

**EFFECT OF MOBILE TOWER RADIATION ON BIRDS IN BIJAPUR DISTRICT, CHHATTISGARH****Devendra Kumar Durgam<sup>1</sup>, Dr. Shweta Sao<sup>2</sup> and Dr. R. K. Singh<sup>3\*</sup>**

<sup>1</sup>M.Phil Zoology [Research Scholar], Dr. C.V.Raman University, Kargi-Road, Kota, Bilaspur-495113 [C.G.].

<sup>2</sup>Professor and Head, Department of Life Science, Dr. C.V.Raman University, Kargi-Road, Kota, Bilaspur-495113 [C.G.].

<sup>3</sup>Professor and Head, Department of Zoology, Dr. C.V.Raman University, Kargi-Road, Kota, Bilaspur-495113 [C.G.].

Article Received on  
26 June 2017,

Revised on 17 July 2017,  
Accepted on 07 Aug 2017,

DOI: 10.20959/wjpps20179-9989

**\*Corresponding Author****Dr. R. K. Singh**

Professor and Head,  
Department of Zoology,  
Dr. C.V.Raman  
University, Kargi-Road,  
Kota, Bilaspur-495113  
[C.G.].

**ABSTRACT**

A field survey was conducted on effect of mobile tower radiation on birds in Bijapur district (c.g.) from January to June 2017, in different sites of mobile tower situated in this area. This survey identifies species of bird present in before and after mobile tower. Electromagnetic radiation from Cell phone and cell tower affects the birds, environment. When birds are exposed to weak electromagnetic fields, they disorient and fly in all directions, which harm their natural navigational abilities. A large number of birds like pigeons, sparrows, swans are getting lost due to interference from the “unseen enemy”, i.e. mobile tower. It has also been noted of late that animals used near mobile towers are prone to various dangers and threats to life including still births, spontaneous abortions, birth deformities, behavioral

problems and general decline on overall health. Electromagnetic pollution is a possible cause for deformations and decline of some amphibian populations too. Apart from birds and animals, electromagnetic radiation emanating from cell towers can also affect vegetable, crop and plants in its vicinity. This study aims at studying the possible effects of Electromagnetic Radiations on birds and other mentioned living beings.

**KEYWORDS:** Electromagnetic radiation; Cell phone and cell tower; hazards; Environment, Radio frequency, Health effects.

## INTRODUCTION

Cell phone technology has revolutionized the telecommunication scenario in India. Due to its several advantages, cell phone technology has grown exponentially in the last decade. Currently, there are more than 50 crore cell phone users and nearly 5.5 lakh cell phone towers to meet the communication demand. The numbers of cell phones and cell towers are increasing without giving due respect to its disadvantages. All over the world, people have been debating about associated health risk due to radiation from cell phone and tower. The boundaries of Andhra Pradesh, Orisha and Maharashtra are located around the Bastar division. This division is also a confluence of four cultures. But the culture of the people of Bastaranchal has created their own identity throughout the world. About 165 K.M. from Bastar, Naxal- affected district is located at Bijapur. Bijapur situated from North to South is 90 K. M. Long and East to West is 47 K.M. wide and the current area of this district is 6,562.48 Sq K.M.

**Hills and Valleys:** Major part of the district exhibits pediment/ pediplain landforms. Other landforms seen in the district are structural plateau of upper and lower level in the western part, structural plain in the south eastern part, structural hills and valleys in the northern and eastern part, denudation plateau in the eastern part and denudation hills and valleys in the central and western part.

- **Borders:-** Andhra Pradesh, Maharashtra.
- **Tahsil:-** there are four tahsil in Bijapur district.
- **Bailadila:-** Bailadila is a mountain range rising in the Deccan Plateau about 200 KM west of the Eastern Ghats. It is located near kirandul town in the Dantewada district of southern Chhattisgarh, India. It extends in a roughly SW-NE direction for a length of about 70 K.M. south of the Indravati River. Rising to a height of 1,276 M. one of the hills of the Bailadila range is the highest point in the state of Chhattisgarh. The hills are located at a distance of about 40 K.M. south west of Dantewada, the district headquarters in the state. Formerly the Bailadila slopes were thickly wooded.

