*A Brief History of Urbanization*

Human exploitation of land dates back to our earliest settlements, with massive, yet local, destruction and deforestation. Already the Romans transformed the landscape to the treeless landscape of the Mediterranean that we are familiar with today, probably with devastating consequences for the wildlife at that time. Similar scenarios can be found throughout human history and across the world. However, it was not until the Anthropocene that the urban human societies started to grow significantly across the globe. Western industrialization started in the 1700s and with that urbanization and urban sprawl became a significant part of the landscape. Today, urbanization is a global phenomenon with implications for birds as well as for all other animals. Yet, developing countries are still in the early phases of industrial revolution; thus, the impact of global urbanization is expected to increase. Likewise, due to continued growth of the human population, existing urban areas in the western countries are also predicted to intensify and expand in the future.

Although, the total number of bird species declines once an area is urbanized, many bird species do seem to flourish. In fact, birds are probably the loudest and most visible animal group in the urban habitat. The urban species often exploit anthropogenic resources such as the high abundance of novel food sources and artificial nesting holes, e.g., nest boxes and under roof tiles. In temperate regions, birds can also benefit from the warmer climate caused by the so-called “urban heat island” effect, which is caused by the heat-absorbing properties of the impervious surfaces and buildings together with the scattering effects of air pollution, trapping heat irradiation within the atmosphere of the city. However, in warmer or tropical regions, the urban heating effect can be devastating for birds, leading to heat stress and dehydration.

Together with climate change, urbanization is considered one of the largest threats to wildlife, including the persistence of many bird species. The foremost threat is probably habitat loss and fragmentation, which forces rapid decisions about emigrating to more suitable habitats or stay and cope with the new conditions. The new urban conditions are not only through the process of urbanization per se but also the fact that the existing or remaining “green” areas are often changed, through plantation of non-native plant species, managed lawns, and removal of the mid-story canopy

*Urban bird*

Species diversity indicates the health of an ecosystem. If so, how healthy are our urban areas? Who survives in the city and why? Earlier last year, a group of researchers addressed this in a review paper titled ‘What traits influence bird survival in the city? (Differential food resources and predatory pressure results in changes in life history traits, including prolonged breeding duration, and increases in clutch and brood size to compensate for lower survival) This is an extensively studied topic, and the review evaluated the current status of bird diversity in our urban neighbourhoods. It is imperative for us to learn how cities can become better ecosystems for birds as urbanization rapidly increases.

Which bird species survive in an urban landscape depends on various traits ranging from what they eat to how they sing. Bird diversity and abundance is influenced by several factors, such as diet, habitat, and even competition with other species. Experts suggest that generalist species that can cope with a city’s challenging environment survive better and occupy more nesting spaces. They not only acquire basic food and shelter, but also act as competitors to migratory species who arrive seasonally. Chances of a species surviving reduce even further if they are specialists—birds that have specific habitat requirements and diets. For example, ground nesting birds are more affected by infrastructure development, habitat change, and urbanization, than those that nest in tree holes or nest boxes.

Urban birds differ in size, colour, and body mass from those occurring in natural habitats. Their diet and the cityscape influence their appearance. With ample resources, they reproduce in large broods and don’t have to accumulate large amounts of body fat. Relatively high temperatures in the city and low quality of food affects their body size and mass. Thus, birds in the city are known to be smaller than those in rural areas, with a few exceptions.

Birds are also impacted by noise and light pollution, which create stressful environments for them. One of the best described examples is the impact of noise pollution on the dawn chorus, where the males of four out of five songbird species residing near street lights are known to sing earlier in the day. Known as the Lombard effect, evidence also suggests that some species increase the amplitude of their songs in order to be heard above the ambient noise in cities.

A significant difference in the behavior of urban birds has also been noticed. Due to their dependence on food produced by humans, many birds like gulls are known to adjust their activity according to human activities, such as school breaks or the opening of a waste center. Urban birds are also more susceptible to aggression due to the presence of chemicals such as lead, unlike rural birds.

Thus, multiple selection pressures exclude many bird species and affect their diversity in urban areas. Conserving and maintaining native habitats and water bodies, such as lakes, can go a long way in providing homes to our feathered friends. Additionally, ensuring that cats and dogs are unable to access birds or their nests is important. Urban planners and park managers need to work with citizens and scientists on this. After all, a collective effort to restore biodiversity can ensure a

healthy ecosystem that supports us and our non-human neighbours.

