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THE HOUSE SPARROWS: CAUSES OF DECLINE IN PUNJAB, ECOLOGICAL IMPORTANCE & PROACTIVE STEPS

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ABSTRACT

House-sparrow populations have declined sharply in Punjab in recent decades, but the reasons for this decline have yet to be identified, despite intense public interest of people of Punjab in the matter. The unavailability of nests because of modernization, constructions, and deforestation can lead to their decline. The other causes might also include rapid use of insecticides, competition with other species etc. sparrows are known to be sensitive to magnetic radiation. Increasing number of cell phone towers in cities apparently are bringing down sparrow population. The main cause of decline of this species remains unidentified but it is believed that The microwaves (300 MHz to 300 GHz) emitted by cell phone towers and handsets has been found to be responsible for damaging eggs and embryos of sparrows. The most probable cause of the decline in overall population in birds owing to mobile and cell phone base stations is the effect on reproductive success in Sparrows. Sparrow serves the ecosystem of the earth. By spreading seeds, sparrows help the survival of many plants that are the producers in an ecosystem. The most important factors in the continued health and well-being of Sparrows are availability of suitable habitat and of supplies of food and water. If these are supplied, in general, a species will be healthy and can flourish. If an environment is compromised by, say, having it destroyed or polluted to the point of unusability, then the species will at best go elsewhere. Failing that, the species will likely enter into decline. It will at least be more susceptible to diseases.

Keywords: House-Sparrow, Punjab, Integral Part, IUCN, Ecological Importance, Proactive Steps.

I. INTRODUCTION

House Sparrow, once an integral part of our immediate environment, all but disappeared almost two decades ago. The common bird that lived in the cavities of our houses and polished off our leftover food, today sits on the red list of the endangered species of The International Union for Conservation of Nature (IUCN). In the Indian Subcontinent they are commonly found in India including introduced populations in Pakistan, Bangladesh & Srilanka. Ecologists believe that House Sparrow bird is a symbiotic species with human, hence recognizing and identified as bird species depended on human environments. It is an essential bird species as an equilibrant factors in ecosystems which have educational, recreational, economical and aesthetic values.

II. METHODOLOGY

We employed a mixed-methods approach in this study. Here we use a combination of field experimentation, genetic analysis and demographic data to show that a reduction in winter food supply caused by agricultural intensification & intense urbanisation is probably the principal explanation for the widespread local extinctions of rural house-sparrow populations in the state of Punjab & environmental impacts, and provocative steps.

III. MODELING AND ANALYSIS

House Sparrows (Passer domesticus)

These chattering, chirping, chestnut balls of downy feathers have filled our neighbourhoods with their rapacious voices since the Stone-age. Once every city was erupting with them.

According to a 2018 Royal Society of London report, the bond between humans and sparrows goes back 11,000 years, and the starch-friendly genes of the house sparrow tell us a story linked to our own evolution. Agriculture, triggered similar adaptation in three very different species – dogs, house sparrows and humans.

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Scientific studies have established that the house sparrows follow us everywhere and simply cannot live where

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we don't. Fossil evidence from a cave in Bethlehem dating back 4,00,000 years suggests that the house sparrow shared its space with early humans.

Around the start of agriculture, the urban house sparrow split from the wild birds; it has a pair of genes, AMY2A, that helps it digest complex carbohydrates, the reason that it shares our love of starchy wheat and rice.

These once-common birds are becoming a rarity in Punjab and other parts of India and of the world.

The ancient Romans introduced the house sparrow to Europe from North Africa and Eurasia. Human exploration and migration then took the bird to many other parts of the globe, including North and South America, South Africa, Australia and New Zealand.

The Common House Sparrow, which is the most abundant bird in the world, was once considered a nuisance and even a threat to agriculture. However, this small sparrow has recently been recognized as an important and beneficial species. Sparrows clean up around human habitats by eating insects, such as flies and mosquitoes. Evidence suggests that sparrows can dramatically decrease the number of insects, particularly mosquitoes.

