International Journal of Interdisciplinary Cultural Studies
ISSN: 2327-008X (Print), ISSN: 2327-2554 (Online)
Volume 19, Issue 2, 2024
https://cgscopus.com/index.php/journals

"Impact of Mobile Towers on Biodiversity: A Study on H.D. Kote Taluk, Mysuru District"

1. Prof. P. Jayashree, 2. Dr.Ramya. R, 3. Nayana.H.M

1. Professor, Department of Studies in Geography, University of Mysore, Mysuru- 570006.

2. Guest Faculty, Department of Studies in Geography, University of Mysore, Mysuru -570006.

3. Student, Department of Studies in Geography, University of Mysore,Mysuru -570006.

Email: **ramya29041990.geo@gmail.com** Email: drjayashreeram@gmail.com

Abstract
Mobile phones are very important wireless electronic devices for communication. In recent decades, users have increased a lot in their day-to-day lives. These mobile phones are connected to the mobile tower. Mobile towers emit radiation that is harmful to human health as well as to creatures and pretty birds. The distribution and location of mobile towers are very important, but only a few companies are following the rules, regulations, and instructions given by telecommunication. Instructions are not followed by many companies. Harmful radiation is affected by surrounding human bodies as well as animals and birds. The issues can be identified with the location of the mobile tower.

The study has risen about biodiversity conservation in the study area. Geospatial techniques have been employed to analyze the impact of mobile towers on species present in the study area. To identify the radiation problems, researchers collected primary and secondary data. Primary data was collected by using GPS devices to collect data from the local people. Secondary data was also collected from the mobile tower companies. By using Arc GIS to make maps of the location and distribution of different mobile companies, buffer analysis is also done for the different distances for each mobile tower. In each buffer zone, the different land uses affected by mobile towers have been studied. This analysis gave the effects on humans as well as more effects on the population and migration of animals and birds.

Introduction:

Cell phone towers have electronic equipment and antennas that send and receive signals to and from cell phones. Antennas may be attached to free-standing towers or structures or may be mounted on non-tower structures such as building rooftops, billboards, or church spires.

Cell towers, also known as cell sites or base stations, are structures that house the equipment necessary for wireless communication. They play a crucial role in providing cellular network coverage, enabling us to make calls, exchange text messages, and access the internet on our mobile devices.Cell phone technology has revolutionized the telecommunications scenario in India. Due to its several advantages, cell phone technology has grown exponentially in the last decade. India's Telecommunications network is the second largest in the world by number of Telephone users, with over 1.1 billion subscribers of December 2023. (Source: Telecommunication of India).

Cell towers, also known as cell sites or base stations are structures that house the equipment necessary for wireless communication. They play a crucial role in providing cellular network coverage; enabling us to make calls, exchange text messages and access the internet on our mobile devices.

International Journal of Interdisciplinary Cultural Studies
ISSN: 2327-008X (Print), ISSN: 2327-2554 (Online)
Volume 19, Issue 2, 2024
https://cgscopus.com/index.php/journals

Cell phone technology has revolutionized the telecommunications scenario in India. Due to its several advantages, cell phone technology has grown exponentially in the last decade. Currently, there are more than 1.2 billion mobile phone users, 600 million smart phone users, and nearly 0.78 million cell phone towers to meet the communication demand. The number of cell phones and cell towers is increasing without giving due respect to their disadvantages. All over the world, people have been debating the associated health risks due to radiation from cell phones and cell towers. Radiation effects are divided into thermal and non-thermal effects. The thermal effects are similar to those of cooking in the microwave oven. Non-thermal effects are not well defined, but it has been reported that non-thermal effects are 3–4 times more harmful than thermal effects.

History:

The history of Indian telecom can be started with the introduction of the telegraph. The Indian postal and telecom sectors are one of the world's oldest.
In 1850, the first experimental electric telegraph line was started between Kolkata and Diamond Harbor. In 1851, it was opened for the use of the British East India Company.
The post and telegraph department occupied a small member of the public works department. The Telegraph and Telegraphs department occupied a small corner of the Public Works Department at that time.
William O'Shaughnessy, who pioneered the telegraph and telephone in India, belonged to the Public Works Department, and worked towards the development of telecom throughout 1853. A separate department was opened in 1854 when telegraph facilities were opened to the public. Subsequently the construction of 4000 miles of telegraph lines connecting Kolkata and Peshawar in the north along with Agra Mumbai through Sindwa Ghats and Chennai in the south. Bangalore started in November 1853. In 1882 telephone companies, namely The Oriental Telephone Company limited, and the Anglo Indian telephone Company limited approach the Government of India to established telephone exchange in India.

MOBILE TOWER
A vertical structure built on a small parcel of land, designed to accommodate multiple wireless tenants. Our tenants utilize many different technologies, including: telephony, mobile data, broadcast television and radio and paging.

The word "Telephone" has been adopted into the vocabulary of many languages. It is derived from the Greek: τηλε, tēle, "far" and øwvñ, phōnē, "voice", together meaning "distance voice ".

Importance of Mobile Towers Communication Infrastructure:
Connectivity: Mobile towers enable widespread mobile phone usage, internet access, andconnectivity, which are essential for personal and professional communication.
Emergency Services: Reliable mobile networks are crucial for emergency services and disaster response, ensuring timely communication in critical situations.
Economic Development: Enhanced connectivity supports economic activities, enabling e- commerce, telecommuting, and various digital services that contribute to economic growth.
Technological Advancements: Internet of Things (IoT): Mobile towers support IoT applications, allowing for smart devicesand systems to communicate efficiently.
5G Deployment: The rollout of 5G networks, which promises faster speeds and more reliable connections, relies heavily on an extensive network of mobile towers. Around 2030 rollout the 6G; still it's in under Development process.

International Journal of Interdisciplinary Cultural Studies
ISSN: 2327-008X (Print), ISSN: 2327-2554 (Online)
Volume 19, Issue 2, 2024
https://cgscopus.com/index.php/journals

Statement of the problem:

The distribution and location of mobile towers are very important, but only a few companies are following the rules, regulations, and instructions given by telecommunication. Instructions are not followed by many companies. Harmful radiation is affected by surrounding human bodies as well as animals and birds. The issues can be identified with the location of the mobile tower. The study is mainly concentrating on biodiversity conservation in the study area.

Objectives:

- Mapping of the Location and Distribution of Mobile Towers in H.D Kote.
- To Study the Impact of Mobile Tower Radiation on Biodiversity and Human beings.

Methodology:

The present study reveals the detailed location of mobile towers, and their impact on health. For this we have to collect both primary and secondary data. Secondary data regarding Google sources about health impacts. Primary data regarding the location of mobile towers was taken using GPS with latitude, longitude and elevation. Later, to present the location of mobile towers, we created maps to show different company towers. Information is collected by local people based on Common Observations of the mobile tower's effects on the Ecosystem.

Review of Literature:

Arkady Zaslavsky and Zahir Tari were entitled" Mobile Computing, Overview and Current status using secondary data as methodology, Current status of Mobile Computing Research and the results are that mobile computing is a rapidly emerging research and development area. This paper provides an overview of concepts, achievements, research issues and challenges in mobile computing.

H. A. Eiselt, Vladimir Marianov were entitled," Mobile phone tower location for survival after natural disasters"- This paper discusses the location or strengthening of cell phone towers using primary data, (location model) as their methodology. In this paper, the coastal area in the biobi'o region in the south of Chili is affected by earthquakes. The resulting model was then applied to a region in Chile, where the earthquake last February showed that it was stronger.

Kanimozhi et al. was entitled Mobile Tower Radiation Impact on Biological Impairment. They used primary data and remote sensing radiation. In this paper they have studied biological effects (health effects) of Chennai's people. They got the final results of mobile users. Such as brain tumors, facial nerve tumors, breast and blood, some of the diseases. The radiation from the cell phone is a lethal poison that is slowly impairing people.

Premlal P. D was entitled on paper, The effect of Mobile tower radiation on child health, and used different methodology. Primary data (field visiting) in this paper they have studied for study consists of four villages of Udumpumchola taluk in Idukki (Kerala). The final result was twenty diseases were examined to discover if any relation exists between any one of them and the RF exposure levels. The effects of RF exposure on the health of children under 15 years have been examined.

Central Pollution Control Board, Awareness not of Mobile Tower Radiation and its impacts on the Environment. Collected information Technology-Radio transistor, Television, Mobile handset, Mobile towers and many more. Remote sensing based - Mobile tower certification and Testing India.

Electromagnetic Radiation (EMR) emitted from mobile towers, a non-air pollutant. Radiation emissions from mobile towers are huge due to their dense installations and unscientific proliferation.

An "Expert Group to study the possible impacts of communication towers on wildlife including Birds and Bees" used secondary data from Telecom Engineering center "Effects on Bird's and Bee's of Delhi and West Bengal. Included by microwave and radio frequency pollution appears to constitute a potential cause for the decline of, animal populations.

Ramraj Dangi, Alberto Gotta and others were entitled, "Study and Investigation on 5G Technology: A Systematic review "using GIS and Remote Sensing as a methodology. The objective of this survey is to provide a detailed guide to key 5G technologies, methods of researchers etc. They have implemented 5G networks in real life (article Organization) 5G applications in their results. This article covers a detailed survey on the 5G mobile network and its features.

Zuguang Zhen was entitled" The effect of mobile cellular network performance and contextual factors on smartphone user's satisfaction". They used surveys as their methodology and also a questionnaire. In this he discussed Quality of Experiences (QoE). It is essential to understand customer's expectations and satisfaction with certain services or APP usage. For this study, a survey which is based on Qualtrics has been chosen as one of the best methods (surveys). This paper investigates the effect of mobile cellular network performance and contextual factors on smartphone user's satisfaction.

Valentina Hartwig and Giuseppe Acri were entitled on "Methodology of studying effects of mobile phone radiation on Organism" using Vivo research methods and laboratory, radio frequency radiation (secondary data). In this paper they have studied harmful radiation of 4G and 5G mobiles. They have observed the DNA changes of organisms. The paper reviews laboratory methods studying the effects of radio frequency radiation on organisms.

Nupur Chowdhury wrote the paper, entitled "Exploring Public Resistance to Cell Tower radiation in India, using public communication as a methodology. In this paper they have studied EMF radiation given the higher levels of usage of mobile phones. Mainly focused on issues of health research.

Arkady Zaslavsky and Zahir Tari were entitled" Mobile Computing, Overview and Current status using secondary data as methodology, Current status of Mobile Computing. Research and results is that Mobile computing is a rapidly emerging research and development area. This paper provides an overview of concepts, achievements, research issues and challenges in mobile computing.