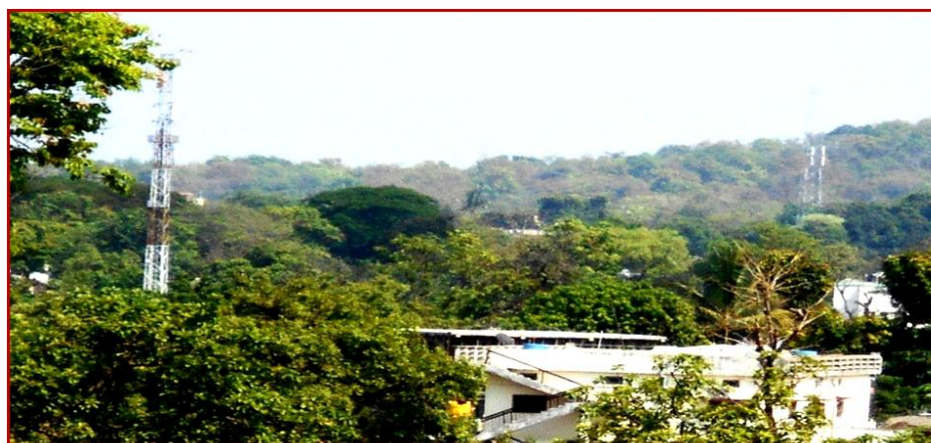
Total Population in Bijapur district.- 2,55,230, Male- 1,28,663, Female-1,26,567 Population Density- 30/KM<sup>2</sup>, Sex Ratio-984, Literacy rate- 40.86, Proper Population in Bijapur – 60,000 ¼Sixty Thousand½, Mobile User 30,000 ¼Thirty Thousand½,

Acronym	Meaning
<b>1xEV-DO</b>	Evolution-Data Optimized, a 3G CDMA technology for boosting data speeds and network capacity.
<b>2G, 3G, 4G</b>	The second-generation, third-generation and fourth-generation of digital wireless technologies.
<b>3GPP</b>	3rd Generation Partnership Project, a GSM wireless technology standards consortium
<b>CDMA</b>	Code Division Multiple Access, a foundational digital wireless technology.
<b>CDMA One</b>	The 2G version of CDMA, also called IS-95
<b>CDMA2000</b>	The 3G version of CDMA, which includes 1xEV-DO.
<b>EDGE</b>	Enhanced Data rates for GSM Evolution, a 3G GSM technology.
<b>GSM</b>	Global System for Mobile Communications, the world's most widely deployed 2G wireless technology.
<b>LTE</b>	Long Term Evolution, a 4G technology platform.
<b>UMTS</b>	Universal Mobile Telecommunications System, a 3G GSM technology.
<b>WiMAX</b>	Worldwide Interoperability for Microwave Access; the Mobile version is a 4G technology and is also.

### Mobile Tower Status in Bijapur

Total 9 mobile tower available in bijapur city

1. Govt. Boys Higher secondary School bijapur1 –BSNL :- Tower- 1
2. Govt. Boys Higher secondary School bijapur2 – Reliance :- Tower-2
3. District Hospital bijapur – BSNL :- Tower-3
4. Exchange office bijapur –BSNL :- Tower-4
5. Janpad office bijapur – BSNL :- Tower-5
6. Jaitalur bijapur – Reliance :- Tower-6
7. Near by SBI Bank bijapur –BSNL :- Tower-7
8. Distict Collectorate Bijapur –BSNL :- Tower-8
9. Front of Atal Awas bijapur – Reliance :- Tower-9



**Fig 1: Mobile Tower Situated in Bijapur.**

## **MATERIALS AND METHODS**

### **Study Area**

Bijapur district formerly known as Birjapur one of the 27 districts of Chhattisgarh state in central India. It is one of the two new districts created on May 11, 2007. As of 2011 it is the second least populous district of Chhattisgarh (out of 18), after Narayanpur. Moreover, it holds the dubious distinction of being the second least literate district in India at 41.58%, as per the 2011 census, after Alirajpur, Madhya Pradesh.

### **Data Collection**

In this study we have taken up a brief survey in the areas where the mobile towers are situated, to get a clear estimate of how much of radiations are emitted by these mobile towers affecting the bird counting status of residence and environment from January 2017 to June 2017. Study area visited 2 times in a day, the observation were made between 2-3 hrs morning and 2-3 hrs evening and birds were identified.