The decline in house sparrow populations has been observed in many urban and suburban areas around the state of Punjab. While the exact reasons for the decline may vary in different regions, several factors are commonly implicated in the decline of house sparrows in Punjab:

Loss of Habitat: Urbanization and changes in the land use of Punjab result in the destruction or alteration of natural habitats. The removal of traditional nesting sites, such as old buildings with nooks and crannies, and the reduction of green spaces, negatively impact house sparrow populations. The ubiquitous glass buildings , the corporate dens have replaced many older structures that were built with a façade that had nooks and crannies, even bricked roofs, which allow sparrows to nest. Cavities are important for birds like sparrows to make nests.

Absence of native plants: Plants provide a habitat for sparrows to nest and roost. They can also offer shelter and protection from predators**.** Native & Heritage Plants of Punjab such as Sheesham (Dalbergia sissoo), Kikar (Acacia nilotica), Neem (Azadirachta indica) Banyan (Ficus benghalensis), Pipal (Ficus religiosa), Ber (Ziziphus mauritiana), Mulberry (Morus spp.) Mehndi and many others are outdone by fancy non-native ones like Duranta Erecta, Dumb Cane and others as the trend of modern landscaping catches on. Sparrows prefer trees with dense foliage and branches that are close together, such as oak, maple, and hawthorn trees. Native plants are the natural habitats of sparrows, providing them insects such as aphids to feed on. Sparrows need a diet of insects in their formative years to grow into healthy adults.

Dependence of Sparrows on Insect life, Pollen seeds & Grass

Sparrows depend on a variety of food sources, including insects, pollen, and seeds from grasses. But with heedless urbanisation sparrows not only have less space to hunt for these food items, but also the insects that sparrows feed upon are being wiped out due to the destruction of their natural habitats.

This makes sparrows increasingly dependent on the availability of food sources in urban areas, which are much less abundant than in rural areas. In addition, sparrows also need green and open spaces to fly around and build nests, which is made difficult by the lack of these kinds of places in urban areas due to heedless urbanisation.

Changes in Agriculture: Modern farming practices, of Punjab including the use of pesticides and herbicides, can reduce the availability of insects for sparrows to feed on. Additionally, changes in crop types and harvesting practices may affect the availability of food for sparrows.

Pollution: Air and water pollution in urban areas o Punjab can have detrimental effects on house sparrows. Pollution may reduce the availability of insects, which are a crucial part of their diet. Contaminated water sources can also affect the health of sparrows.

Lack of Food & Modern grocery storage: Punjab – which is contributing around one-fourth of the total cereal grains to the national pool. In ancient times, women in Punjab used to sit outside their houses and clean wheat and millet, with which some grains fell on the ground and became food for sparrows. Sparrows' favorite seeds are white millet (tiny grains like bajra) and sunflower seed. They also eat crop foods corn, wheat, buckwheat. Changes in human food habits and waste management is influenceing the availability of food for sparrows. For example, a decrease in food scraps or the availability of food in open areas is impacting sparrow populations. Also these were earlier freely available from pecking at gunny bags stored outside older-style grocery stores

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and even the grains spilled on the ground. Modern grocery stores with air-conditioning and plastic packaging are taking away any chance of finding food grains to feed on.

Nest Predation: Increased predation on nests, either by natural predators or introduced species is contributing to declining house sparrow numbers. Cats and other predators also poses a threat to eggs and nestlings.

Climate Change: Changes in weather patterns and climate can affect the availability of food resources for house sparrows. Extreme weather events, altered rainfall patterns, and temperature changes may impact the abundance of insects and seeds.

Electromagnetic Radiation: Some studies have suggested that exposure to electromagnetic radiation from mobile phones and other electronic devices is affecting house sparrow populations, although the evidence is not conclusive and more research is needed in this area. The electromagnetic fields and radiation created by mobile towers are known to affect sparrows, simultaneously indicating that the radiation is also harmful to humans. The effects range from damage to the immune and nervous system of sparrows to interference with their navigating sensors.

