

A SURVEY ON THE IMPACT OF CELL PHONE TOWER RADIATION ON SOME NUT AND BANANA PLANT

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ABSTRACT

Now-a-days researchers are very much concerned about the health effects and potential hazards of cell phone radiation. They evaluate Specific Absorption Rate (SAR) at different human organs due to the radiation coming from cell phone and towers. But, if the vision is slightly changed toward the effect of RF on agricultural field and plant kingdom, no such theoretical study has been done earlier. Few publications can be found on this topic which is limited to statistical observation. The aim of this assessment is to study the effect of cellphone tower radiation on coconuts, betelnut and banana. The study shows that there is an abrupt decrease in the production of coconuts and betelnuts after the installation of mobile tower and the decreasing continues till date. Electromagnetic radiation generates heat and disturbs the ecological cycle.

Keywords: *Banana, Betel-Nut, Cell Phone Tower, Coconut, E.M. Radiation, Production.*

I INTRODUCTION

With the growth of cell phones subscribers in Assam, it also leads to growth of infrastructure in the form of mobile phone towers. Today, in absence of any policy on infrastructure development and location of cell phone towers, large number of mobile towers is being installed in a haphazard manner across urban and sub-urban habitats in the state. The need of the hour is to check unscientific proliferation of mobile towers and promote more studies and come out with practical solutions. The unchecked radiation from the mobile towers, has taken its toll on plants and even human. There was study by WHO and they have established a clear linkage between malignant tumour and radiation. As of now the way things are going, radiation will emerge as the biggest environmental problem in the days to come. EMF pollution is a reality that we need to protect ourselves from, just like any other form of pollution we have in our environment. The cell phones are only part of the problem, other devices like computers, TV and other electrical devices are also of concern. They all contribute to the electrical pollution that surrounds us every minute of our lives. Due to its several advantages cell phone technology has grown exponentially in the last decade. In India there are more than 90 crores cell phone users and nearly 4.4 lacs cell phone towers to meet the communication demand. All the transmitting towers, such as AM and FM towers, TV towers, cell towers, etc. emit RF/Microwave radiation continuously. Also, Wi-Fi (wireless Internet), wireless computers, cordless phones and their base units, cell phones and all other wireless devices emit microwave radiation. A cell phone that is ON but not in use is also radiating. Cell phones operate within the frequency band of 800 MHz, 900 MHz and 1800 MHz and

the latest 3G technology works between 1900 -2200 MHz Computers and laptops operate within the frequency range of 1000 – 3600MHz, and most Wi-Fi systems and some cordless phones operate around 2450 MHz, which is same frequency as that of a microwave oven! The growing use of wireless communication in the last decade has introduced concerns about health risks from the so called man made electro smog. Various epidemiological and experimental studies have been carried out and the results have shown to have a close relation between biological effects and Electromagnetic radiation^[1].

Microwave radiation effect can be classified as - thermal and non-thermal. The thermal effect has been largely studied and refers to the heat that is generated due to absorption of microwave radiation. Being exposed to the thermal effect could cause fatigue, cataracts and reduced mental concentration. Research is going on to study the non-thermal effects of radiation, and it has been associated with affecting the cell membrane permeability. A base station and its transmitting power are designed in such a way that mobile phone should be able to transmit and receive enough signal for proper communication up to a few kilometers. Majority of these towers are mounted near the residential and office buildings to provide good mobile phone coverage to the users. These cell towers transmit radiation continuously, so people living within 10 meters from the tower will receive 10,000 to 10,000,000 time's stronger signal than required for mobile communication. In India, crores of people reside within these high radiation zones. At many places, cell phone towers are mounted on the roof top of residential /commercial buildings. Even though antenna radiates less power vertically down but the distance between the antenna and top floor is usually a few meters, so the radiation level in the top two floors remain very high. There is very little available literature on the effect of electromagnetic radiation on the trees. Tops of trees tend to dry up when they directly face the cell tower antennas and they seem to be most vulnerable if they have their roots close to the water^[2].

Electromagnetic radiation emanating from cell towers can also affect vegetables, crops and plants in its vicinity. Studies show definitive clues that cell phone EMF can choke seeds, inhibit germination and root growth, thereby affecting the overall growth of agricultural crops and plants.^[3] Various studies have shown the ill-effects of radio-frequency electromagnetic field (RF-EMF) on bees, fruit flies, frogs, birds, bats, and humans, but the long-term studies of such exposures are inconclusive and scarce, and almost non-existent in India^[4].