### **Equipment**

Bird activities are often rewarded using the latest digital camera safest way to photography birds in never to touch them.

### **IBMs SPSS Tool**

SPSS is a comprehensive and flexible statistical analysis and data management solution for almost thirty years now. SPSS can take data from almost any type of file and use them to generate tabulated reports, charts, and plots of distributions and trends, descriptive statistics, and conduct complex statistical analysis.

## **RESULT**

The results are summarized in Table 1-3.

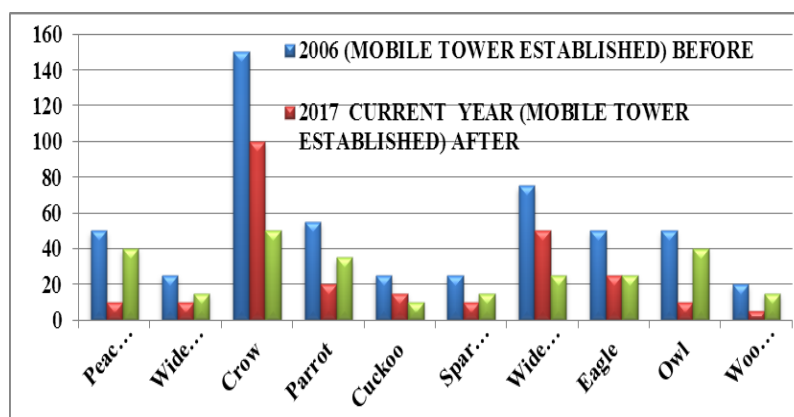
**Table 1: Before and After Mobile tower established Number of Birds [January 2017- June 2017].**

S.N.	Birds	2006 [Mobile Tower Established] Before	2017 Current Year (Mobile Tower Established) After
1	Peacock	50	10
2	Wild Duck	25	10
3	Crow	150	100
4	Parrot	55	20
5	Cuckoo	25	15
6	Sparrow	25	10
7	Wild Pigeon	75	50
8	Eagle	50	25
9	Woodpecker	20	5
	<b>Total</b>	<b>475</b>	<b>245</b>

The following are the graphical representation of the various data analysis done. The following are the graphical representation of the various data analysis done. Through the Chi Square test conducted, we see that p (Pearson Chi-Square) value is less than 0.05 in some of the cases. This implies that there is a significant impact by Height of tower on some of the listed effects on living beings and environment.

Accordingly, the results are formulated in the following table:

Total Migrate Birds Percent =  $51.4 \times \frac{270}{525} \times 100 = 51.43\%$  and 48.57% Birds live in Bijapur.



**Fig. 2: Before and After Mobile tower established Number of Birds [January 2017-June 2017].**

**Tab. 2: Radiated power density from the cell tower location and birds watching in area.**

S. No.	Tower Location in Bijapur City	Tower type	100 meter radiance Distance Total No. of Tower	Power density in wats/meter <sup>2</sup>	Total Power density in wats/meter <sup>2</sup>	100 meter radiance Distance Total No. of Birds watching in area
1	Janpad Office Bijapur	1 BSNL	01	0.008	0.008	6
2	Dist. Collectorate Bijapur	1 BSNL	01	0.008	0.008	5
3	Exchange Office Bijapur	1 BSNL	01	0.008	0.008	4
4	Jaitaloor Road Bijapur	1 Reliance	01	0.008	0.008	7
5	Govt. Boys school Bijapur	1 BSNL+ 1 Idea + 1 Reliance	03	0.008	0.024	3
6	Near By SBI Bijapur	1 BSNL	01	0.008	0.008	4
7	Distict Hospital Bijapur	1 BSNL	01	0.008	0.008	5
8	Front of Atal Awas Bijapur	1 Reliance	01	0.008	0.008	6

Power density is increase birds number decreases

Power density Pd at a distance R is given by

$$P_d = (P_t \times G_t / 4\pi R^2) \text{ Watt/m}^2$$

$$P_d = \frac{P_t \times G_t}{4\pi R^2} \text{ Watt/m}^2$$

where, P<sub>t</sub> = Transmitter power in Watts

G<sub>t</sub> = Gain of transmitting antenna

R = Distance from the antenna in meters

For P<sub>t</sub> = 20 W, G<sub>t</sub> = 17 dB = 50, P<sub>d</sub> for various values of R is given in Table 1.