Bird Habitats Affected by Urbanization

Urban sprawl is one of the main causes for sparrow habitat destruction. Urban sprawl results in the cutting down of trees, construction of roads, and development of land – all of which makes it difficult for sparrows to find enough space to feed and breed.

Another way urbanisation affects sparrow habitats is through air and noise pollution. Pollution from industry, vehicles and other sources have an adverse effect on sparrows' health and wellbeing. The sparrows' ability to find food is also hindered due to the polluted air.

In order to protect sparrow habitats from urbanisation, it is important that we take steps such as planting trees and shrubs that sparrows like, creating green spaces in cities, and building sparrow-friendly infrastructure. We can also build birdhouses for sparrows so that they have a safe place to nest.

By taking these steps, we can help sparrows survive the effects of urbanisation and ensure that their habitats remain safe and healthy.

Pesticides effect on Food Production

Urban sparrows also face another threat – the use of harmful pesticides in urban areas. Pesticides are used to protect crops from insects, but they also affect sparrows that feed on these insects or on the plants treated with them. Furthermore, sparrows can be poisoned by consuming pesticide-contaminated food or water.

Pesticides reduce sparrows' food sources, which can lead to malnutrition and reproductive failure in sparrows. This further contributes to sparrow extinction due to heedless urbanisation

Mosquito repellent & other toxins

A wide range of hazardous compounds often found in the house damage the health of birds. Poisoning of sparrows can occur by ingestion or inhalation. Insecticides and pesticides are two of the most prevalent toxins for these birds. Ammonia, bleach, various glues, nail polish remover, oven cleaning, paint, fragrant candles, and heavy metals are among the other toxins. Poisonous plants, especially festive flora, are also harmful.The chemicals involved in coils may be toxic when ingested at high doses to these birds.

The field bean theory

The field bean theory is particularly interesting. Formerly, urban households in India used to buy field beans as pods in vegetable markets. When the pod was broken, larvae came out, to be promptly devoured by sparrows. But now that fresh seeds are available in packets, these larvae have disappeared, depriving the sparrow. It is the same sad story for the sparrow all over the globe. Changing lifestyles and architectural evolution have wreaked havoc on the bird's habitat and food sources. Modern buildings devoid of eaves and crannies, disappearing home gardens and crop fields cleaned of insects by the use of chemical pesticides, all play a part in denying sparrows nesting sites and food, especially for the young.

Diseases: The spread of diseases, both avian and zoonotic, can impact house sparrows. Increased contact with human settlements and other bird species may facilitate the transmission of diseases.

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Superstitions: Last but not least, humans with their firm belief in superstitions are known to consume sparrows, as some believe the male species to be an aphrodisiac.

Importance of House Sparrow

House sparrows play a significant role in ecosystems and offer several benefits to the environment and human communities. Sparrows are helpful in that they can be used as an indicator to determine environmental pollution. Sparrows are attractive birds that enjoy spending time near humans.

Here are some of the key aspects highlighting the importance of house sparrows:

Sparrows Add To The Beauty Of Nature : You must have enjoyed the songs and beauty of birds in your garden, but what you might not know is that the most common small bird we see often in our gardens and lawns is a sparrow. Other birds that build a nest in our gardens and lawns are often sparrows. Sparrows add to the beauty of nature by their chirping, making them a welcome sight or part of nature for many.

Sparrows Help In Seed Distribution: Sparrows also help plants grow because when they eat from plants, they pass on the seeds in their droppings which helps the plant grow into a new one. The specific type of grass that is grown naturally can be used as food by cattle and other animals. When these animals graze on these grasses, it helps not only the cows but also ensures a regular cycle of rearing livestock.

Sparrows As Food To Other Birds And Mammals: Sparrows, though small birds of the size of about 12 to 14 centimeters, serve as food for not only humans but also other larger birds and mammals. Sparrows, as a diet for some species of raptors, eagles, owls, hawk, and falcon contain about 13 percent protein on average.

Sparrows Are Important To The Ecosystem And Environment: Sparrows are very beneficial to the environment because they help in seed dispersal by eating grains from the feeder placed at homes to attract them. In fact, scientists have found that sparrows can spread seeds up to 15 times farther than just being at the feeder only.

