

## THE ADVERSITY OF WIRELESS CONNECTIVITY ON BIRDS: A RELOOK

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**Abstract:** Radiations due to wireless connectivity are engulfing the world day by day. 4G or 5G networks are inevitable requirement for most of the civilians from a toddler to an old citizen. Though most of us are well aware of the undesirable consequences which may even lead to fatal, we are unable to control our cravings to the screens for hours long. Apart from human health, it has profound impacts on ecosystems. Our current work is a brief revision of scientific research works that have been already done or still going on; for the investigation of the multi level effects of electromagnetic waves on common birds. The negative correlation between the bird population, distribution, breeding, nesting, behaviors, navigation, and migration with the microwaves has been strongly established from the ecologists of different corners of the globe. The global pandemic of the current decade has made the circumstances tougher to overcome.

**Keywords:** Electromagnetic, radiation, health, birds, pandemic

### 1 Introduction

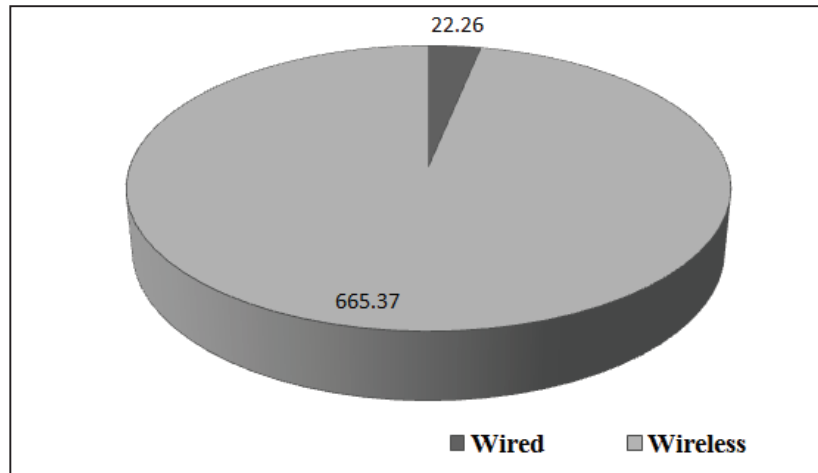
Since the last couple of decades, the telecommunications industry has taken over the major part of the media outlets. Neurodegenerative diseases, birth defects, immunity disorders, learning disabilities and cancer in human body have been proved to be originated from exposures to electromagnetic fields. Studies are going on since the decades and we have handful number of evidences about the substantial impacts of electromagnetic radiations mainly from cell phone towers and cell phones, i.e., uplink and downlink frequencies on the wildlife too. In spite of being conscious about the adverse impacts of it, the technological convenience has been well accepted by the human society accepting telecommunications as an inevitable way of progress. Health issues and biodiversity losses unfortunately got exempted from the considerations of the policy makers ever since the wireless tele-technology took its acceleration.

### 2 Backgrounds

The Telecom Authority of India (TRAI), reports that the figure of internet subscribers boosted quarterly at a growth rate of 3.35%. Out of 687.62 million internet subscribers, only 3% uses wired connections and almost 97% are using the wireless ones (Figure 1)[1]. Moreover, the current decade has brought COVID 19 as a challenge to the human race; imposing the civilians to get locked down to maintain social distancing at their residing places, most of the economic activities got closed, except the emergency sectors, thus several factories remain shut for months, vehicular movements became nominal.

Although this picture overall indicates a massive economic and societal dissipation and even human population losses, the least interference of human has restored the natural environment to

some extent, as stated by several news reports throughout the nation. Still, this scenario has driven at least 80-90% of employees in corporate and non corporate sector, to work from home. Besides, almost the entire academic system is going on using internet (mostly wireless) to protect citizens form the social gathering thus securing them from the infection of the virus.



**Figure 1** Number of internet subscribers per 100 heads (in millions)

The ‘tele-working’ has got acceleration even in developing nations, due to the advent of the pandemic [2]. Now while considering the tele-dependency, hence exposures to electromagnetic radiations, it has enhanced perhaps twenty times than the last few decades, only due to this corona disaster [3]. This paper is a short revision of the influence of EMF to common birds’ population, behaviors, breeding, nesting and so on.