*What is the most common bird in cities?*

The three commonest city birds are the **starling, sparrow and pigeon**. They are three very adaptable species, always ready to exploit a potential food source or a suitable nest site. Starlings are sociable birds - they congregate in their thousands and fly to suitable roosts.

* starling

Starlings are small to medium-sized passerine birds in the family Sturnidae. The name "Sturnidae" comes from the Latin word for starling, sturnus. Many Asian species, particularly the larger ones, are called mynas, and many African species are known as glossy starlings because of their iridescent plumage. Starlings are native to Europe, Asia and Africa, as well as northern Australia and the islands of the tropical Pacific. Several European and Asian species have been introduced to these areas as well as North America, Hawaii and New Zealand, where they generally compete for habitats with native birds and are considered to be invasive species. The starling species familiar to most people in Europe and North America is the common starling, and throughout much of Asia and the Pacific, the common myna is indeed common. Starlings have strong feet, their flight is strong and direct, and they are very gregarious. Their preferred habitat is fairly open country, and they eat insects and fruit. Several species live around human habitation and are effectively omnivores. Many species search for prey such as grubs by "open-bill probing", that is, forcefully opening the bill after inserting it into a crevice, thus expanding the hole and exposing the prey; this behaviour is referred to by the German verb zirkeln.Plumage of many species is typically dark with a metallic sheen. Most species nest in holes and lay blue or white eggs. Starlings have diverse and complex vocalizations and have been known to embed sounds from their surroundings into their own calls, including car alarms and human speech patterns. The birds can recognize particular individuals by their calls and are the subject of research into the evolution of human language.

* Sparrow

The house sparrow is a bird of the sparrow family Passeridae, found in most parts of the world. It is a small bird that has a typical length of 16 cm and a mass of 24–39.5 g. Females and young birds are coloured pale brown and grey, and males have brighter black, white, and brown markings. One of about 25 species in the genus Passer, the house sparrow is native to most of Europe, the Mediterranean Basin, and a large part of Asia. Its intentional or accidental introductions to many regions, including parts of Australasia, Africa, and the Americas, make it the most widely distributed wild bird.

The house sparrow is strongly associated with human habitation, and can live in urban or rural settings. Though found in widely varied habitats and climates, it typically avoids extensive woodlands, grasslands, and deserts away from human development. It feeds mostly on the seeds of grains and weeds, but it is an opportunistic eater and commonly eats insects and many other foods. Its predators include domestic cats, hawks, and many other predatory birds and mammals.

Because of its numbers, ubiquity, and association with human settlements, the house sparrow is culturally prominent. It is extensively, and usually unsuccessfully, persecuted as an agricultural pest. It has also often been kept as a pet, as well as being a food item and a symbol of lust, sexual potency, commonness, and vulgarity. Though it is widespread and abundant, its numbers have declined in some areas. The animal's conservation status is listed as least concern on the IUCN Red List.

* Why sparrows are being extinct?

The reasons for the decline of the sparrow population are loss of habitat due to rapid urbanization, diminishing ecological resources for sustenance, high levels of pollution and emissions from microwave towers.

“Ventilators in homes have been replaced by ACs and trees by ornamental plants and decorative flower shrubs in parks, making it impossible for the bird to make nests,” explained Khatri.

Another reason is replacement by other avian species. “The threat is the introduction of other avian species like pigeons with greater reproduction rate and a more generalized need for survival. With pigeons being an invasive species to the sparrow landscape, the competition for resources increased, and pushed the sparrows to degraded and ecologically sub-structured regions of their natural habitat,”

While exact population estimates are unavailable, some reports suggest a decline of 80 per cent in India’s sparrow population. One of the key reasons for this decline is our changing urban lifestyle, which causes habitat destruction. Sparrows prefer to live in crevices and holes of man-made structures rather than naturally occurring nesting sites in forests or woodlands. Modern buildings, often made of glass, or inaccessible houses that are mostly netted, are devoid of cavities that provide suitable nesting space for the sparrow. Also, the concrete jungles we live in lack essential green spaces and native trees required for nesting, feeding, breeding and roosting

* Why do we need to conserve sparrows?

Like every living creature, sparrows are important for preserving our natural ecosystem. Back in 1960, following China’s Great Sparrow Campaign, China suffered its worst famine. The Communists hadn’t realized that sparrows don’t just eat crops, but also insects. Following their elimination, China’s locust population soared and destroyed crops. Grain production in most rural areas collapsed, triggering a famine. Millions of people starved to death.

