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# Of House Sparrows and Human Settlements

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*Distribution of House Sparrows in Bangalore, India*

H. S. Sudhira and K. V. Gururaja

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### About the Logo

The logo depicts a male House Sparrow. The word 'Gubbi' is inspired from the name of a town, Gubbi in Tumkur district of Karnataka. The place got its name after House Sparrows, *Passer domesticus* following a historical event involving the Sparrows. House Sparrows are typically distributed in and around human settlements and thus epitomize the human-environmental interactions.

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Abstract:

The concern on House Sparrows has been on the rise mostly in urban areas while the causes for their declines in and around human settlements are still undetermined. Off late, the concern on House Sparrows surfaces once a year on 20<sup>th</sup> March about their 'decline'. In this working paper we are putting forward some key hypotheses or speculations for the possible decline, although not conclusive at this point of time. Some recent initiatives like the Citizen Sparrow can perhaps throw more conclusive light on the distribution of House Sparrows in the sub-continent.

We first speculate that increasing urbanisation coupled with extreme hygienic environments in Bangalore has resulted in loss of availability of food grains to the House Sparrows. Our next speculation is that rise of automobiles from horse-drawn carriages and other non-motorised modes of transport has in some ways affected them for feeding on any spill-over on-street. We thus speculate that some of the above or all of the above in combination have been at play in many ways that have restricted the distribution of House Sparrows in selected pockets of Bangalore.

Going forward, echoing recommendations by Laet and Summers-Smith (2007), we suggest dedicated studies to ascertain the selective presence and absence of House Sparrows in urban environments of Bangalore that can be statistically robust with better data and interdisciplinary research.

Keywords: House Sparrows, Bangalore, Hygiene Hypothesis, Urbanisation,

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# Of House Sparrows and Human Settlements

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## Introduction

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The evolution of human social organisation has come a long way from the initial hunter-gatherer state to living in larger settlements called cities in the last three thousand years. While the evolution of current species, *Homo sapiens*, dates back to a few hundred thousand years (about 250,000 years ago), the evolution human social organisation has been fairly recent and perhaps rapid. The innate social ability of humans coupled with intelligence has led the human social organisation to new levels signalling the process of urbanisation that is currently underway (Davis, 1965).

Yet, in all this transformation, it is believed that House Sparrows (*Passer domesticus*), have been a witness to humans in this transformation. In other words, House Sparrows are known to be widely distributed and mostly in and around human habitations both rural and urban settings and including farmlands (Laet and Summers-Smith, 2007). The evolution of the current species of House Sparrows has been fairly recent than humans (*Homo sapiens*) dating back to about 25,000 to 15,000 years ago (Allende *et al.*, 2001; Arnaiz-Villena *et al.*, 2009). Perhaps, the transformation of human social organisation influenced and is influencing the distribution of this species in many ways.

The bird's scientific and common name refers to its association with humans. The Latin word *passer*, like the English word "sparrow", is a term for small active birds, coming from a root word referring to speed. The Latin word *domesticus* means "belonging to the house", like the common name a reference to its association with humans ("House sparrows", 2013). House sparrows are perhaps the first wild birds to be associated closely with human beings without being domesticated. Parakeets, Doves, Kites and Hawks have been trained and domesticated, but not sparrows.

Sparrows have been epitomised by Salim Ali, the father of Indian ornithology by his famous auto-biography titled, '*The Fall of a Sparrow*', following an incident involving a different species of sparrows, the Yellow-throated Sparrow or Chestnut shouldered Petronia (Salim Ali, 1985). This in no way is directly related to the species in question, the House Sparrow.

At several points of time, the sparrows were considered as pests and have been declared as enemies of farmers due to its dependency on grains in farmlands and largely agrarian rural countryside. The most infamous one is the 'Great Sparrow Campaign' or 'Kill a Sparrow Campaign', officially known as the 'Four Pests Campaign'. This was one of the first actions taken in the Great Leap Forward from 1958 to 1962 in China by Mao Zedong. The four pests to be eliminated were rats, flies, mosquitoes, and sparrows (the Eurasian Tree Sparrow and not

the House Sparrow). The extermination of the last upset the ecological balance, and enabled crop-eating insects to proliferate (“Four pests campaign”, 2013).