This study/survey aimed to analyses the impact on the production of betel-nut, coconut and banana due to establishment of cell phone towers. The Objectives of the study are that:

- I. To analyze the rate of production of betel- nut, coconut and banana per annum in the residential areas.
- II. To analyze the environmental change near the towers.
- III. To know the merits and demerits of using cell phones and effects of base stations on environment.

2.1 Method and Materials

In recent years, some researchers along with the peasants are claiming that the production of crops/fruits gets affected near the high radiation cell phone towers. But, there are no such scientific research document found except, few publications which are mostly limited to statistical observations^[5]. From that point of view, some effort has been given to throw light on this issue. Radio frequency used to communicate by mobile phone has the ability to

penetrate through semi-solid substances like meat, and living tissue to a distance proportional to its power density ^[6]. In Assam, coconut, betel-nut is not cultivated commercially in large scale. It is reported that two factors are affecting in the production of nut, these are immature nut falling and nut cracking (splitting) due to the deficiency of micronutrient borax ^[7]. This implies that there is certain cell tower radiation effect on nut in this region.

The survey was conducted with the gross production of betel nut, coconut and banana per.annunDhingsuburban areaduring the month of October and November 2014. A pretested Questioner including questions regarding the number of trees, production of the fruits before and after the establishment of cell phone tower, soil condition, climate condition, deforestation, method of cultivation and management, uses of chemicals for growth and production and relative causes is prepared. Questions had also been included to know about the environmental change near the towers, the soil condition and deforestation. We meet and interact with 215 individuals like Farmers, People living near cell towers, local Agricultural officials, different Socio-NGO's, Social workers and Fruit-Sellers of the town to know how a mobile tower affects their lives and how radiations from cell phone towers effects in production of fruits.

2.2 Sample: BETEL-NUT (*Areca catechu*), COCONUT (*Cocosnucifera*) AND BANANA (*Musaparadisiaca*)

2.3 Site Selection

Dhing Suburban Area is situated to the north of the district Nagaon of Assam; India. The place covers an area of about eight square kilometer. An attempt has been made for comprehensive study of impact of E.M. Radiation from cell Phone base stations in Dhing town of Nagaon district. Nagaon town is located between $25^{\circ} 45'$ to $26^{\circ} 45'$ north latitudes and $92^{\circ} 33'$ east and $93^{\circ} 20'$ east longitude. The town has an average altitude of 61 m from mean sea level. This area is mainly a residential area. Almost in all the residence a home garden is attached where mainly banana, betel-nut and coconut are cultivated. The environment, climate and soil condition of this area is suitable for betel-nut, coconut and banana. First cell phone Tower was established in 2005 by BSNL, Nagaon and today its number increases to 12. Almost all the towers were established in residential area.

III RESULT AND DISCUSSIONS

The summarized of the filled Questioner by the individuals that we met during the survey period and outcome of the interactions with the local people/farmer regarding the problems in the production of betel-nut, coconut and banana in their areas is given in following table.

ITEMS	2004	2005	2006 (installation of mobile tower)	2012	2013	2014
Banana (In qncls)	10,600	10,700	9,800	9,600	8,900	8,500
Betel-nut (in qncls)	9,800	9,750	8,000	6,500	4,500	2,500
Coconut (in pieces)	2600	2800	2500	1800	1400	800

Table 1: Year wise production of Banana, Betel-nut and Coconut.