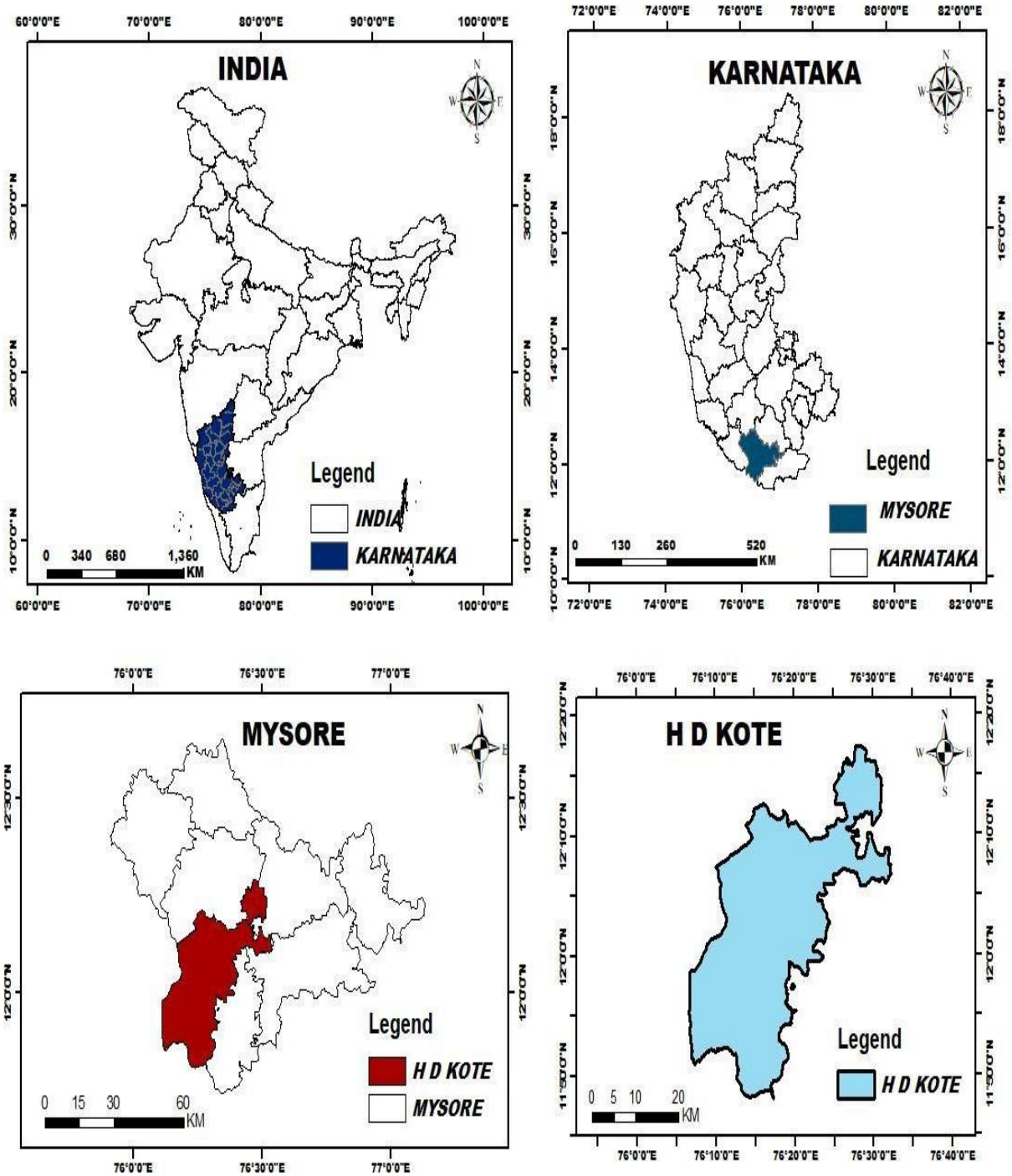
Introduction:

One of the most tourist attracted places in Karnataka is Mysuru. Mysuru District is a majestic, mysterious and mesmerizing city. It has inherited all the Indian traditions of modernity. Mysore is a district 8 taluks. Among the 8 taluks, H D KOTE is one of those.

Heggadadevanakote or H.D. Kote is a town and a taluk headquarters in Mysore district in the Indian state of Karnataka. Kakana kote forest lies in Heggadadevana kote taluk. H. D Kote city is divided into 13 wards for which elections are held every 5 years.

International Journal of Interdisciplinary Cultural Studies
ISSN: 2327-008X (Print), ISSN: 2327-2554 (Online)
Volume 19, Issue 2, 2024
https://cgscopus.com/index.php/journals

Study Area Map



(Source: Map Prepared by Researcher)

International Journal of Interdisciplinary Cultural Studies
ISSN: 2327-008X (Print), ISSN: 2327-2554 (Online)
Volume 19, Issue 2, 2024
https://cgscopus.com/index.php/journals

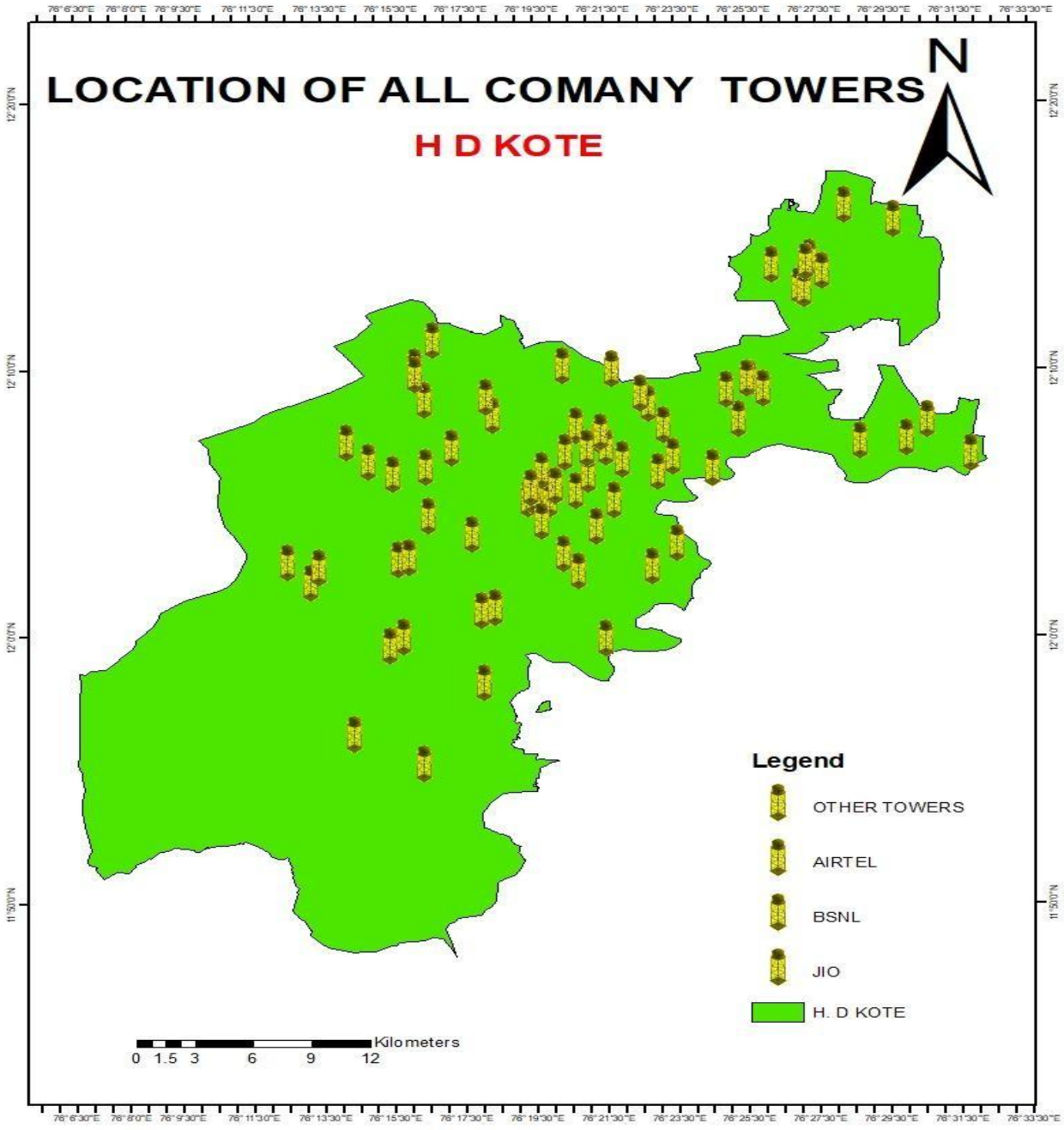
Demography: As per the 2011 census, the total population of H.D. Kote was 14,313, of which 7,184 are males while 7,129 are females. The population of children with ages of 0-6 is 1662, which is 11.61 % of the total population of Heggadadevankote (TP). In Heggadadevankote, male literacy is around 85.09 % while female literacy rate is 73.95 %. In H.D. Kote Town Panchayat, the Female Sex Ratio is 992. The Child Sex Ratio in Heggadadevankote is around 962. The literacy rate of Heggadadevankote city is 79.53 %. Heggadadevankote Town Panchayat has, in total, an administration over 3,336 houses to which it supplies basic amenities like water and sewerage.

Agriculture: H.D. Kote Taluk has nearly four major reservoirs. The Kabini, Hebbal, Taraka and Nugu reservoirs. These reservoirs support and are the main source of resources for the development of agriculture in this taluk. In terms of location, H.D. Kote taluk is rain-fed mainly because the government has failed to harness the capacity of the reservoirs. Barring the Kabini reservoir, the other reservoirs are always dry. As a result, farmers who could otherwise raise three crops are able to hardly raise one and are perennially in debt. Many food crops like paddy, Ragi and other crops have been used for raising. In recent decades, most farmers have changed their cropping pattern to a commercial crop, especially cotton. This is one of the main reasons for the economic backwardness of the taluk and distressing migration to cities is common.

Natural vegetation and Biodiversity: Healthy Tropical deciduous thorn-scrub forests, A contiguous forest, the plant species that used to occur in scrub jungles, grass lands and lightly wooden deciduous area about five decades back is still present in the all around the Forest and other parts of H. D Kote Taluk. A very famous Kabini reservoir and Nugu Dam, Knakan Kote Forest gave a boost to the development of Folra and fauna, including very small organisms in this entire taluk. Many immigrated huge birds are located in this taluk. Birds like Black Winged Stilt, Eurasian Spoonbill, Little Ringed Plover, Greater Painted-Snipe, Peregrine Flocon, Painted strok, Red-naped Ibis, Indian roller, Wooly - Necked strok, Magical Birds in Kabini Peafowl, Peacock, Indian roller, flameback Woodpecker, Streak-throated woodpecker, Indian Pygmy woodpecker, Flycatcher, Wagtails, Malbar pied Hornbill (format of the Forest), Hoopoe, Small minivet, Kingfisher of Kabini, Parakeets etc. Spotted Deer, Asiatuc Elephants, Indian Gaur, a Few Endangered species like Leopards, Sambar and Spotted deer and Panthers.