### Are House Sparrows Declining?

Towns and cities have been around for over 2,000 years now. Yet, in the recent past, there have been concerns on the distribution and population of sparrows in India and elsewhere. According to the Royal Society for the Protection of Birds (RSPB) in England, house sparrow numbers were not monitored adequately before the mid-1970s. Since then, numbers in rural England have nearly halved while numbers in towns and cities have declined by 60 per cent. Because of these large population declines, the house sparrow is now red-listed as a species of high conservation concern (RSPB, 2012). Although there have been widespread concerns on the decline in the population of House Sparrows, the conservation status of this species is listed as Least Concern on the International Union for Nature Conservation (IUCN) Red List (Birdlife International, 2012).

Several studies and assessments in the recent past have been undertaken to ascertain the cause of this decline mostly in north-western Europe and a few in India. Laet and Summers-Smith (2007) plot the Population Index for the bird in Great Britain from 1970 to 2002 based on the Common Bird Census (CBC) run by the British Trust for Ornithology (BTO) that gives an indication of the abundance of the bird. They note that the numbers did increase until the late 1970s, but then, without warning, numbers began to decrease and, by 1997, had fallen by about 60%. Clearly two key ‘decline’ events can be noticed from their plot.

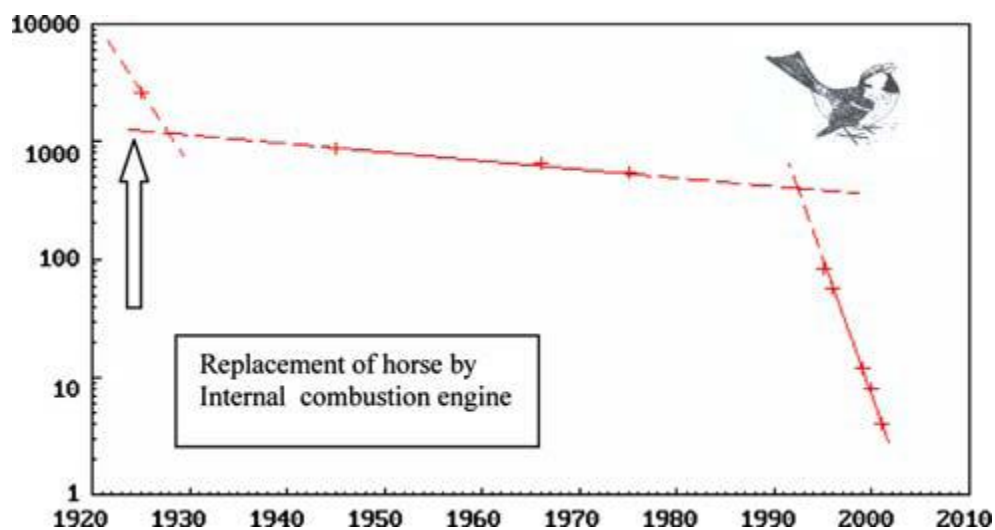


Figure 1: Autumn counts of house sparrows *Passer domesticus* in Kensington Gardens, London between 1925 and 2002 (Laet and Summers-Smith, 2007)

In a first of its kind, a citizen science based initiative was launched in 2012 called ‘Citizen Sparrow’ in India. ‘Citizen Sparrow’ is an ongoing citizen science project in which members of the public are encouraged to contribute information on presence and absence of the House Sparrow. It is organized by Bombay Natural History Society and Ministry of Environment and Forests (India) in partnership with the National Centre for Biological Sciences and Nature Conservation Foundation. The effort resulted in gathering 10779 observations from 5723

people at 8514 locations across India (Citizen Sparrow, 2013: <http://www.citizensparrow.in>). The findings of this study are awaited.

Commenting about the decline in population of House Sparrows in India is difficult primarily due to non-availability of any historical data / counts about this species though there have been 'observations' about their apparent decline from many quarters including hearsay.

## Where are House Sparrows in Bangalore?

With no apparent answer to the decline of House Sparrows, the first task is to perhaps gather data on their current distribution. Earlier during 2007, Sudhira (2007) had initiated a shared Google Maps project on 'Sparrows in Bangalore' that gathered data from personal field observations and records posted in the birdwatchers mailing list, 'bngbirds'. The effort resulted in about 40 odd locations where Sparrows were 'still' found despite notions that among residents in Bangalore that House Sparrow was not found in their locality or even 'extinct'.

