in the forest and soil material. The style of architecture and construction of houses requires a lot of timber and grass (Fig. 1a and b). The total constructions were 1161 in which 64.85% were thatched roof with mud wall houses, followed by 32.73% cattle sheds, 1.63% thatched huts and others. The traditional mud architecture of houses with thatched roof provides the site for letting the house sparrows breed in them. There is no lack of nesting sites in these houses (Fig. 1c). From the observation of some *deras*, there were averages of 2-3 house sparrow nests in each *deras* (Fig. 1d). Movements of large number of flocks of house sparrows were observed near *deras*. There is greater availability of granivorous and insectivorous food and straw for nesting inside and outside *deras*, which influences the house sparrow population. In despite of cities and towns, the new buildings and landscaped gardens which are being constructed are not at all sparrow friendly. This scenario was supported by Crick & Siriwardena [53] that urban declines are continuing because generically low insect availability prevents density dependent improvement in breeding output. Moss [76], also supported the statement by suggesting that modern buildings may contain fewer nest sites for birds that those in old buildings.



**Fig. 1.** House sparrow in Van Gujjars community: a – external architecture of a construction, b – internal architecture of a construction, c – the presence of a house sparrow, d – the nest inside the deras

*Van Gujjar* communities followed the traditional way of living. There were certain aspects such as their dwelling, eating and buying habitats of life, unhygienic condition around grain stores and land use (few settlements) that promotes the availability of shelter and food for the house sparrow. It was observed that *Van Gujjars* women often sits longer outside their deras to clean grain or offer grain or *chapatti*, which is a daily routine and major source of food for sparrows. The secondary literature revealed that changing lifestyle changes in cities and towns, purchasing food grains (in sealed packs) and vegetables in extreme hygiene environments and their efficient disposal will have resulted in reduced availability of food around the household for house sparrows. As Laet and Summers-Smith, [58] stated that decline in house sparrow population due to improved hygiene measures around grain stores. Similarly, Crick et al., [7], concluded that an extreme hygiene and changing lifestyles has resulted in lack of availability of food by way of leftovers, grains, etc. to the house sparrows. Key respondents also stated that people in the cities and towns are also becoming increasingly intolerant towards house sparrow because they do not like nesting in their homes and dropping nesting material inside.

During discussion with *Van Gujjars*, members of NGO “The Corbett foundation”, and some forest department officials, it was observed that lifestyle of *Van Gujjars* supports the conservation of house sparrow. It was also observed that numbers of house sparrows were more likely to be less in their adjacent villages (modern buildings). It was suggested by key informants that the most obvious reason for less population in their adjacent villages is due to disappearance of their nesting places with urbanization. These statements of key informants

were well supported by White et al. [77], whose results portray that due to urbanization, the population of house sparrow has drastically declined. Van Gujjars have a major influence on house sparrow population as they belong to the low socio-economic status. Their settlements were situated in the inaccessible area inside the forests with cutoff from major facilities. These factors can be explained by greater prevalence of native shrubs supporting higher densities of insects for house sparrows. Similarly, Robinson et al. [30], stated that variations in population trends also occurred among urban sparrows, with the most severe declines in areas of high socio-economic status, but relative stability in low income areas. Other studies also linked decline of house sparrows to areas with high socio - economic status [78].

## Conclusions

In recent decade in India, populations of house sparrows have seen a dramatic decline. It is difficult to comment about the actual population decline in India, due to non-availability of any historical data. There is a lack of area- wise data on common birds especially house sparrow. There are no or less figures to map the distribution of decline and understanding its cause. For the conservation and to fight the decline in population, Ministry of Environment and Forests, Indian Council of Agricultural Research and various NGOs, The Bird Life International, Royal Society for the Protection of Birds (RSPB), Bombay Natural History Society (BNHS), and the Sparrow Club are working. In India over the last few years several campaigns, outreach and awareness programmes, research surveys have been carried out to understand the decline of a species, but little work has been done for its conservation. Many countries have had bird monitoring programs since a long time and acts as early warning system for bird decline. Perhaps if there had been a common bird monitoring system in India earlier than its formation, the decline in population of house sparrow had come to notice in the earlier stages. In India, there remains a huge amount to be discovered about sparrows as we know relatively little about house sparrows in the urban and suburban environment. There is an urgent need to undertake a number of studies, surveys to establish baseline figures, bird habitat relations and identify future actions to reverse declines. There is a bigger need of targeted studies to identify the relative importance of potential key mortality factors including predation; food availability in urban and suburban habitats; building architecture, air quality; pollution; disease transmission etc.

There is no doubt that human civilization has had a negative impact on biodiversity, but in case of house sparrow, they are adapted and thrive in the close proximity to humans. Similarly, *Van Gujjars* are aware that their dwellings provide a sheltered habitat which enhances and encourages the survival of house sparrow population by providing access of favourable and flexible ecosystem. But the rehabilitation of *Van Gujjar* communities has clearly emerged as an important issue in conservation of protected areas in Uttarakhand. If in case of *Van Gujjar's* are relocated in the near future, there are chances of changes in their life style and architecture of houses, which will be supplemented with better facilities as found in Rajaji National Park, Uttarakhand, India. The modern architecture of houses at the relocated site may lead to drastic decline in the nesting sites and food shortage for the house sparrow as compared to current site with mud architecture houses. If in case of old dwellings will be left as such for nesting site for house sparrow, there will be deplete in the food resource which will ultimately lead to stress and will disappear with their ecological niche. In the future any relocation programme in the CTR area may ensure the long-term wildlife survival in this part of globe and can fulfill the issue of conservation of biological diversity. So, we need to start taking the issue tad more seriously and adopt a systematic method to address the decline of population through resolving the various issue of conservation.

Following points should be taken into consideration for the better conservation of house sparrow:

- Encourage public participation in Breeding Bird surveys and other monitoring activities

- Enforce best practice in the construction and renovation of buildings. Develop appropriate policies
- Encourage the provision of house sparrow nest boxes by householders and industrial building owners
- Use available data to keep up to date the estimate of overall breeding population size
- Encourage lower levels of pesticides in gardens, parks etc
- Publicize through leaflets, websites and other means, ways in which the public can assist House sparrow and other urban birds through nest site provision and / or gardening practices Lobby for research on ecology of urban birds, especially house sparrow

### Acknowledgements

We are highly grateful to The Corbett Foundation, Dhikuli Ramnagar, Nainital, Uttarakhand, India for providing necessary facilities and funds. Thanks are due to staff members of “The Corbett Foundation” for helping us during the field work. Sincere thanks are also due to the Forest Department officials for their kind support and co-operation. We are also thankful to the *Van Gujjars* of the study area for their co-operation during the data collection.

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Received: May, 31, 2014

Accepted: October, 20, 2014