### 3 Striking researches of the influence of EMF on avians

**Table 1** Review of worldwide researches on impacts of EMF birds

Year	Reports	Study Location	References
1966	As experiments resulted, it may be stated that microwaves have latent impacts on the nervous systems of animals and birds as it penetrates into their bodies.	Canada	Tanner, 1966[4]
2005	The frequencies of radiation from mobile towers may interfere the reproduction capabilities of several birds like storks and also may damage the growth of amphibians thus enhancing their mortality rate.	Spain	Balmori, 2005 [5]
2007	A probable link has been identified between GSM	Belgium	Evereart and

	mobile base stations on the house sparrow population (male) mainly during their breeding periods as studies 150 points in 6 residential areas in Belgium. Long term exposures of higher frequencies can potentially damage their abundances and behaviors.		Bauwens, 2007 [6]
2009	An in depth review on the possible impacts of radiation on birds concludes that it can affect nervous systems, immune systems, reproductive systems and cardiovascular systems.	Spain	Balmori, 2009 [7]
2014	Report represents that the rate of mortality at around the mobile towers more than 200 ft possibly be a risk to the population of common birds, and it also highlights that the electromagnetic fields may also be the cause for the disappearances of insects, butterflies, bees and birds like sparrows. Moreover, the report brings forward the proof that depicts that the EMF is probably the reason of navigation disabilities of birds.	India	Sandlas, 2014 [8]
2014	Insects are also highly responsive to EMR as birds are.	Spain	Balmori, 2014 ,Bhattacharya and Roy, 2013 [9,10]
2014	The migratory birds such as the European robins ( <i>Erithacus rubecula</i> ) are found to be unable to apply their magnetic compass while exposed to electromagnetic radiations, as have been proven by tests.		Engels <i>et al.</i> , 2014 [11]
2016	75% decline of house sparrows have been reported since 1994. The species has almost been marked as extinct in several cities. Besides, birds near the cell phone towers show some behavioral alterations including chick mortalities, nesting difficulties and so on. Thus it may be concluded that the continuous increasing exposures of RF is potential enough to swallow the entire biosphere up.	India	Rafiqiet. al, 2016 [12]
2017	A survey has been conducted at Bijapur, Chhattisgarh in 2017 and reports several adverse impacts of cell phone radiation on birds. The	Bijapur, Chhattisgarh. India	Kumar <i>et. al.</i> , 2017 [13]

	report states that even the weak radio radiations can destroy the orientation of birds thus affecting their navigational capacity. A number of common species such as sparrows, pigeons, swans are getting declined due to the EMR. The radio waves are also responsible for death of newborn, birth defects, behavioral anomalies and population decline of birds and some other animals that are exposed to it		
2018	Another study has been carried out by Kumar and Singh, at Durg, Chhattisgarh, proving the negative impacts of EMF on the local birds in both urban and rural habitat types. The data in the vicinity of 33 mobile towers have been presented along with the identification and distribution trends of 13 avian species. The results indicated a fall of 69% avian density in case of urban area whereas, 31% decline in rural localities.	Durg, Chhattisgarh, India	Kumar and Singh, 2018 [14]
2018	The adverse biological effects on birds, bees, and humans from cellphone towers were observed. As an impact of EMR a sharp decline in fruit-eating seed dispersers' wild birds was reported and the role of insect pollinators also have serious consequences on food production.	Canada	ChandaSiddoo-Atwal, 2018 [15]
2020	EMR has high impact on Sparrows, pigeons, parrots and swans.	Singapore	Siddiqui et al, 2020 [16]

#### 4 Conclusions

Several independent researches are still going on to measure the intensity of adversities due to ever increasing exposures of microwaves on the entire living world. Still, technological advancement is a prime necessity in the fast moving world. But the in depth studies of ecological impacts of these radio waves is also a vital issue to look into at this very moment. Besides of affecting bees, birds these are hurting the human physiological systems too (European Environment Agency, 2013).

The worsening situation got accelerated as the COVID 19 emerged, and most of the official and unofficial activities, starting from classes in schools to daily shopping is going on using internet connections (mostly wireless).

A report released over a video conference between BARC India, and the Nielsen Global Media, South Asia, clearly shows that the total time used up per user on smart phones enhanced by 6.2% to 25 hours a week (Figure 2). Therefore it is high time to think of a potential alternative, before the wound gets deeper.



**Figure 2** Increased use of cell phone due to Corona Pandemic (courtesy: India Times, 28<sup>th</sup> March, 2020)

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