International Journal of Interdisciplinary Cultural Studies
ISSN: 2327-008X (Print), ISSN: 2327-2554 (Online)
Volume 19, Issue 2, 2024
https://cgscopus.com/index.php/journals

Objective 1 : Mapping of the Location and Distribution of Mobile Towers in H. D Kote

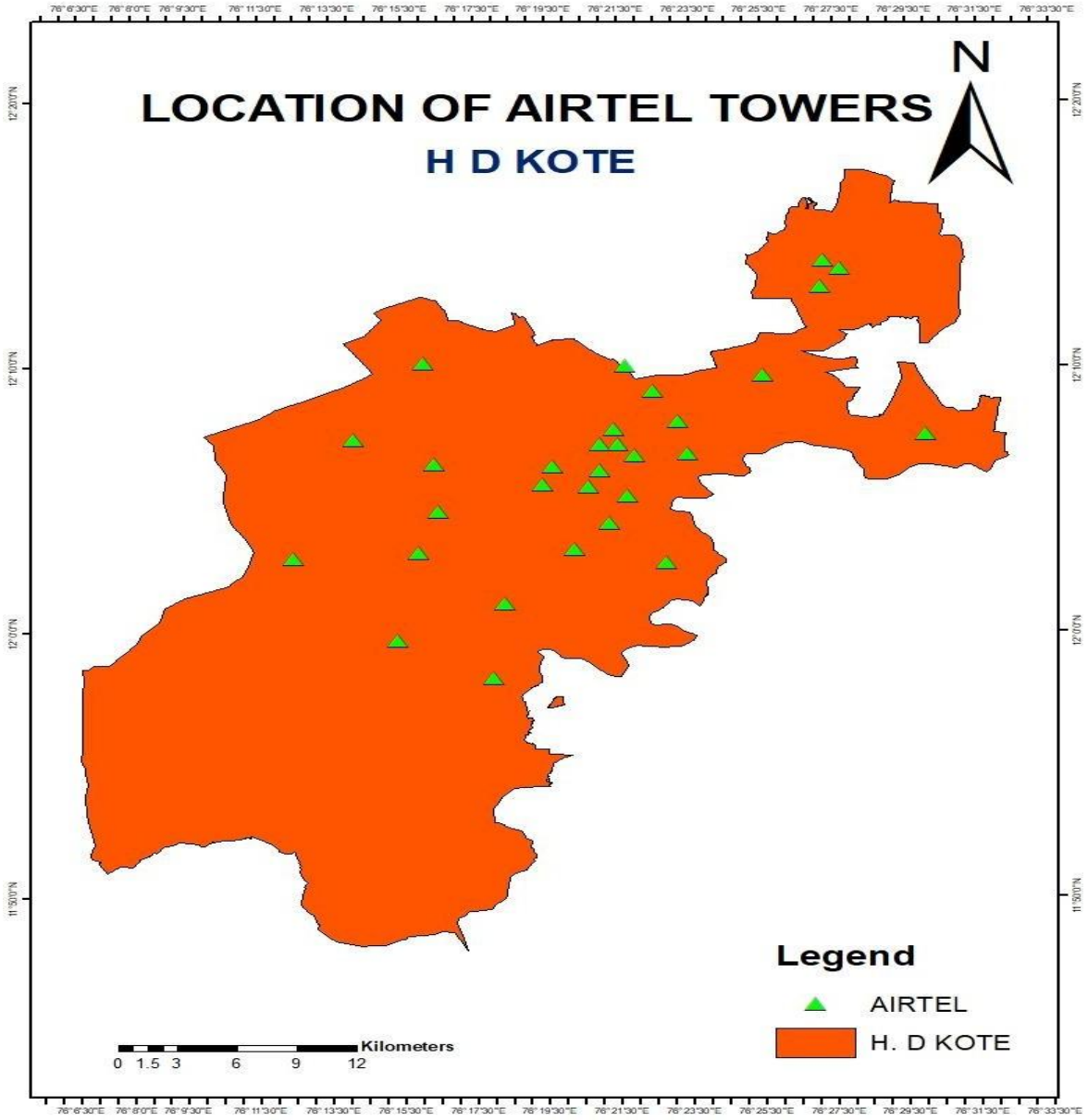


(Source: Map Prepared by Researcher)

The above map refers to all the company mobile towers in H. D KOTE taluk. The total towers located are 83; the approximate population is 14.313, and households are 3334. In this, 43 towers are located on agricultural land, 2 towers located on the roof floor and 38 mobile towers located near to households.

International Journal of Interdisciplinary Cultural Studies
ISSN: 2327-008X (Print), ISSN: 2327-2554 (Online)
Volume 19, Issue 2, 2024
https://cgscopus.com/index.php/journals

Airtel Mobile Towers

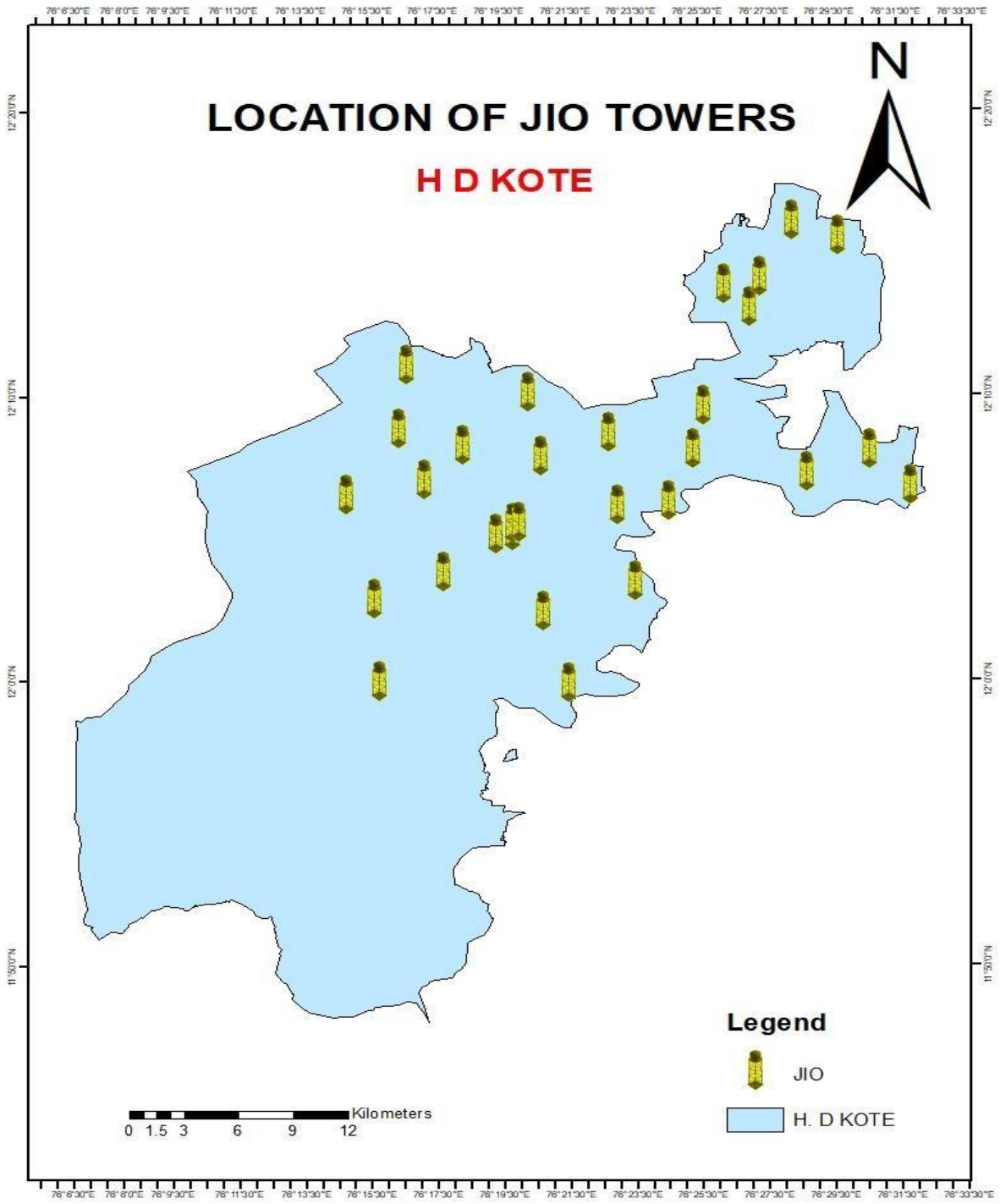


(Source: Map Prepared by Researcher)

The above map refers to the location of Airtel mobile towers. The total towers are 36. In 31 villages, the approximate population is 14,314. Households are 3,334.

International Journal of Interdisciplinary Cultural Studies
ISSN: 2327-008X (Print), ISSN: 2327-2554 (Online)
Volume 19, Issue 2, 2024
https://cgscopus.com/index.php/journals