Continuing the effort, the map is updated periodically. A revised map of Sparrows in Bangalore has been prepared (Figure 2) including the location data from the earlier map. The map is made available online here: <http://tiles.mapbox.com/gubbilabs/map/map-yxvaeqx7>

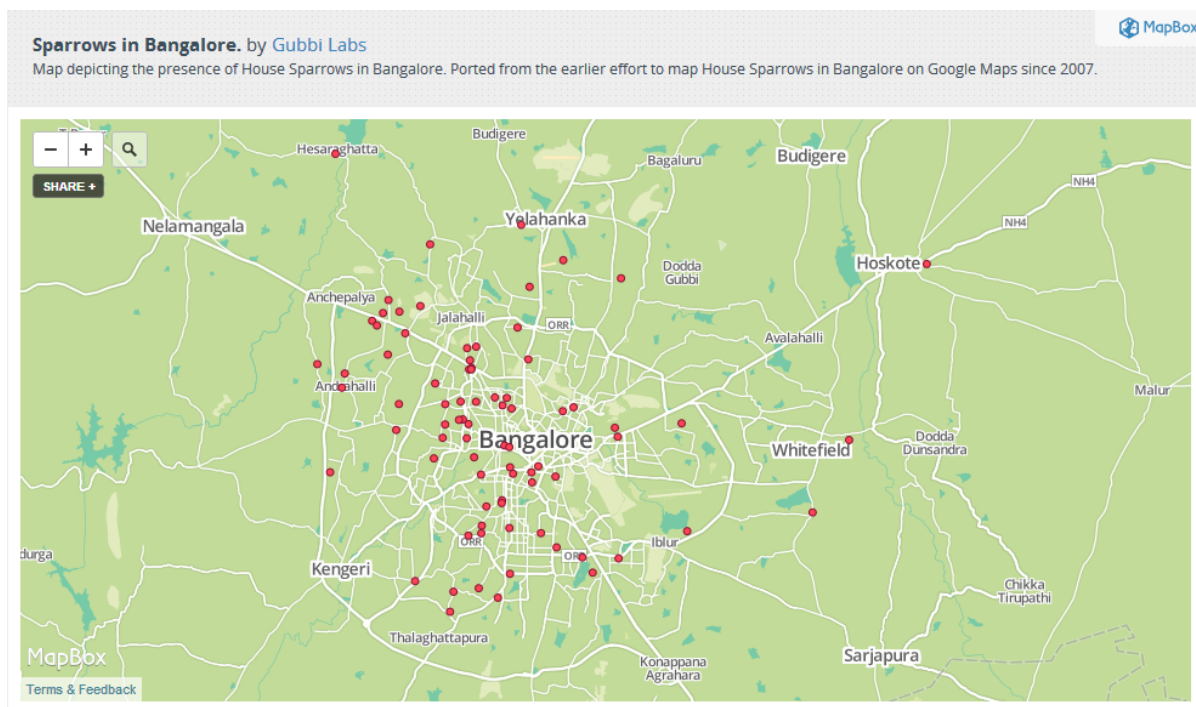


Figure 2: Distribution of House Sparrows in Bangalore.