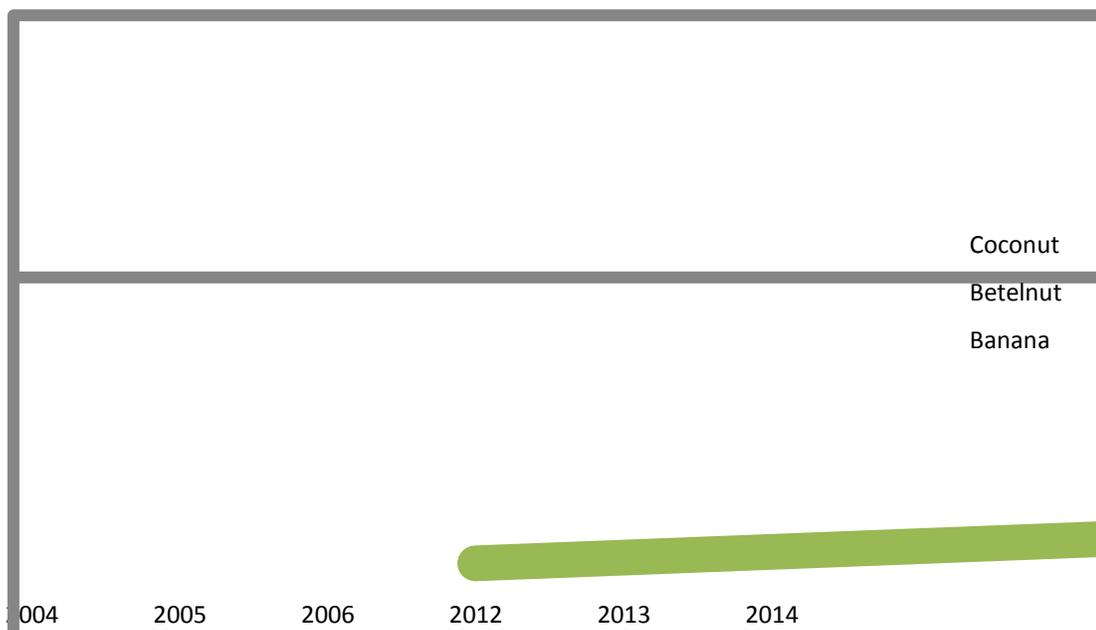


Fig: 1 Graph shows comparison in decrease in production of sample year wise

Is the natural production of coconut, betel-nut and banana decreases due to cell phone tower radiation?

No of respondent(150)	Yes	No	Doesn't Know
Coconut	105	26	19
Betel-nut	97	21	32
Banana	72	46	32

Table 2: Out of 150 respondents for the above query the results came out as mentioned below.

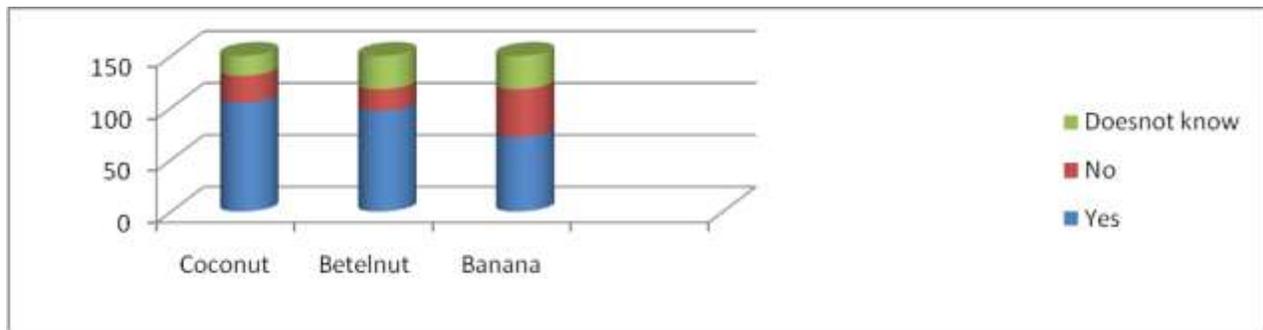


Figure 2: Shows the views of respondents on productivity

IV CONCLUSION

The progress in science and technology is a nonstop process. New things and new technology are being developed and adopted but we have to look after our surroundings. Studies show definite clues that cell phone radiation can choke seeds, inhibit germination and root growth, thereby affecting the overall growth of agricultural crops and plants. Also Electromagnetic radiation generates heat and due to this, the microorganisms present in the soil near it would be killed. The seriousness of the health hazards and effect on plants and animals due to radiation from the cell phones and cell towers has not been realized among the common man. The study shows that there is an abrupt decrease in the production of coconuts and betel-nut after the installation of mobile tower and the decreasing continues till date. It is observed that the production of coconut as well as its growth in this region is highly affected by cell phone towers. It is also strongly reported that coconut and betel-nut are falling before they matured and size and shape i.e. volume of them is continuously decreases. This problem strongly arises around 50 meter radius of cell phone tower. The production of banana is almost stable before and after the installation of the mobile tower. Trees located around 50 meter of cell phone tower look sad and feeble, have dried tops, show slow growth and high susceptibility to illnesses and plagues. Also, electromagnetic radiations generate heat. Due to this, the microorganisms present in the soil near it would be killed. This in turn harms those organisms which feed on them and disturbs the ecological cycle.

4.1 Precautionary Measures

The International Commission on Non Ionizing Radiation protection (ICNRP) is an international commission whose activities include determining exposure limits for electromagnetic fields used by devices such as cell phones. In India the Dept. of Telecommunication has ordered the mobile phone companies to follow all the guidelines of ICNIRP.

- There should be more numbers of cell towers with lesser transmitted power.
- Self-certification by the operators must be immediately abolished; measurements must be done by third party, which is independent and trustworthy.
- The cell phone towers should be installed far from the residential areas, Agricultural area, hospitals etc.

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