Jio Mobile Towers

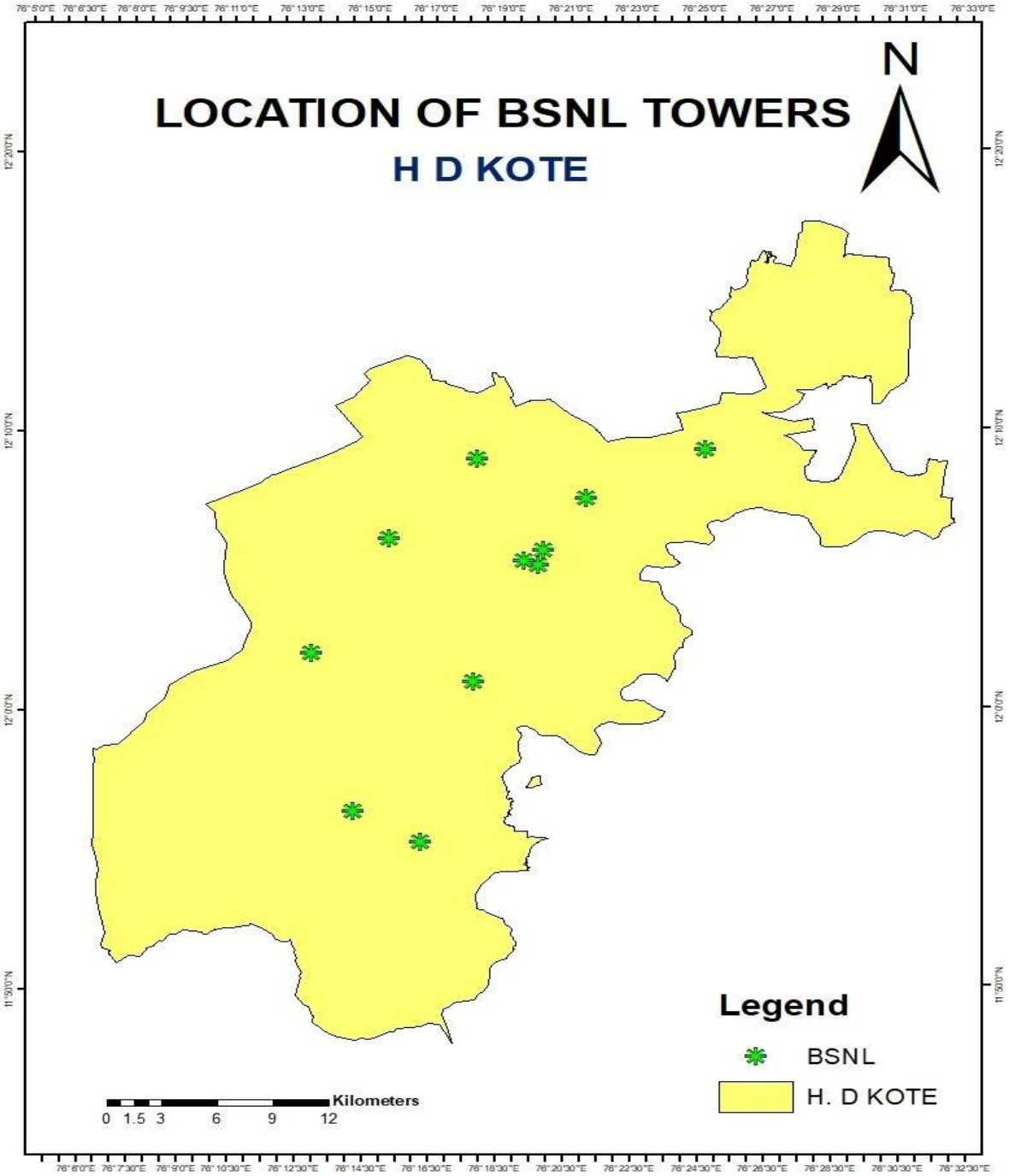


(Source: Map Prepared by Researcher)

The above map refers to the location of Jio mobile tower. The total towers are 31 in 27 villages. The approximate population is 14,314. Households are 3,334.

International Journal of Interdisciplinary Cultural Studies
ISSN: 2327-008X (Print), ISSN: 2327-2554 (Online)
Volume 19, Issue 2, 2024
https://cgscopus.com/index.php/journals

BSNL Mobile towers

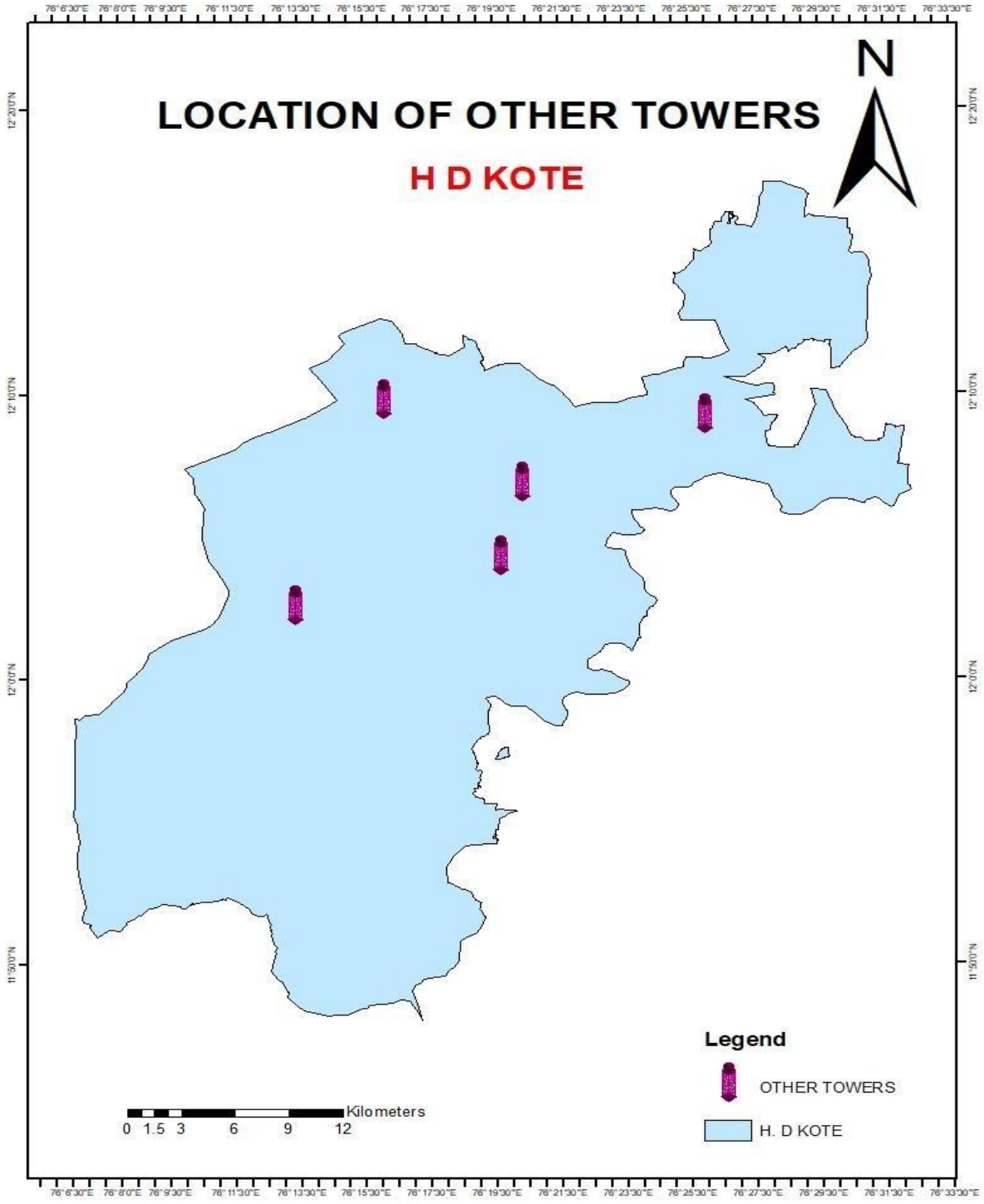


(Source: Map Prepared by Researcher)

The above map refers to the location of the BSNL mobile tower. The total towers are 11 in 7 villages. The approximate population is 5673. Households are 956.

International Journal of Interdisciplinary Cultural Studies
ISSN: 2327-008X (Print), ISSN: 2327-2554 (Online)
Volume 19, Issue 2, 2024
https://cgscopus.com/index.php/journals

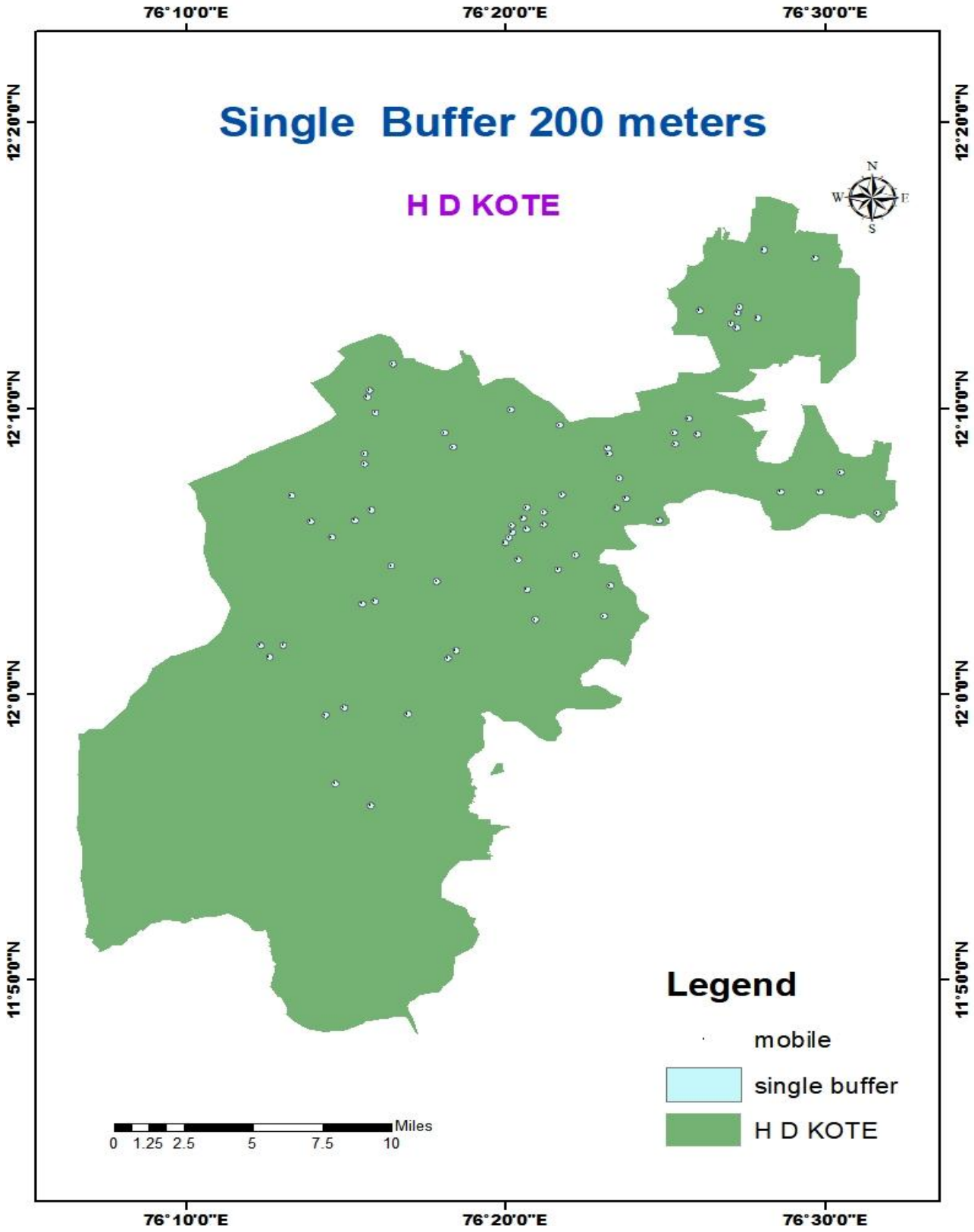
Other Mobile Tower located in H.D Kote Taluk



(Source: Map Prepared by Researcher)