## Speculating about the Distribution of House Sparrows in Bangalore

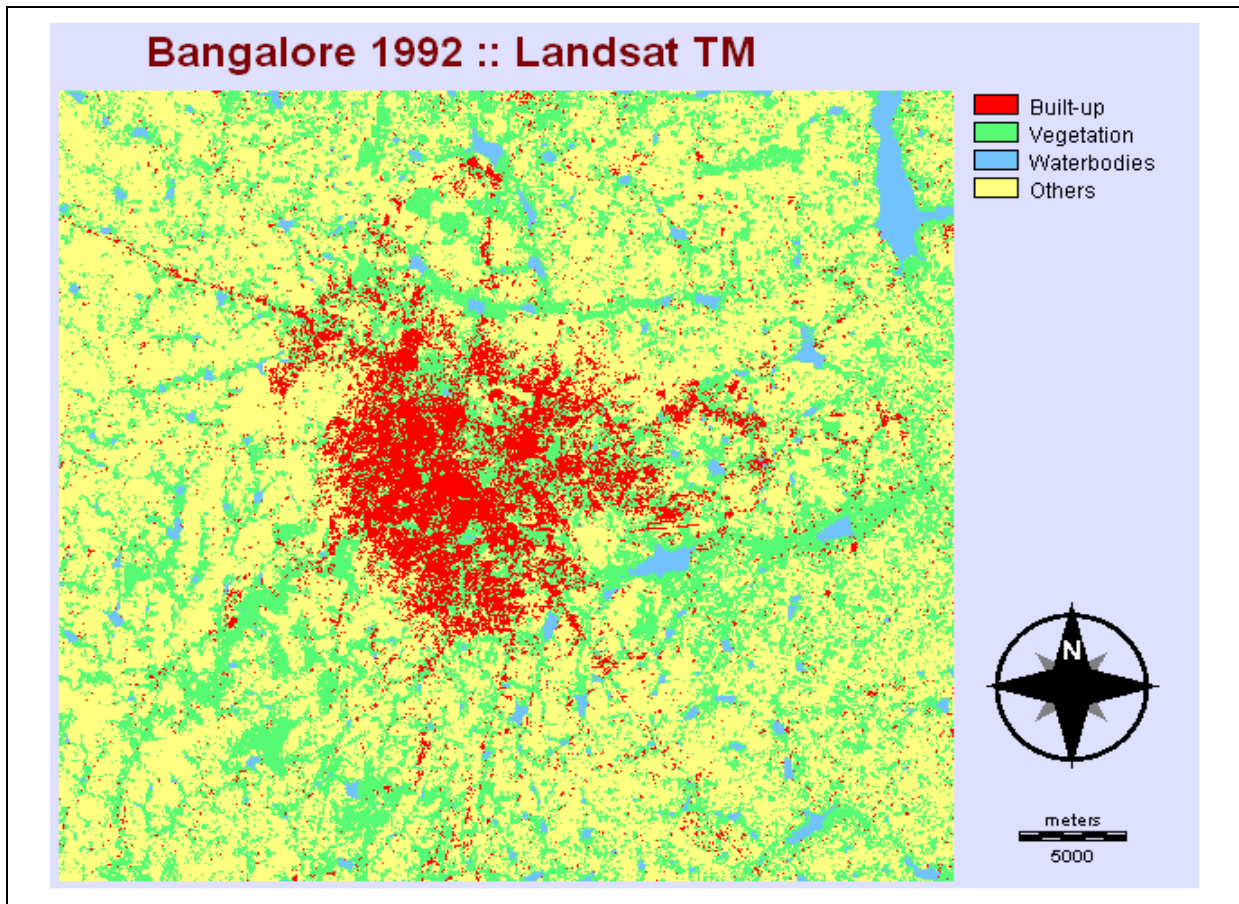
With no apparent previous data to conclusively suggest about the 'decline' or 'distribution' of House Sparrows, the present working paper speculates by putting forward several hypotheses based on the prevalent distribution (presence and absence) of House Sparrows in Bangalore.