**Table 3: Power density at various distances from the transmitting tower.**

Distance R (m)	Power density Pd in W/m <sup>2</sup>	Power density Pd in μW/m <sup>2</sup>
1	79.6	79,600,000
3	8.84	8,840,000
5	3.18	3,180,000
10	0.796	796,000
50	0.038	31,800
100	0.008	7,960
500	0.000318	318

The power density values given in Table 1-3 are for a single carrier and a single operator. If multiple carriers are being used and multiple operators are present on the same roof top or tower, then the above values will increase manifold. However, radiation density will be much lower in the direction away from the main beam. One should know actual radiation pattern of the antenna (which unfortunately is not made public) to calculate exact radiation density at a point.

Information was collected from 113 studies on the potential ecological effects of radiofrequency electromagnetic fields (RF-EMF) in the range of 10 MHz to 3.6 GHz. In 65% of the studies, ecological effects of RF-EMF (50% of the animal studies and about 75% of the plant studies) were found both at high as well as at low dosages. The very low dosages are compatible with real field situations, and could be found under environmental conditions.

### Suggestions

List of birds which are found in Bijapur district last 10-11years ago but their number are reduced day by day because increasing number of mobile tower.

### CONCLUSION

The seriousness of the health hazards due to radiation from the cell phones and cell towers has not been realized among the common man. Cell operators continue to claim that there are no health issues. Even organizations like WHO, ICNIRP, FCC, etc. have not recommended stricter safe radiation guidelines, whereas several countries have adopted radiation norms, which are 1/100th to 1/1000th of these values based on their studies. Cell phone industry is becoming another cigarette industry, which kept claiming that smoking is not harmful and now there are millions of people around the world who have suffered from smoking. In fact, cell phone/tower radiation is worse than smoking; as one cannot see it or smell it, and its effect on health is noted after a long period of exposure.

### REFERENCES

1. Aboul Ezz HS, Khadrawy YA, Ahmed NA, Radwan NM, El Bakry MM. The effect of pulsed electromagnetic radiation from mobile phone on the levels of monoamine neurotransmitters in four different areas of rat brain. *Eur Rev Med Pharmacol Sci*, 2013; 17(13): 1782-8.
2. Adams JA, Galloway TS, Mondal D, Esteves SC and Mathews F. Effect of mobile telephones on sperm quality: A systematic review and meta-analysis. *Environ Int*, 2014; 70: 106-12.
3. Adang D, Remacle C, Vorst A V. Results of a long-term low-level microwave exposure of rats. *IEEE Trans Microwave Theory Techniques*, 2009; 5: 2488-97.
4. Aerts S, Plets D, Verloock L, Martens L, Joseph W. Assessment and comparison of total RF-EMF exposure in femtocell and macrocell base station scenarios. *Radiat Prot Dosimetry*, 2013; 162(3): 236-43.