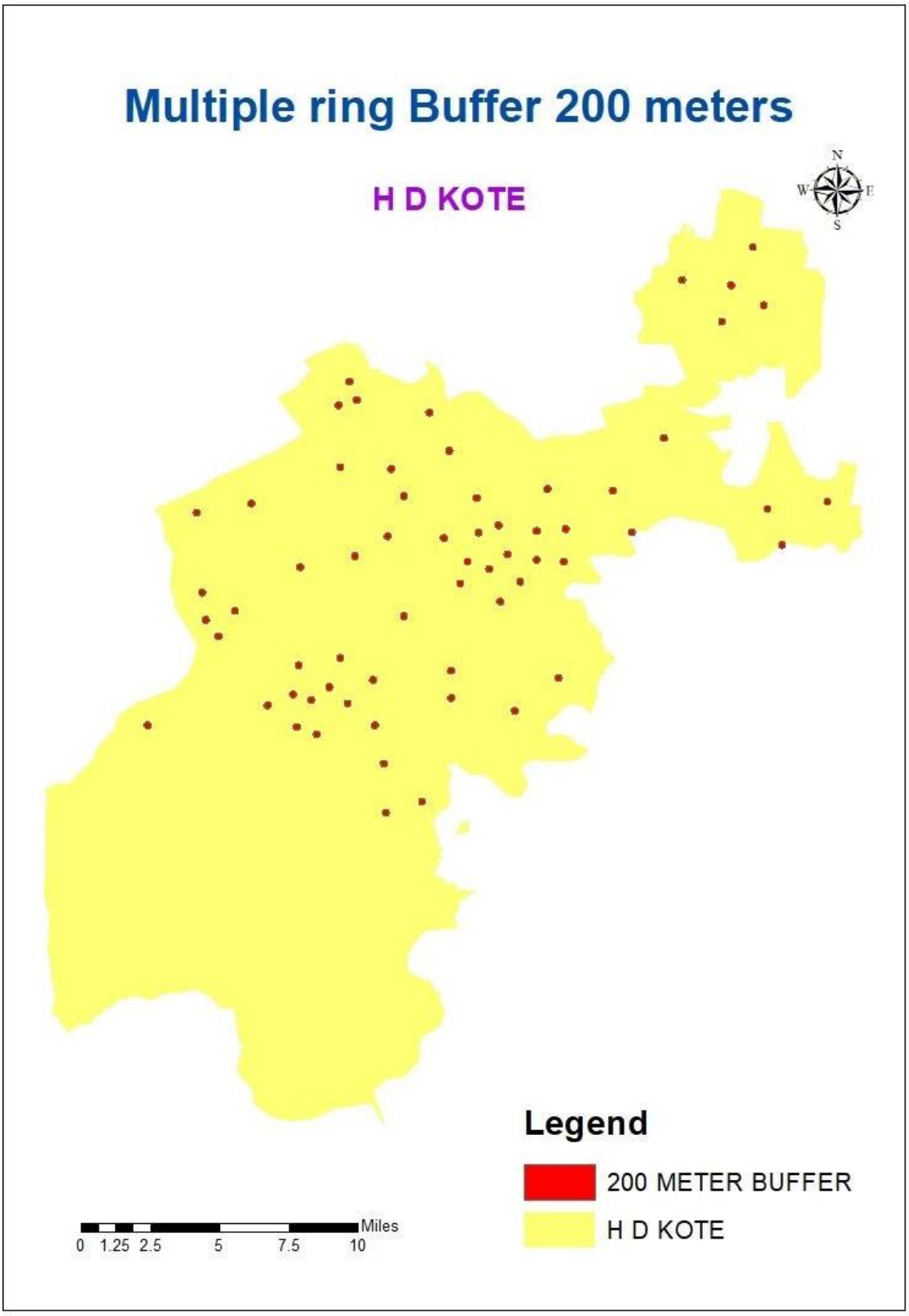
The above map refers to the location of other mobile towers. The total towers are at 5 and the approximate population is 1825. There are 489 Households.

International Journal of Interdisciplinary Cultural Studies
ISSN: 2327-008X (Print), ISSN: 2327-2554 (Online)
Volume 19, Issue 2, 2024
https://cgscopus.com/index.php/journals



(Source: Map Prepared by Researcher)

International Journal of Interdisciplinary Cultural Studies
ISSN: 2327-008X (Print), ISSN: 2327-2554 (Online)
Volume 19, Issue 2, 2024
https://cgscopus.com/index.php/journals

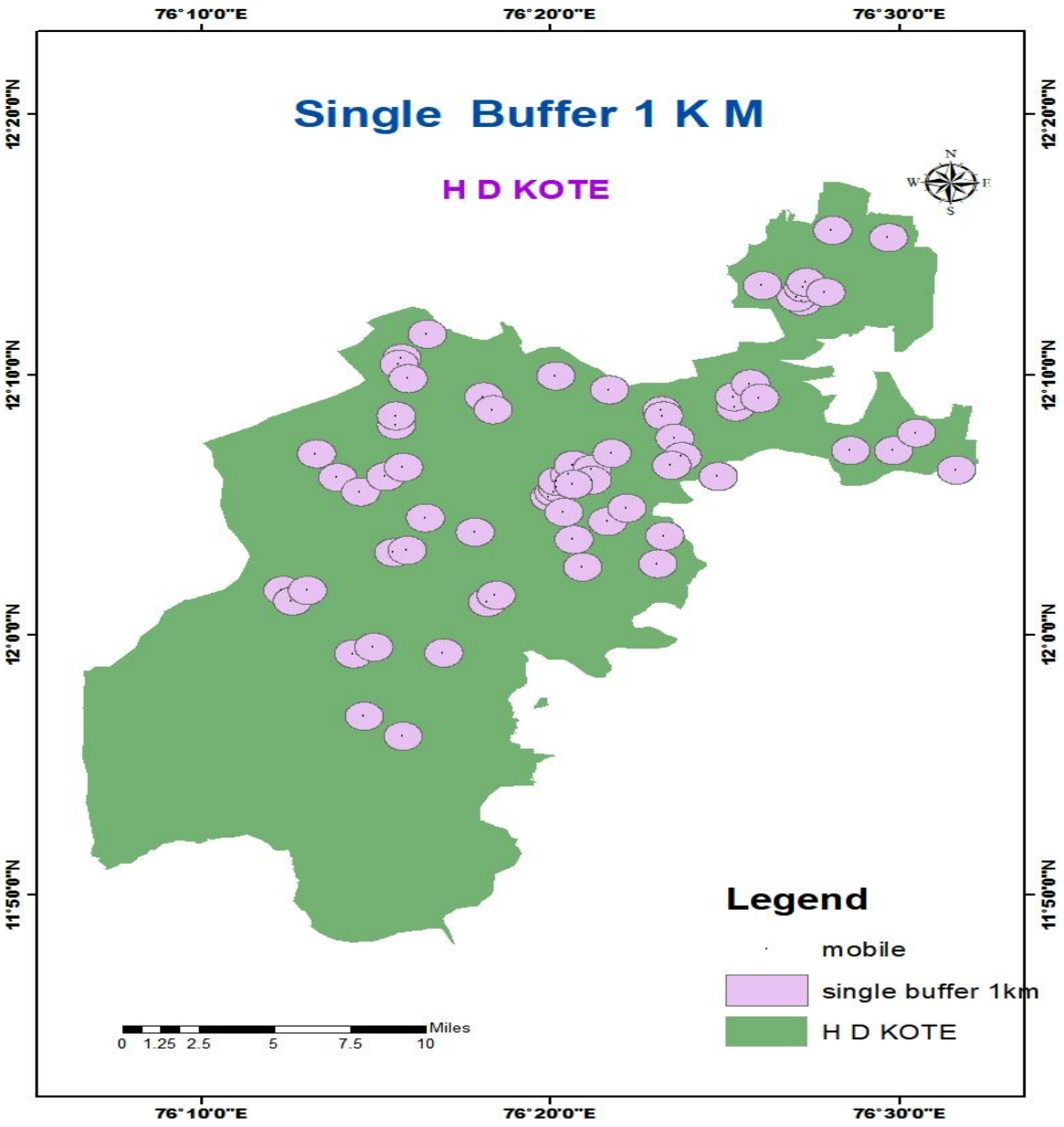


(Source: Map Prepared by Researcher)

International Journal of Interdisciplinary Cultural Studies
ISSN: 2327-008X (Print), ISSN: 2327-2554 (Online)
Volume 19, Issue 2, 2024
https://cgscopus.com/index.php/journals

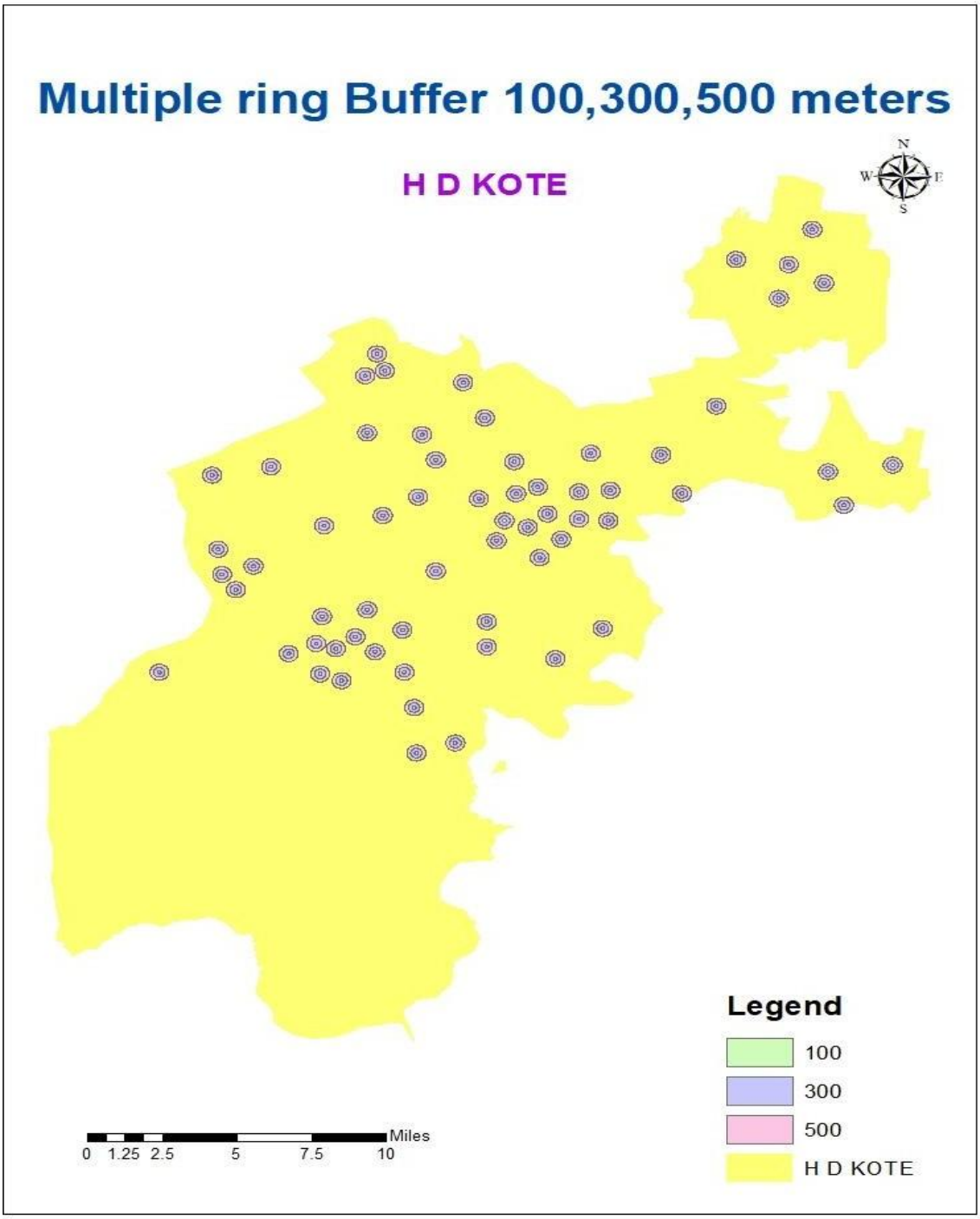
As observed in the above map, with the help of GPS we have taken all the tower distribution in H D Kote Taluk. We can observe in the 5th chapter we can study about impacts of radiation because of mobile towers, and we created the 200 metres buffer zone (light blue-colored circle) with the help of Arc GIS. A 200 metres buffer zones has been created because of high radiation in this area. The total population affected with this radiation is approximately 14314, and households are 3334 covered in this area. a 200 mts Buffer zone area has been taken because all GSM towers will radiate 1 KM (1000 metres), so 200 metres buffer zone area has been mentioned as a prone area (highly radiated area).