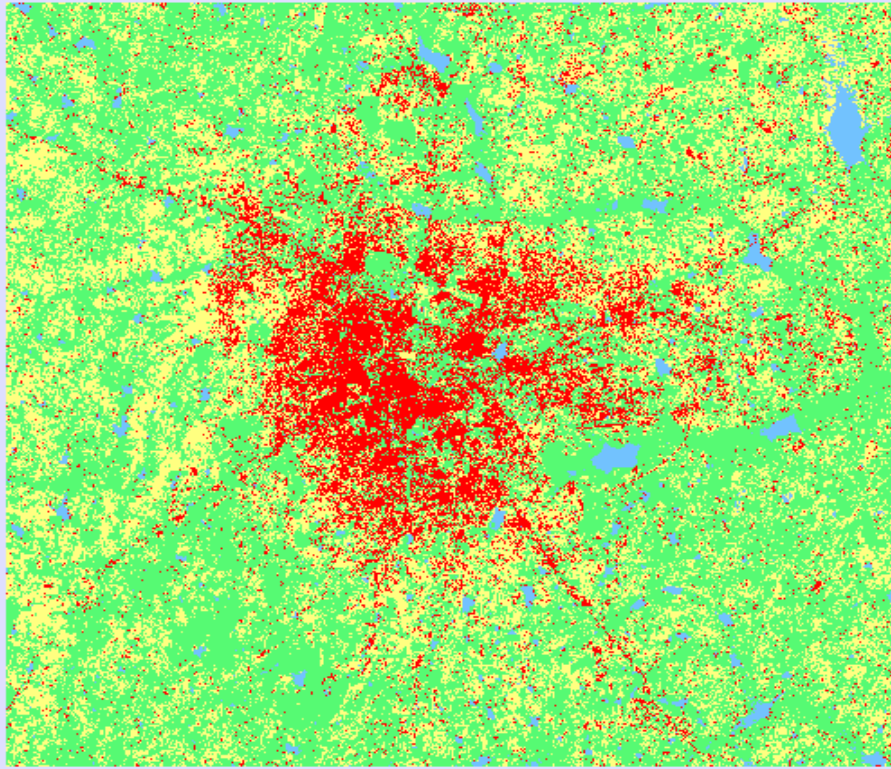
### Built-up areas and House Sparrows

Bangalore, in the recent past has seen unprecedented growth spatially. This has resulted in rapidly urbanizing landscapes leading to fragmentation and loss of open spaces, vegetation and water bodies. Based on Sudhira (2008) and Ramachandra and Sudhira (2011), the land-use change in Bangalore has been very significant with the rise in proportion of built-up areas from 27.3 % in 1992 to 35.37 % in 2000 to 58.4 % by 2009. Effectively, the built-up areas doubled in the last two decades resulting in the reduction of open lands, vegetation and water bodies. Our first speculation on the lines of Summers-Smith (2003) is that the rise of built-up areas has affected the distribution of House Sparrows in Bangalore.

Year	Built up	Vegetation	Water bodies
1992	27.3	46.22	2.6
2000	35.37	45.77	2.26
2009	58.4	16.32	0.72



### Bangalore 2000 :: Landsat ETM+

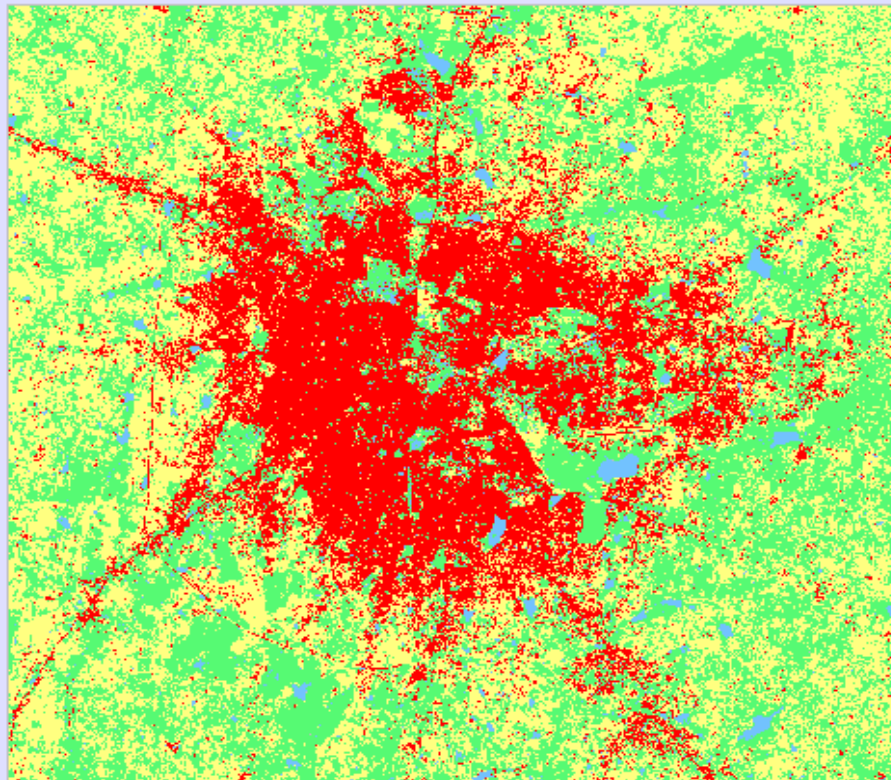


- Built-up
- Vegetation
- Waterbodies
- Others



meters  
5000

### Bangalore 2009 :: Landsat ETM+



- Built-up
- Vegetation
- Waterbodies
- Others



meters  
5000



Laet and Summers-Smith (2007) note that earlier in 1963, Summers-Smith predicted that 'the future looked bright for the house sparrow with man's dominance of the globe and the increasing amount of built-up land, the preferred habitat for the bird. He is now the first to admit how wrong he was'. Perhaps, if this were to be true, then Bangalore should have harboured more House Sparrows than it does now. Evidently, there must have been other processes at work that prevented the sustenance of the species and led to the 'decline' of the bird with the rise of built-up areas.