Sparrows also play a vital role in the food chain. They feed on small insects and worms such as caterpillars, beetles and aphids. Some of these creatures destroy plants and the sparrow helps keeps their numbers in check. In turn, they also serve as prey for larger birds like hawks and snakes.

* What can be done to save the sparrows?

Keep a bowl of water and some grains for sparrows to feed on. Plant trees in and around your homes to create shelters for them or keep bird feeders outside your house. Do not use chemical insecticides and pesticides in your garden as it is harmful. The only way to bring the sparrow back is by people's participation.

The only way to bring them back is by people's participation. We need storytellers, sparrow feeders, photographers, bloggers, poets and volunteers and people from all walks of life to do their bit to create a harmonious space for the house sparrows to co-exist with human beings,” says Dilawar.

* Pigeon

The domestic pigeon (Columba Livia domestica or Columba livia forma domestica) is a pigeon subspecies that was derived from the rock dove (also called the rock pigeon). The rock pigeon is the world's oldest domesticated bird. Mesopotamian cuneiform tablets mention the domestication of pigeons more than 5,000 years ago, as do Egyptian hieroglyphics. Research suggests that domestication of pigeons occurred as early as 10,000 years ago.

Pigeons have made contributions of considerable importance to humanity, especially in times of war.In war the homing ability of pigeons has been put to use by making them messengers. So-called war pigeons have carried many vital messages and some have been decorated for their services. Medals such as the Croix de Guerre, awarded to Cher Ami, and the Dickin Medal awarded to the pigeons G.I. Joe and Paddy, amongst 32 others, have been awarded to pigeons for their services in saving human lives.

Despite this, city pigeons today are seen as pests, mainly due to their droppings. Feral pigeons are considered invasive in many parts of the world, though they have a positive impact on wild bird populations, serving as an important prey species of birds of prey.

*Survival tactics of urban birds*

Birds that thrive in urban environments either have larger brains or the ability to reproduce multiple times throughout their lifespan, researchers found.

Past research showed that birds with larger brains had higher intelligence in cities when it came to finding new food sources. But other research showed species with smaller brains, like pigeons, were also successful in cities.

Species with larger brains that reproduced fewer times were successful. These include species like the black-capped chickadee, American kestrels and the American crow. Species with smaller brains that reproduced frequently were also successful. These species included mourning doves, swifts and swallows. Species that didn’t do well in cities that have small brains and don’t reproduce often include the Virginia quail and the American goldfinch.

Another striking survival trait of urban birds is the altered frequency and amplitude of their songs. In urban areas, low-frequency noise levels like that of traffic are high. This noise masks bird songs resulting in poor song transmission and hence, poor reproductive success.  Urban birds are seen to modify song and call structure to overcome the hurdle. While some bird species sing at a higher frequency in areas with high anthropogenic noise levels, some other species like great tits and Eurasian blackbirds increase the amplitude of their songs, a phenomenon called “Lombard effect”, in order to be heard above the city noises. On the other hand, birds like European robins choose to sing in the night to avoid song masking, says the study.

Physiologically too, urban birds seem to differ from their rural counterparts. Reduced body fat and larger brain size are some of the distinctive features of certain urban bird species, according to the review. And surprise, surprise! The city birds are as stressed as the humans if the increased level of plasma corticosterone hormone (CORT) secretion in some of the birds is any indication. An increase in the clutch size and brood size has also been noticed, perhaps to overcome the losses that occur during predation or the effects of urbanization, such as mortality caused due to collision with cars or windows.

*Ways to save urban birds*

Various ecosystem services that the birds provide apart, one can’t deny that it is magical to wake up to bird songs whether you are in a city or a village. If Indian cities were to harbour diverse species of birds, said the researchers, we need to maintain those remaining patches of native vegetation and small lakes and ponds and control urban predators of birds such as dogs, cats and rodents. “City planners need to understand the importance of designing suitable urban green spaces, which are not just aesthetically pleasing, but also support biodiversity.

Ornamental plants and trees will not do the trick but more fruiting and flowering trees and trees which provide good nesting sites as banyan will. Another city design that is hurting the urban birds is the use of tinted glass windows on buildings—flying birds see their reflection in them and try to attack which leads to serious injury. “Protecting patches of native vegetation and water bodies is perhaps the most important thing that city planners can do,” said Suryawanshi adding, “Very often we see lakes and parks getting ‘developed’ where native vegetation is replaced with exotic plants and green lawns. This needs changing. Citizens need to use these spaces, but the vegetation that gets planted should be native and designed in a way to help maintain biodiversity.”