Single Buffer 1 k m



(Source: Map Prepared by Researcher)

International Journal of Interdisciplinary Cultural Studies
ISSN: 2327-008X (Print), ISSN: 2327-2554 (Online)
Volume 19, Issue 2, 2024
https://cgscopus.com/index.php/journals

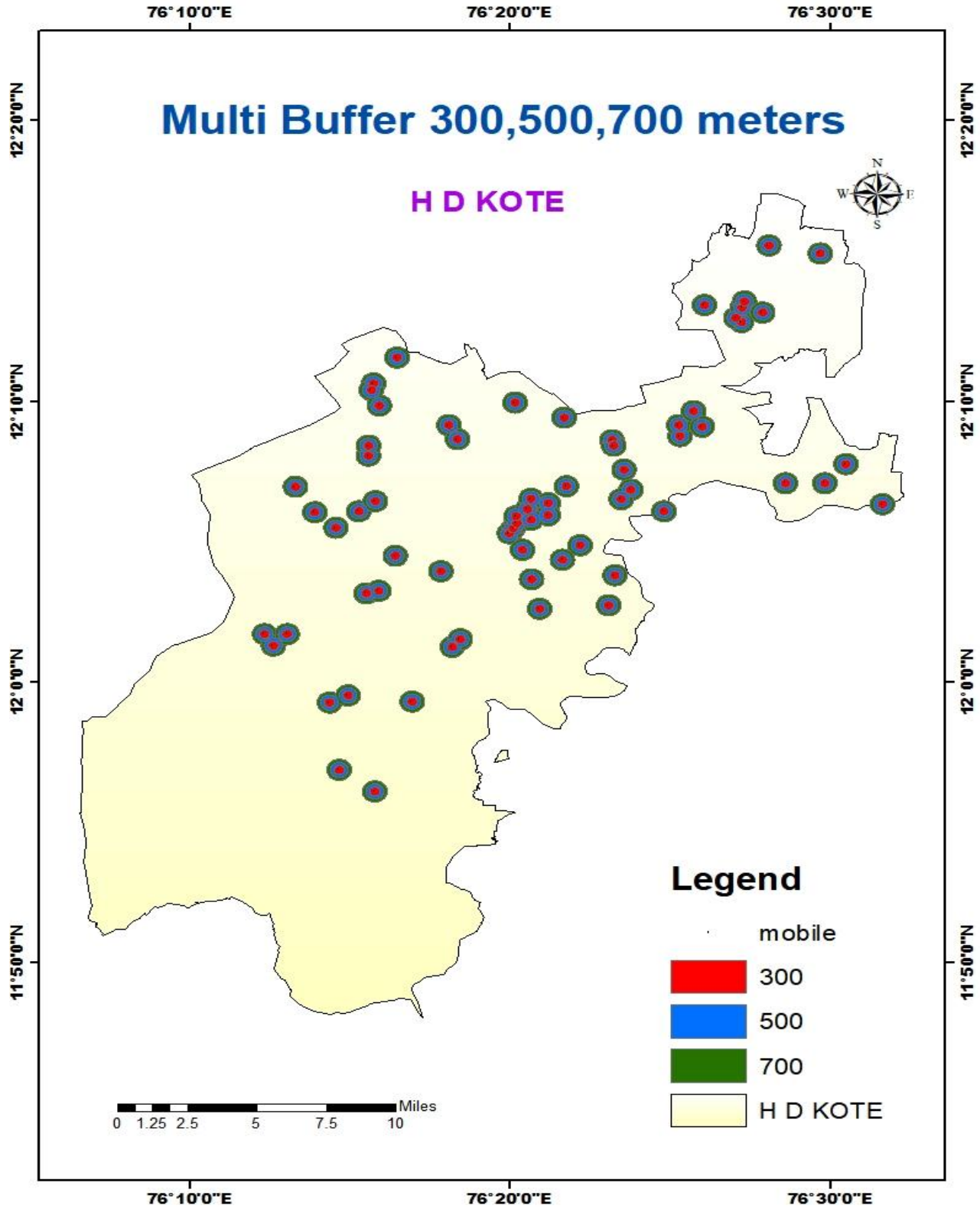


(Source: Map Prepared by Researcher)

The above picture shows the 3 buffer zones,. 100. buffer zone (high radiated) as observed. H D Kote, Hand post is affected with the high rated radiation, and Madapura, Kolagala are suffering with moderate radiation area 300 mts buffer zone (moderate radiated) and Hirehalli, Naganahalli & Chakahalli are less radiated area that is 500 metres buffer zones
(less radiated).

International Journal of Interdisciplinary Cultural Studies
ISSN: 2327-008X (Print), ISSN: 2327-2554 (Online)
Volume 19, Issue 2, 2024
https://cgscopus.com/index.php/journals

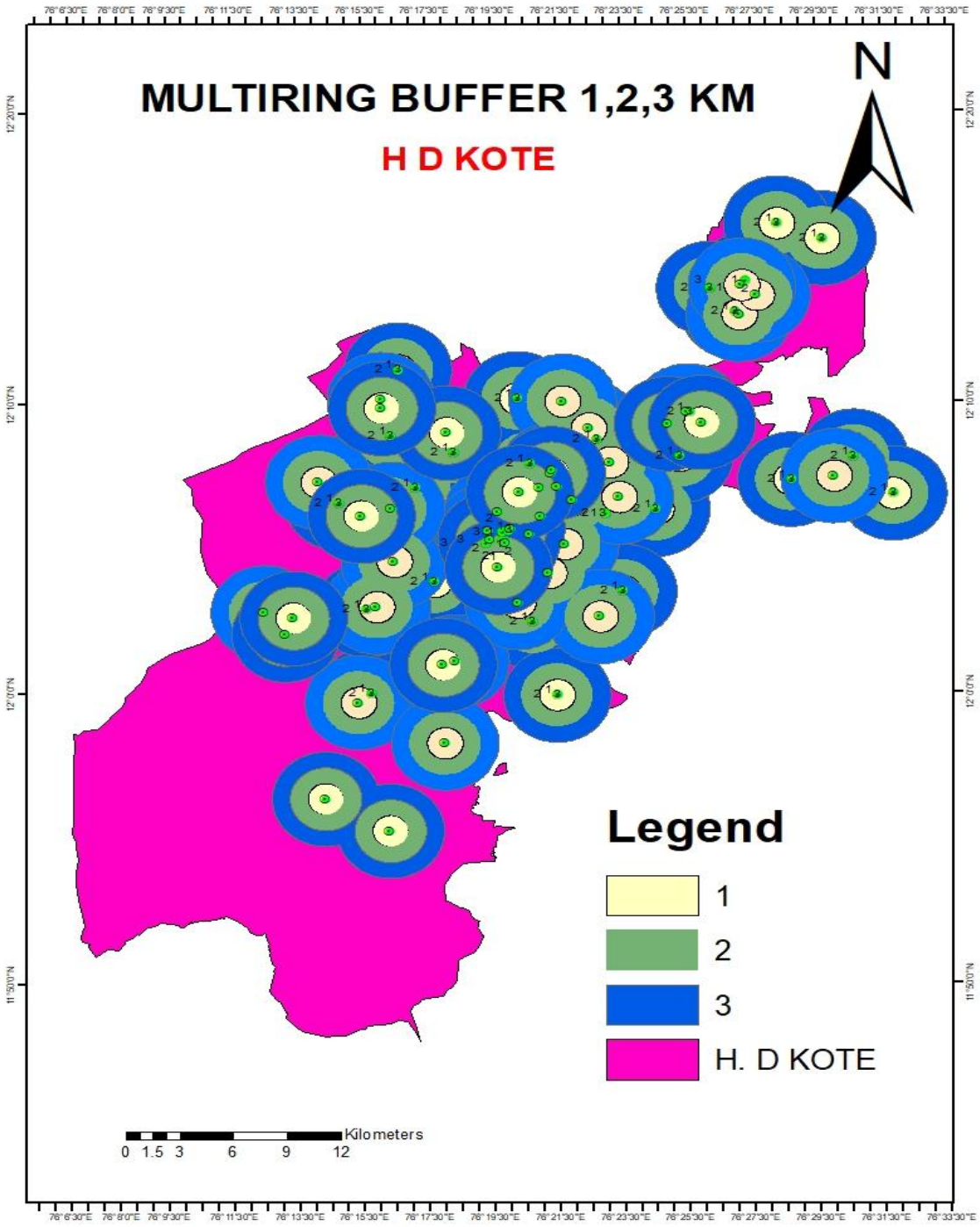
Multi Buffer 300,500,700 meters



(Source: Map Prepared by Researcher)

International Journal of Interdisciplinary Cultural Studies
ISSN: 2327-008X (Print), ISSN: 2327-2554 (Online)
Volume 19, Issue 2, 2024
https://cgscopus.com/index.php/journals

Multi Ring buffer 1,2,3 km



(Source: Map Prepared by Researcher)

International Journal of Interdisciplinary Cultural Studies
ISSN: 2327-008X (Print), ISSN: 2327-2554 (Online)
Volume 19, Issue 2, 2024
https://cgscopus.com/index.php/journals

Objective 2: To study the impact of mobile tower radiation on Biodiversity and Human

Introduction to mobile phones and radiation:

When you talk on your cell phone, the phone must be communicated wirelessly with some base station that is (typically) hundreds of meters away. Further, since the antennas on a mobile phone are not directive, the energy is transmitted in all directions; the radiation pattern of mobile phone is transmitted in all directions; the radiation pattern of a mobile phone is roughly omni-directional.
So, the previous paragraph states that the mobile phone can't control in what direction the transmitted energy will radiate. Since the cell phone does not know where the cell tower is, this is a good thing from a communication viewpoint. The energy goes everywhere, and so some of the energy will get to the cell tower, and the phone can communicate.
But - if the energy goes everywhere, and the phone is up against your head, your phone must also be transmitting radiation directly into your head! This most certainly is a fact. Now, the big question: should we panic or is this a non-issue? Let's examine the facts.