### Hygiene and House Sparrows

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From the distribution map of House Sparrows, several interesting facts emerge. In some of the locations (like KR Market, Tilak Nagar, Swimming Pool Extension, Srirampura etc.) where they are found are also localities that have livestock / cowsheds or vegetable markets in the neighbourhood. Very evidently, the 'absence' of House Sparrows is noted in some of the localities that are apparently 'well-planned' (or at least geometrically well-laid, like several blocks in Jayanagar, parts of Malleshwaram, Indiranagar, Vidyanarayana, etc.). Furthermore, a preliminary mapping of the locations suggest that the distribution of House Sparrows are mostly found in and around neighbourhoods of dense and low-income housing (Mohan Kumar Nagar, Sudhamanagar, etc.) and urban villages (Kodigenahalli, Amruthahalli, Varthur, etc.) than that of middle or high income housing. Some exceptions do however occur.

In the first of the 'speculation' for possible distribution of House Sparrows in Bangalore, we invoke the Hygiene Hypothesis that is typically applied in medicine ("Hygiene hypothesis", 2013). The hygiene hypothesis postulates that the cause of asthma, eczema, and other allergic diseases is an unusually clean environment. The hypothesis states that exposure to bacteria and other immune system modulator is important during development, and missing out on this exposure increases risk for asthma and allergy.

Declines in rural house sparrow populations are thought to be linked to changes in agricultural practices, particularly the loss of winter stubbles and improved hygiene measures around grain stores (Laet and Summers-Smith, 2007). Similarly, an extreme hygiene and changing lifestyles has resulted in lack of availability of food by way of leftovers, grains, etc. to the House Sparrows. Lack of availability of food by way of insects (prey), grains and other leftovers have been speculated earlier for the decrease in distribution of House Sparrows (Crick et al., 2002). Among the other lifestyle changes in Bangalore, purchasing food grains (in sealed packs) and vegetables in extreme hygiene environments and their efficient disposal have resulted in reduced availability of food around the household for House Sparrows.

In an elaborate study by Vincent (2005) as part of her doctoral thesis, it suggests that the abundance of invertebrate prey within home ranges of House Sparrows breeding within suburban and rural garden habitats limits the quantity and quality of chicks raised to fledging. The combined effects of relatively high rates of chick starvation and low body masses at fledging (and consequently low post-fledging survival) observed in suburban localities are large enough to result in rapid population declines. Invertebrate abundance in suburban areas is probably determined, at least in part, by the availability of suitable habitat including native deciduous shrubbery, trees and grassland. Although there is no evidence that the abundance of key invertebrate prey have declined in urban-suburban landscapes, such declines do provide a plausible mechanism for the observed declines in urban-suburban House Sparrow populations. Vincent (2005) conclude that management techniques, which increase densities of

key invertebrate prey during summer, have the potential to increase the annual productivity and possibly the breeding densities of House Sparrows in urban-suburban landscapes. Perhaps, ascertaining the prey (insects) populations can conclusively throw some light into this.

Similar to the hygiene hypothesis, the risks of incidence of asthma or allergy by remaining in extreme clean conditions reducing the immunity levels, pursuing extreme hygiene in urban environments can cause decline of House Sparrows. The speculation of extreme hygiene as a possible cause of decline is not to suggest that we need 'unhygienic' environments for House Sparrows, but for a more balanced hygienic environment where provisions for food sources to House Sparrows are ensured without compromising our health that can be achieved through adapting lifestyles.

### Automobiles and House Sparrows

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Laet and Summers-Smith (2007) note that changes in farmland were not the only spurs to growth in sparrow populations and further reason that unlike other birds, sparrows positively prospered from the growth of towns. Yet, they ascribe to increasing urbanisation with a horse-drawn transport provided a major source of food for the house sparrows in the spillage of oats from the nosebags and undigested seed in the droppings. It is assumed that the first urban decline of the house sparrow was the result of the replacement of the horse by the automobile as a means of transport (Summers-Smith, 2005). Not only did this remove a great source of food for the sparrow, but the faster moving traffic made the streets less safe to feed in (Bergtold 1921, In: Laet and Summers-Smith, 2007) and were presumably responsible for a disproportional mortality of naive young birds.