Sparrows Promote Plant Growth: A sparrows' wings and their droppings cause the plant dung around your homes to multiply. Sparrows help in providing necessary fertilizer (excrement) for all such plants which they feed on. The other benefit is that those droppings also provide natural pesticides for those plants as bird's waste contains arsenic which functions as a poison for many pests.

Sparrows Have Strong Survival Instinct: Sparrows deal with the hardships of life better than humans sometimes. If a sparrow is forced to fly in a specific pattern, it will do so even if the new route doesn't make sense. Even when a hungry cat sees a sparrow flying, she can't catch it because the sparrow somehow knows that this behavior makes him safe from harm.

Sparrows Are Used In Science: Sparrows are used in scientific experiments to better understand the way they communicate with one another. In addition, scientists have been able to record their natural history and behavior as a means of studying men. This has enabled them to learn more about sparrows and their complex communication patterns.

Sparrows Are Used In Art: In art, sparrows represent innocence and simplicity because this bird is cute looking and does not harm anyone, unlike other bigger animals that may eat us for food or even kill us on sight if we threaten them in any way. Thus, artists draw inspiration from this little but important creature which helps people see how beautiful nature can be sometimes when we stop making it a hostile environment where only survival of the fittest matters. Sparrows indeed are very helpful to humans in many ways.

Sparrows Are A Part Of Our Cultures And Traditions: Sparrows are a part of different cultures and traditions around the world as they usually represent luck, good luck, and happiness which is one of their most important roles in human culture. For example, many people believe that seeing a sparrow will bring you good luck or even a new birth to your family if it flies into your home.

Sparrows Are Indicators Of A Healthy Environment: Sparrows' role in making the environment healthy is very important as they are the little helpers that nature sends to us. In fact, environmentalists view sparrows as a good indicator of a healthy environment. To monitor air pollution, scientists are taking the help of the sparrows. Sparrows feed on insects and their massive population shows how your ecosystem is doing – if you have a lot of sparrows then everything must be going well!

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Sparrows Are Useful For Farmers And Gardeners: Sparrows help farmers and gardeners by eating weed seeds and insects that can cause harm or damage to crops and plants. If there were no sparrows in such areas, then these pests might destroy the entire crop which would not only cost the farmer money but also greatly affect other organisms that depend on such produce for food such as livestock like cows thus creating a gap somewhere else in nature.

Sparrows Bring Joy And Happiness: Another good reason is that you must feel happy when you see these small birds around your home. Just imagine if there were no sparrows in your garden or even your lawns, then it would be a very sad and cheerless place to live in. This brings us another reason why sparrows are important since they bring joy and happiness to all who see them around their homes.

Sparrows Are Symbols Of Good News: Sparrows are symbols of good news – whether it is seeing them for the first time after weeks or months of being away from home or watching them build nests in your backyard. Their constant chirping every morning before sunrise also symbolizes that there's another day coming which means more opportunities to grow and learn new things.

Insect Control: House sparrows are voracious insect eaters, consuming a wide variety of insects and their larvae. They help control insect populations, including agricultural pests, making them valuable allies in pest management.

Biodiversity: As a part of the ecosystem, house sparrows contribute to the overall biodiversity of an area. Their presence supports the interconnected web of life by participating in food chains and ecological processes.

Cultural and Aesthetic Value: House sparrows have cultural significance in many societies and are often associated with human habitats. Their songs and activities add to the aesthetic value of urban and suburban environments, contributing to a connection with nature.

Pollination Assistance: While not primary pollinators like bees, house sparrows may contribute to pollination by visiting flowers while foraging for nectar and insects. This incidental pollination can support plant reproduction.

Economic Benefits: House sparrows contribute to agriculture by helping control insect pests, potentially reducing the need for chemical pesticides. This can result in economic benefits for farmers and promote more sustainable farming practices.

Ecosystem Services: By participating in ecological processes like nutrient cycling, seed dispersal, and insect control, house sparrows provide essential ecosystem services that contribute to the overall health and balance of ecosystems.