5. Ahlers MT, Ammermüller J. No influence of acute RF exposure (GSM-900, GSM- 1800, and UMTS) on mouse retinal ganglion cell responses under constant temperature conditions. *Bioelectromagnetics*, 2013; 35(1): 16-29.
6. Aït-Aïssa S, Billaudel B, Poullétier de Gannes F. In utero and early-life exposure of rats to a Wi-Fi signal: screening of immune markers in sera and gestational outcome. *Bioelectromagnetics*, 2012; 33(5): 410-20.
7. Aldad TS, Gan G, Gao XB, Taylor HS. Fetal radiofrequency radiation exposure from 800-1900 MH-rated cellular telephones affects neurodevelopment and behavior in mice. *Sci Rep*, 2012; 2: 312.
8. Altwegg, R., Underhill, L.G., Apparent survival rates of Cape Sugarbirds *Promerops cafer* at a breeding and non-breeding site. *Ostrich: Journal of African Ornithology*, 2006; 77: 220-224.
9. Atkinson, C.T., van Riper, C., Pathogenicity and epizootiology of avian haematozoa: Plasmodium, Leucocytozoan, and Haemoproteus. *Bird-parasite interactions: ecology, evolution and behaviour*. Oxford University Press, Oxford, United Kingdom, 1991.
10. B. Blake levitt and Henry Lai, "Biological effect from exposure to electromagnetic radiation emitted by cell tower base station and other antenna arrays ", published by NRC Research press, *Environ Rev*, 2010.
11. Balodis V. Brumelis G., Kalvinskis K, et al, Does the Skrunda Radio Location Station diminish the radial rowth of pine trees?, *Sci Total Environ*, 1996; 180: 57-64.
12. Bhattacharya, R., Roy, R., Impacts of Communication Towers on Avians: A Review, *Int. J. Elec. And Comm. Tech.*, 2013; 4(spl 1): 148-150.
13. Blums, P., Clark, R.G., Mednis, A., Patterns of reproductive effort and success in birds: path analyses of long-term data from European ducks. *Journal of Animal Ecology*, 2002; 71: 280–295.
14. Kaur, G., Dhami, A. K., Orientation studies of a cell-phone mast to assess electromagnetic radiation exposure level, *Int. J. Env. Sc*, 2012; 2(3): 2285-2294.
15. MacLeod, R., Barnett, P., Clark, J. and W. Cresswell, Mass-dependent predation risk as a mechanism for House sparrow declines?. *Biology Letters*, 2006; 2: 43-46.
16. Manoj, K., Nandkishor, D., Raju, K., Sanjay, C. and B. Prosun, Impact of urbanization on avian population and its status in Maharashtra state, India. *Int. J. App. Env. Sci.*, 2012; 7(1): 59-76.



17. Memom, A., Sheth, H., Patel, P.U. and M.Ansari, *Passer domesticus* – A disappearing species due to increasing effects of electromagnetic radiations (EMRS). *International Journal of Pharmaceutical and Biological Science Archive*, 2013; 1(1): 1-6.
18. Michaelis J, Olsen JH, Tynes T, Verkasalo PK. A pooled analysis of magnetic fields and childhood leukaemia. *Br J Cancer*, 2000; 83(5): 692-8.
19. Mohanraj, S and S. Murali., Survey of bird species inhabiting Sivakasi town, Virudhunagar District. M.Sc., Project Report submitted to Ayya Nadar Janaki Ammal College (Autonomous), Sivakasi, 2007.
20. Mohitkaushal, tanvirsingh Ami kumar, Effects og mobile tower Radiations & Case Studies from different countries pertaining the Issue”, *International journal of Applied Engineering Research*, ISSN 09734562, 2012; 7(11).
21. Pineda, J., Herrera, A., Antonio, M. T. and J. Aguirre, Urban models and their effects on immune system of house sparrow *Passer domesticus* populations in Central Spain. 9th Conference of the European Ornithologists Union (EOU), 2013; 25.
22. Rahmani, A.R., 2008. Flight to extinction. *Spectrum, The Tribune*. Available on <http://www.tribuneindia.com/2008/20080608/spectrum/Main1.htm>. Via Internet accessed on June 8, 2013.
23. Rajashekar, S. and M.G. Venkatesha, Occurrence of House sparrow, *Passer domesticus indicus* in and around Bangalore. *Curr. Sci.*, 2008; 94(4): 446-449.
24. Report on Cell Tower Radiation submitted To secretary, DOT, Delhi Prepared by Prof. Girishkumar Electrical Engineering Department IIT Bombay, Powai, Mumbai – 4000
25. Saeid, S. H., Study of the Cell Towers Radiation Levels in Residential Areas, *Proc. Int. Conf. Elec. And Comm. Sys.*, 2013; 87-90.
26. Selga T., selga M. Response of *pinussylvestris* L. needle to electromagnetic field, cytological and ultrastruscturalAspect *Sci Total Environ*, 1996; 180: 65-73.
27. Sharma VP, Singh HP, Kohli R.K and Batish DR, Mobile phone radiation inhibits Vigan radiate (mung bean) root growth by inducing oxidative stress, *science of The total Environment*, 2009; 407(21): 5543-5547.
28. Tkalec M., MaLarik K., Pavlica M., Pevalek-Kozlina B. and Vidakovic-Cifrek Z., Effects of radiofrequency electromagnetic fields on seed germination and root meristematic cells of *Allium cepa* L., *Mut Res*, 2009; 672: 76-81. <http://www.ncbi.nlm.nih.gov/pubmed/19028599>.