Our second speculation is that rise of automobiles must have led to decline of House Sparrows. Changes in urban transport have been phenomenal in Bangalore, posing significant challenges for the environment and general well-being. From the available literature there is adequate reasoning to suggest that rise of automobiles led to the decline of House Sparrows in the United States and Canada apart from Britain and Belgium (Summers-Smith, 2005). The rise and dominance of automobiles in Bangalore is well documented (BMLTA, 2009) with an estimated vehicle to person ratio of almost 1:2 in Bangalore. We further this speculation, linking the rise of automobiles replacing horse drawn carriages with loss of food on one hand and less safe to feed on-street (based on Bergtold 1921, In: Laet and Summers-Smith, 2007) on the other.

### Discussion and Future Work

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The concern on House Sparrows has been on the rise mostly in urban areas while the causes for their declines in and around human settlements are still undetermined. In this working paper we are only putting forward some key hypothesis or speculations for the possible decline, although not conclusive at this point of time. Some recent initiatives like the Citizen Sparrow can perhaps throw more conclusive light on the distribution of House Sparrows in the sub-continent.

We first speculate that increasing urbanisation coupled with extreme hygienic environments in Bangalore has resulted in loss of availability of food grains to the House Sparrows. Our next

speculation is that rise of automobiles from horse-drawn carriages and other non-motorised modes of transport has in some ways affected them for feeding on any spill-over on-street.

Among other causes for their decline, Everaert and Bauwens (2007) suggest possible effects of long-term exposure to low-intensity electromagnetic radiation from mobile phone (GSM) base stations on the number of House Sparrows during the breeding season that was studied in six residential districts of Belgium. Although, there have been speculations on this front conclusive studies are required to ascertain the effects of electromagnetic radiation.

In last of the possible causes, it is the housing typologies that could affect the House Sparrow population. With an increase in RCC-roof types and a shift from tiles, there are hardly any crevices or spaces in the household for the House Sparrows to nest.

We thus speculate that some of the above or all of the above in combination have been at play in many ways that have restricted the distribution of House Sparrows in selected pockets of Bangalore.

Going forward, echoing recommendations by Laet and Summers-Smith (2007), we suggest dedicated studies to ascertain the selective presence and absence of House Sparrows in urban environments of Bangalore that can be statistically robust with better data and interdisciplinary research. With limited historical data and observation, there can be limitations in interpreting as to what is currently going on in the urban environment of Bangalore.

Given that House Sparrows are perhaps the first wild birds to be closely associated with human settlements; their declining populations may have a lot to convey about the quality of urban environment, something that we need to know. As Laet and Summers-Smith (2007) ask, is the House Sparrow present day equivalent of the 'Miner's Canary'? Perhaps much detailed and interdisciplinary research that can ascertain the causes, processes and consequences are required for facilitating sustainable ecosystems and creating liveable settlements that ensure co-habitation of House Sparrows and humans.

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## About Gubbi Labs

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Gubbi Labs is a private research collective with strong foundations in research and underpinnings of a social enterprise. The Labs work on a host of domains ranging from sustainable ecosystems to liveable settlements. The Labs is powered by a collective with interdisciplinary expertise and focus on research, development and consultancy.

The Labs has an extreme focus for taking theory to practice and vice-versa with expertise in geospatial science and technologies, field ecology, urban and regional planning, and transportation. Gubbi Labs has three primary agenda: Research; Training; and Projects and Consulting. At the core of Gubbi Labs lies the Research agenda that gets the highest priority. This is followed by Training and Projects and Consulting, the other core activities of the Labs. Typically, Projects and Consulting are pursued that is in alignment to the Labs core agenda.



The Labs pursues pure and applied research primarily in areas of Urban Systems (spanning from land-use land cover change, transportation, parking, and non-motorized transport - policy and planning), Biodiversity, Conservation Biology, Geo-informatics and Remote Sensing, and Alternative Energy. As an enterprise, Gubbi Labs is committed for sustainable development and empowerment of society through application of appropriate science, technology and management practices. The Labs is committed for enhancing the social capital and to work on enabling opportunities for overall societal empowerment and its development. The success of Labs efforts, besides financial metrics, is measured by societal impact – the overall reach to number of people it has impacted, direct and indirect, through its combined efforts in research, projects and consulting.



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