The mobile phone is in the users' pocket or usually will be in their hand. It produces and is non-ionizing radiation. Radiation can be loosely defined as the existence of an electromagnetic wave.
Electromagnetic waves are simply electric or magnetic fields, and these are produced from electric voltage and current.
All the AM radio stations, FM radio stations, TV signals, GPS signals, Wi-Fi, (anything energy/information that is possible to receive wirelessly) is around you all the time. And all of this radiation has been around your entire life.

Some radiation is bad (nuclear bombs) and some radiation is relatively harmless. There are two types : ionizing and non-ionizing radiation. Lonizing radiation means that the electromagnetic waves have enough energy to ionize particles. This means that the fields are powerful enough that they can rip the electrons off the atoms of a material - producing ions. This is the type of radiation that can damage your DNA and its leads to cancer or radiation poisoning, etc.
So non-ionizing radiation then, is radiation that does not have enough energy to ionize particles.
This means that the surrounding fields from non-ionizing radiation sources don't have enough energy to knock the electrons off the atoms of your body.
Examples of non-ionizing radiation include cell phones, sunlight, AM/FM radio, microwave ovens and TV stations.
A cellular network or mobile network is a wireless network distributed over land areas called cells, each served by at least one fixed-location transceiver, known as a cell site or base station.
In a cellular network, each cell uses a different set of frequencies from neighboring cells to avoid interference and provide guaranteed bandwidth within each cell.

When joined together, these cells provide radio coverage over a wide geographic area. This enables numerous portable transceivers to communicate with each other and with fixed transceivers and telephones anywhere in the network, via base stations, even if some of the transceivers are moving through more than one cell during transmission.

International Journal of Interdisciplinary Cultural Studies
ISSN: 2327-008X (Print), ISSN: 2327-2554 (Online)
Volume 19, Issue 2, 2024
https://cgscopus.com/index.php/journals

Guidelines for Installation of the Mobile Towers:

The Department of Telecommunications (DoT) is in the process of finalizing tougher norms for radiation emitting from cell towers. Our India currently follows the International Commission for Non-Tonizing Radiation Protection (CRIP), a German independent body's guidelines set for exposure to radiation.
Mobile phone towers installed on top of buildings are a definite threat to human health.
According to experts, radiation from mobile phones used for a long duration is higher than that from mobile towers.
A good part of Telecom Tower is a single installed unit that can be a home to multiple telecom providers. Mean, the same telecom tower can be used by multiple companies for distributing the signals. The government framed a policy in 2006 in which guidelines, rules and regulations have been framed for installing a tower. Under the guidelines, mobile service providers have to take clearances from the government before installing a tower.

Important Guidelines for Installation of the Mobile Towers:

The Environment (Protection) Act, 1986 and rules made under it, all mobile phone service providers are hereby directed to follow the following guidelines strictly at the time of installation of the mobile towers.

* Installation of Base Station Antennas within the premises of schools and hospitals may be avoided because children and patients are more susceptible to Electro Magnetic Field.

* Installation of Base Station Antennas in narrow lanes should be avoided in order to reduce the risks caused by any earthquake or wind related disaster.

* The Base Station Antennas should be at least 3m away from the nearby building and antennas should not directly face the building. Further, the lower end of the antenna should be at least 3 meters above the ground or roof.

* The case of multiple transmitter sites at a specific locality, a common tower infrastructure should be explored, as far as possible, which can be coordinated through a nodal agency.

International Journal of Interdisciplinary Cultural Studies
ISSN: 2327-008X (Print), ISSN: 2327-2554 (Online)
Volume 19, Issue 2, 2024
https://cgscopus.com/index.php/journals

* Access to Base Station Antenna sites should be prohibited by the public by suitable means, such as wire fencing, locking of the door to the roof etc. Access to the tower site, even for the maintenance personnel, should be for a minimum period long as possible.

* Sign boards/Warning Signs are to be provided at Base Station Antenna sites which should be clearly visible and identifiable. A warning sign should be placed at the entrance of such a zone.

* The "Warning Sign" should discourage longer stays in the zone, even for the maintenance personnel. The sign board may contain the following text:
1. Danger ! RF radiation. Do not enter!
2. Restricted Area.

* The operators and maintenance personnel, who are dealing with radio frequency devices, especially with Base Station Antennas installed on towers and at any other outdoor sites, should be protected from electromagnetic radiation. It is required that operators and maintenance personnel should be educated about possible hazards from these devices.

1. Instructions/guidelines have been issued to the TERM Cells for auditing the
RF radiation from BTS for compliance with the prescribed norms. The following are additional guidelines for TERM Cells in this matter.

2. With a view to strengthening monitoring and compliance of safety aspects / provisions in regard to radio frequency emissions from mobile towers, TERM.
Cells may also take the following into account while conducting their audits for the purpose of ensuring that all public areas are within safe EMF exposure limits as prescribed by DoT.

* In the case of both ground-based towers & rooftop towers, there will be no building right in front of the antenna(e), of equivalent height considering the tilt of the lowest antenna on the tower, as per details in the table below. Further, the antennae at the same height are only to be counted, as the beam width of the mobile antennae, in the vertical direction, is very narrow.
(Source: The Environment (Protection) Act, 1986.)

Number of antenna (e) pointed in the same Direction	Building\structure safe distance from the antenna at the same height (in meters)
1	20
2	35
4	45
6	55

International Journal of Interdisciplinary Cultural Studies
ISSN: 2327-008X (Print), ISSN: 2327-2554 (Online)
Volume 19, Issue 2, 2024
https://cgscopus.com/index.php/journals

The distance figures in the above table are based on empirical estimation considering that all the antennae are emitting at their maximum RF power of 20 Watts and exactly in the same direction with same height (a worst case scenario). In practice, the values of safe distance of buildings will depend upon actual deployment scenarios and mostly, may be far less than depicted above.

3. **Wall Mounted/Pole mounted Antenna:**

* Wherever the antennae are mounted on the wall of building or pole on/along the road, their height should be at least 5 meters above ground level /road level. However, such installations will have to comply with the radiation limits.

* As far as safe distance of buildings from antenna is concerned, guidelines as given above will apply.

Location of mobile towers:

(Source: Google)

As per the guidelines framed in 2006, rules and regulations have been framed for installing a tower. No tower would be installed within 100-meter radius of hospitals and educational institutes. But this are not followed as many towers are seen without taking care of the guidelines. With regard to the location of towers, cellular operators shall avoid residential areas for erection of the same.

* First preference shall be given to the location of tower in the Forest areas.

* Second preference shall be given to the location of tower in the open or public areas away from residential locations.

Where it is not possible to avoid the location of the tower in residential area, the same shall be located in open space or park, with prior consent of owners of adjoining residential houses.

Erection of tower shall not be allowed within a radius of 100 meter from residential building, school and hospital. Permissions or Documents Required

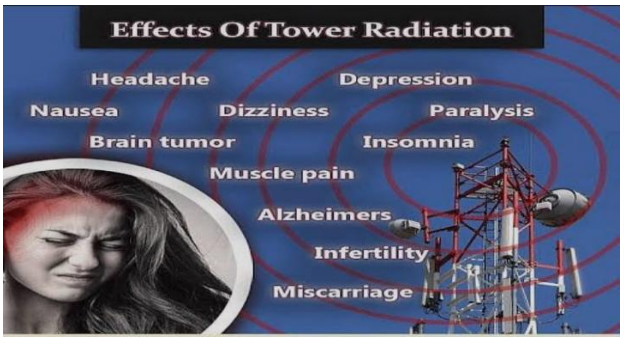
International Journal of Interdisciplinary Cultural Studies
ISSN: 2327-008X (Print), ISSN: 2327-2554 (Online)
Volume 19, Issue 2, 2024
https://cgscopus.com/index.php/journals

* Structural safety certificate from designated institute: This is important certificate for installation of tower in building as the tower is installed on building of school.

* Consent from authority: Mobile phone operators and building owner has to get consent of Municipality or respective authority. Ensure that school or building owner has obtained required permission from consent authority to set up the tower.

* Indemnity Bond: This is required from owner or service provider for the installation of tower. Indemnity Bond is to take care of any loss or injury due to accident caused by the tower.

In Cities like Delhi, Mumbai, Chennai, Hyderabad and Bangalore, civic body has launched a drive to remove the illegal cell phone towers in the city. The civic body has observed that housing societies giving permission to service providers erect towers for a rent. Before erecting such towers, it is necessary to check the structural stability of the building according to the Development Control (DC) rules.



(Source: Google)

Areas of mobile towers

Areas	Numbers of mobile towers	Area in square feet
Agricultural land	43	2000
Top of the roof	02	1200
Near to house holds	38	2000
Total	83	

The Above table refers to the Location of mobile towers, In H D Kote taluk, 43 towers are located in agricultural lands, and it's required minimum 2000 square feet of land. 2 towers are located on

International Journal of Interdisciplinary Cultural Studies
ISSN: 2327-008X (Print), ISSN: 2327-2554 (Online)
Volume 19, Issue 2, 2024
https://cgscopus.com/index.php/journals

Top of the Roof with the area in 1200 square feet for each. 38 mobile towers are are located in near to households, with the area in 2000 square feet for installation of each mobile tower.

Radiation effects on human Health :

Health Problems	Number of people	Percentage (%)
Headache	10	40
Infertility	2	3
Sleep disorders	9	36
Cancer risk	2	3
Psychological effects	2	3

The impact of mobile tower radiation can mainly effects on Human health. Above table refers to the number of people suffering from different health problems. By collected 40 samplea from 25 families.

Rent payment is by company (MONTHLY)

Company	Urban area (Rs)	Rural area (Rs)
Airtel	14OOO	5700
Jio	11000	5500
BSNL	9500	4900

International Journal of Interdisciplinary Cultural Studies
ISSN: 2327-008X (Print), ISSN: 2327-2554 (Online)
Volume 19, Issue 2, 2024
https://cgscopus.com/index.php/journals

Rent payment is by company (monthly) is vary from rural to urban land. Above table refers to the rent payment by different companies to the land owners who are gave their land to install of a tower.