WHAT WE CAN DO:

1. Adopt a nest box (surrogate cavity) and a feeder with the right kind of grain in it, to encourage sparrows to feed. This way, you'd provide them with a constant source of food.
2. lant native species of plants to help build a sparrow-friendly habitat and to espouse insect population.
3. Set up a water bath, especially in summer, to allow the birds to drink and bathe.
4. Spread the word and encourage friends and family to save the sparrow.

Save the sparrow Project (SOS)

World Sparrow Day, celebrated on March 20 annually, is an initiative of the Nature Forever Society. In 2005, to push his agenda, Mohammed Dilawar started a non-profit organisation called Nature Forever Society (NFS) that focuses on conserving common bird species. Apart from conducting research on sparrows, Dilawar and his organisation tried to encourage citizens to care for the bird.

In less than four years, this popular event has been celebrated in more than 50 coutries around the world; including in Europe and parts of South Asia. World Sparrow Day is not only about house sparrows. It includes all 26 species of sparrows found in the world.

SOME STRATEGIES AND ACTIONS

Despite their importance, house sparrow populations have experienced declines in many regions. Recognizing and understanding their ecological significance can contribute to conservation efforts aimed at preserving these birds and maintaining the services they provide to ecosystems and human communities. The house

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sparrow is fast disappearing 'common' bird. This avian species can still be spotted at over two-thirds of the world's land surface. But reports are pouring in from all over India and around the world of rapid decline in the populations of these once abundant birds. Conserving and saving house sparrows involves addressing various factors that contribute to their decline. Here are some strategies and actions that can be taken to help save house sparrows:

Provide Nesting Sites: Create and maintain nesting sites by putting up nest boxes or birdhouses with suitable dimensions for house sparrows. These structures can compensate for the loss of traditional nesting sites due to urbanization.

Preserve Green Spaces: Preserve and create green spaces with a diversity of vegetation. House sparrows benefit from areas with trees, shrubs, and grass that provide food, shelter, and nesting opportunities.

Reduce Pesticide Use: Encourage and adopt organic or environmentally friendly farming practices to reduce the use of pesticides and herbicides. This helps maintain a healthy insect population, which is an essential food source for house sparrows.

Provide Food Sources: Set up bird feeders with appropriate food for sparrows, such as seeds, grains, and insects. Ensure that the feeders are kept clean to prevent the spread of diseases.

Control Nest Predators: Implement measures to control nest predators, such as using collars on tree trunks to prevent climbing by cats, and promoting responsible pet ownership to reduce predation on nests.

Reduce Pollution: Advocate for and participate in efforts to reduce air and water pollution. Promote sustainable practices and waste management to create a cleaner environment for both sparrows and their prey.

Community Engagement and Awareness: Raise awareness about the decline of house sparrow populations and the importance of their conservation. Engage communities, schools, and local authorities in conservation initiatives.

Plant Native Vegetation: Plant native trees, shrubs, and plants in gardens and public spaces. Native vegetation provides suitable foraging habitats and encourages a diverse insect population, which is essential for house sparrows.

Climate Change Mitigation: Support and advocate for measures to address climate change. This includes reducing carbon emissions and promoting sustainable practices to mitigate the impact of climate change on bird species.

Research and Monitoring: Support and participate in research projects focused on house sparrows. Monitoring population trends and understanding the specific challenges they face in different regions can guide targeted conservation efforts.

Legal Protection: Advocate for legal protection of house sparrows and their habitats. Encourage the enforcement of laws that protect wildlife and their natural environments.

International Collaboration: Promote international collaboration and information exchange to address the global decline of house sparrows. Sharing successful conservation strategies can benefit efforts in different regions.

Saving house sparrows requires a coordinated effort from individuals, communities, governments, and conservation organizations. By addressing various aspects of their ecology and the threats they face, it is possible to contribute to the recovery of house sparrow populations.

It's important to note that the decline in house sparrow populations is likely due to a combination of these factors, and the specific reasons may vary across different regions. Conservation efforts often involve addressing multiple aspects, including habitat preservation, reducing pollution, and raising awareness about the importance of maintaining biodiversity in urban environments.

But not everyone is fond of the house sparrow; in fact, quite the opposite. Some people see the house sparrow as an invasive pest, a "kind of brown-winged rat stealing our food". In an article in smithsonianmagazine.com, biologist and author Rob Dunn said that the human love–hate relationship with the bird was typical of human beings:

It is time for us to take action to save sparrows from extinction. We can start by taking steps such as creating

more green spaces in cities, planting trees and shrubs that sparrows like, and building sparrow-friendly infrastructure.

We must also become more aware of our impact on the sparrow population and strive to be more mindful of the environment. Every small action we take can make a difference in sparrows' lives and contribute to their survival.

Providing Sparrow friendly leather bird-houses and bird feeders.

Creating sparrow-friendly habitats can help sparrows survive and thrive in urban areas. We can create sparrow conservatories using leather bird houses, sparrow-friendly plants, and bird feeders as a way to provide sparrows with shelter and food sources.

These Bird houses provide sparrows with a safe place to build nests and breed, while bird feeders give sparrows easy access to food sources. This will not only help sparrows in their fight against extinction due to heedless urbanisation, but also help sparrows become more dependent on humans for food.

These sparrow conservatories can be located in green and open spaces such as parks or gardens, providing sparrows with a safe place to live and stay healthy.

IV. RESULTS AND DISCUSSION

The sparrow population has suffered a drastic decline in recent years due to heedless urbanisation. This has had a devastating effect on the sparrows' habitat, as well as on the whole ecosystem in which sparrows were integral.

Urbanisation is defined as the process of population growth and increasing human activity in cities and towns. As cities grow and sprawl, sparrow habitats are further destroyed or disrupted, making it hard for sparrows to find a place to nest or hunt for food.

Sparrows need open spaces to feed and breed, but the urban landscape often does not provide them with enough of such areas. We cut down trees, develop land, and build roads that sparrows cannot cross safely. As a result, sparrow populations decline as they have fewer places to fly to.

A recent study has revealed that sparrow populations are decreasing more quickly in urban areas than in rural ones. This shows how heedless urbanisation is having a direct impact on the sparrow population.

V. CONCLUSION

Conservationists attribute the decline in the population of house sparrows to the unfriendly architecture of our homes, chemical fertilisers in our crops, noise pollution that disturbs acoustic ecology and noxious exhaust fumes from vehicles. The debate about whether the digital revolution has jammed the air passages is inconclusive, but common people say it is no coincidence that the house sparrow started disappearing in the late 1990s, when mobile phones came to India.

Sparrow extinction due to heedless urbanisation is an alarming issue that deserves our attention and action. We must take steps to protect sparrow habitats from destruction, such as creating green spaces in cities, planting trees preferred by sparrows, and building sparrow-friendly infrastructure. By taking these steps, we can help sparrows survive the effects of urbanisation and contribute to their survival. Let us all come together to protect sparrows from extinction due to heedless urbanisation! Every small action we take can make a difference and secure sparrows a future!

Concerted efforts are being made to bring back the house sparrow. According to scientist-conservationist Mohammed Dilawar, "Earlier, the house sparrow and other common species were not considered conservation material by scientists, and common people were far removed from conservation as a subject."

A vigorous campaign by the outfit he heads, "Nature Forever", led to March 20 being observed as the 'World Sparrow Day' and the house sparrow being declared the state bird of Delhi in 2012. Today, Dilawar says, "it enjoys a high profile globally, its conservation, a people's movement." However, data is not available on the impact of the campaign that focusses on simple, doable and affordable things like putting nesting boxes and water/grain bowls in balconies.

The common house sparrow has long been seen as a harmless irritant that does not provide any real value to humans. However, this small bird actually provides many important services including insect control and environmental cleanup!

"we can tell that when sparrows are rare, we tend to like them, and when they are common, we tend to hate them. Our fondness is fickle and predictable and says far more about us than them. They are just sparrows, neither lovely nor terrible, but just birds searching for sustenance and finding it again and again where we live."

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