Radiation effects on different age groups

Age group	Number of people	Percentage (%)
0-14 (children)	12	48
18-30(adults, pregnant ladies)	5	20
Above 55 (elders)	8	32

The mobile tower radiation can effective more on these age groups. Above table refers to the number of people in 3 different age groups who are suffering from radiation effects by collected 40 samples from 25 families.

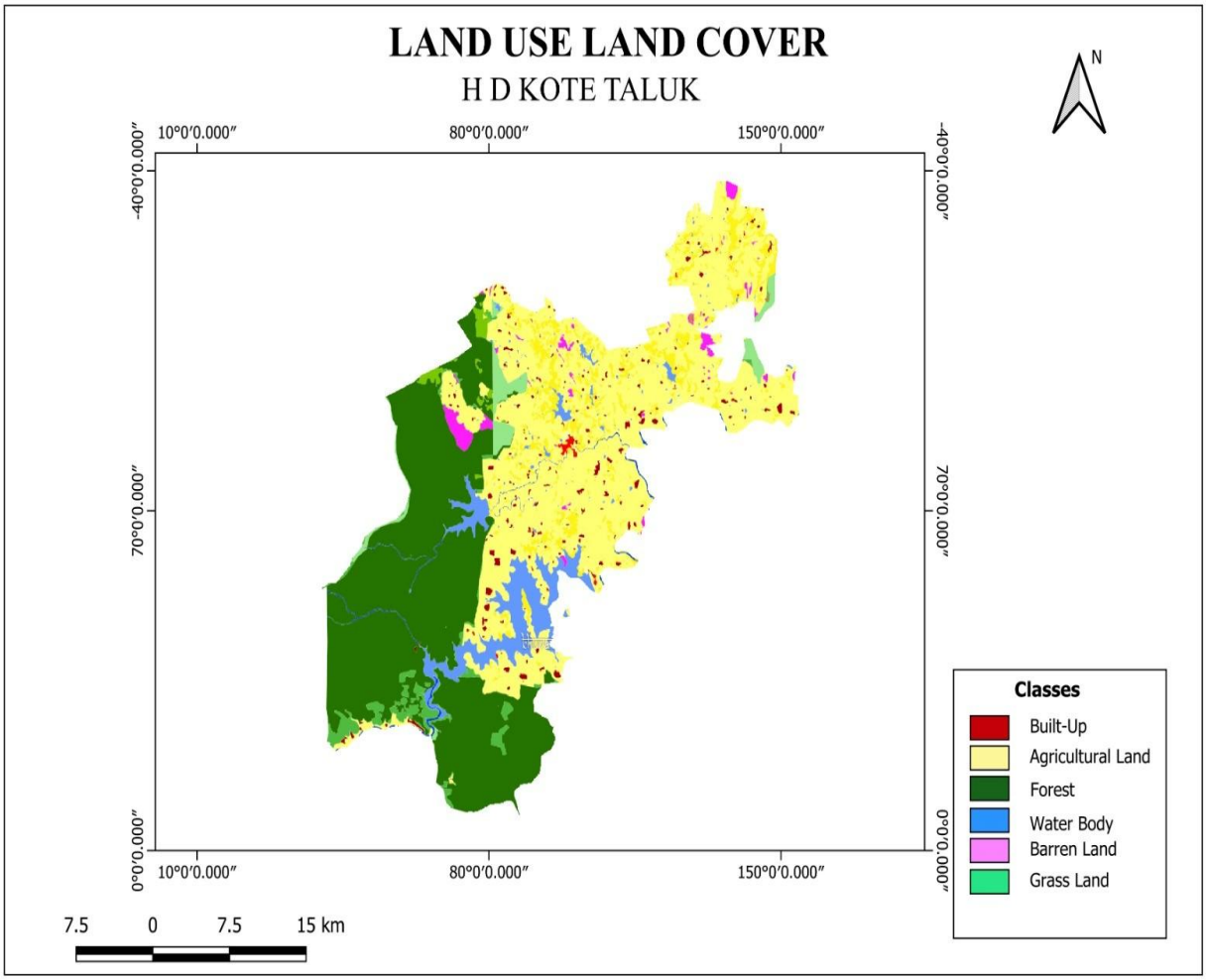
Mobile tower radiation impacts on birds, Animals and species

Effects on Birds

Behavioral Changes: Studies have documented changes in behavior in areas with high RF-EMF exposure. Birds may exhibit altered foraging patterns and nesting behaviors, and migratory routes. For instance, research indicates that RF-EMF can disrupt navigational skills in migratory birds, potentially affecting their migration routes and overall survival. Based on the primary data of 25 respondents' statements, these many below-mentioned birds are not visible near to the cell tower located in the areas, birds are Bats, Kabini Peafowl, Peacock, Indian roller, flameback Woodpecker, Streak-throated woodpecker, Indian Pygmy woodpecker, Flycatcher, Wagtails, Malbar pied Hornbill (format of the Forest), Hoopoe, Small minivet, Kingfisher of Kabini, Parakeets etc
Physiological Effects: Based on primary data, 12 responders have observed the death of birds like Bats, Peacock, Owl ,Eagle, Sparrows, Love Birds, Kingfishers, Crow, Falcon are in physiological stress in birds exposed to RF-EMF, including changes in hormone levels and increased oxidative stress. These changes can influence reproductive success and overall health. However, results are often inconsistent, with some studies finding minimal effects. Population impact, especially Sparrow and falcons are not seen from many Months from 10 Responders hence bird populations remain unclear.

International Journal of Interdisciplinary Cultural Studies
ISSN: 2327-008X (Print), ISSN: 2327-2554 (Online)
Volume 19, Issue 2, 2024
https://cgscopus.com/index.php/journals

Land Use Land cover Map of H.D.Kote Taluk



(Source: Map Prepared by Researcher)

The above land use land cover map shows the percentages of Agricultural areas are covered by more number of Towers based on the GPS Point locations. As per the primary data collection from 25 respondents there was a settlement and movements of different kinds of birds near the Agricultural area now it is decreasing day by day. Based on the Primary data collection food chain is breaking near the Agricultural areas. It's directly indirectly affects on food Crops for the good yield.

International Journal of Interdisciplinary Cultural Studies
ISSN: 2327-008X (Print), ISSN: 2327-2554 (Online)
Volume 19, Issue 2, 2024
https://cgscopus.com/index.php/journals

(Source: Google)

Effects on Animals

Behavioral and Ecological Effects In some cases, some animals are exposed to changes in behavior, such as altered foraging and mating habits. These behavioral changes can have effects on ecosystems, potentially disrupting predator-prey relationships and competition dynamics.

Ecosystem Health: The broader ecological impacts of RF-EMF are complex. Changes in animal behavior and health can affect plant-animal interactions, seed dispersal, and overall ecosystem balance. The full extent of these impacts requires further research to understand how RF-EMF affects ecological processes.

Health Impacts**:** Nearly 25 responders observed various health issues in animals observed near the surroundings of towers. Animals like Monkey, Squirrel, Dog, Snakes, and Cat are suffering from nervous system and has caused death in abnormal way as per the primary Data. Many other from the forest localates are heard about problems faced by Spotted Deer, Asiatic Elephants, Indian Gaur, a Few Endangered species like Leopards, Sambar and Spotted deer and Panthers**.** Hence, near the towers findings to wild animals are challenging.

Effects on Various Species

Invertebrates: Invertebrates such as bees and butterflies are crucial for pollination and ecosystem functioning. Research suggests that RF-EMF can impact their navigation and foraging behaviors. For example, studies have reported disorientation and reduced foraging efficiency in bees exposed to RF-EMF, which could have significant implications for plant reproduction and food production.

Aquatic Life: The impact of RF-EMF on aquatic species is less studied but emerging research indicates potential effects. Changes in fish behavior, including altered feeding and spawning

patterns, have been observed in some studies. The potential impact on aquatic ecosystems needs more investigation to determine the long-term consequences. Pond Ecosystem, Food Chain and Food Cycle are breaking By near the Towers.

Controversies and Research Gaps

The research on RF-EMF impacts is often contradictory, with some studies showing significant effects while others find minimal or no impact. Variations in study methodologies, exposure levels, and species-specific responses contribute to this uncertainty. There is a need for standardized research protocols and long-term studies to better understand these impacts. Much information was not able to be collected during the primary data collection because of lack of knowledge about the particular species reorganization by the responses. Effects of mobile tower radiation on insects and very small organisms are not collected much due to the lack of methodologies and availability of information on the intensity of radiation.

CONCLUSION AND REFRENCES

Conclusion:

Now a day the recent issue of urbanization process took a very good place. But it makes harmful to the people and also the living organisms. So, in this analysis we studied in a detail way of meaning of mobile towers, history of mobile towers, impact of mobile tower radiation. Map of location and distribution of mobile towers, and each towers radiation in H D Kote (study area) area, different meter buffers shows and which area effecting or suffering from the mobile towers. As observed in the above maps, with the help of GPS we have taken all mobile tower distribution in H D Kote taluk, as we have absorbed 100 to 300mts buffer zone has been created because of high radiation in this area, total population effected with this radiation are Approx. 8453 and house hold are 976 covered in this area. 300mts buffer zone has been taken because all GSM towers will radiate 1km(1000mts) so 300mts buffer zone area has been mentioned as prone area (highly radiated area.) These areas are threatening.

In this way we should observe those problems and we make alternatives, the mobile companies and also for the government should be take precaution or use good methodologies mobile companies should use telecom polices and ministrory of telecom policies.

We know there are many technologies and lot of improvements is going, any one of good method should be adopted for mobile towers. Ex: satellite connections for the mobiles. In this way we will avoid the many big problems on living beings. Communication process will be not affecting, everything become a good and healthy environment in this area.

International Journal of Interdisciplinary Cultural Studies
ISSN: 2327-008X (Print), ISSN: 2327-2554 (Online)
Volume 19, Issue 2, 2024
https://cgscopus.com/index.php/journals

REFRENCES:

1. Indian Jounal of history of science 29(91)1994
2. Sri Chandrasekhaendra sarswathi viswa mahavidyayalaya news-JSTOR(July 2020)
3. https://www.sciencedirect.com/science/article/pii/S2212096321000255
4. https://cpcb.nic.in/uploads/upc/Note_Mobile_Tower_Radiation_UPCD_Div.pdf
5. https://www.census2011.co.in/data/town/803195-heggadadevankote-karnataka.html#google_vignette
6. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8668868/
7. H.D KOTE map from KGIS.
8. Google images and information about the mobile towers.
9. Latitude and longitude points taken using GPS.
10. QGIS for creation of maps.

Received: 11/08/2024; ***Accepted:*** 16/08/2024; ***Published:*** 22/09/2024