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Mobile network System of Bhadravathi Town using Remote Sending, GIS & GPS, Shimoga District, Karnataka, India

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Abstract - The use of wireless systems is a very attractive option in the design and development of communication networks, especially with the expansion of cellular telephony and wireless computer networks as their industries seek to increase the number of services and speedy transmission available to their customers. For this transmission needs towers and the location of these towers is very important factor in network coverage. In this regard the study has been taken up in Bhadravathi town and network coverage of all networking companies using Remote sensing GIS and GPS technologies. It's found that the network coverage in southern part of the city is deficit and need of towers for the better communications.

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GJCST Classification : *C.2.1, C.2.m*

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I. Introduction

By the end of 2004 the telecommunication industry had experienced continuous growth, as well as rapid progress in policy and technology development, resulting in an increasingly competitive and networked world (Marcus Noland 2008). Ten years ago, mobile communications were restricted to a few consumers in a handful of countries (ITU 1997), least developed countries were lack of the most basic telecommunications infrastructure (Adedeji, 1986), coupled with low exposure to networking, low computing, information infrastructure and unreliable telecommunication network. As demand increases for mobile phones and new telecommunication services, additional towers are required to maintain and improve the quality of this service. The mobile network operation which is possible with optimal and efficient use of mobile telecommunications towers (Goodman S 1994). Satellite communications plays a major role in global communications networks, wireless communication, especially satellite-based communications play an increasingly important role in modern society, providing a growing number of services to public. Global System for mobile Communication (GSM) is the standard through out the world those who often travel internationally.

This study is aimed to know the locations of all towers of different companies such as BSNL, Airtel, Hutch, Tata Indicom, Reliance, Spice towers with elevation pattern of the city and to understand the availability of network coverage by their buffer zone, to identify the network shadow zones and to suggest the construction of new towers for the further improvement of the network coverage of the city.

Bhadravathi town has been taken up for the details study. Bhadravathi lies in the central part of Karnataka state, in the south-east corner of Shimoga district and has spread over an area of 67 Km^2 (13^0 52'N – 13^0 87" N and 75^0 43' E – 75^0 72' E) it lies at an altitude of 1900 ft above sea level and has a population of 1, 60,662 as per census of 2001 with an average literacy rate of 74%, higher than the nation average of 59.5%.

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Fig. 1 : Location map of the study area

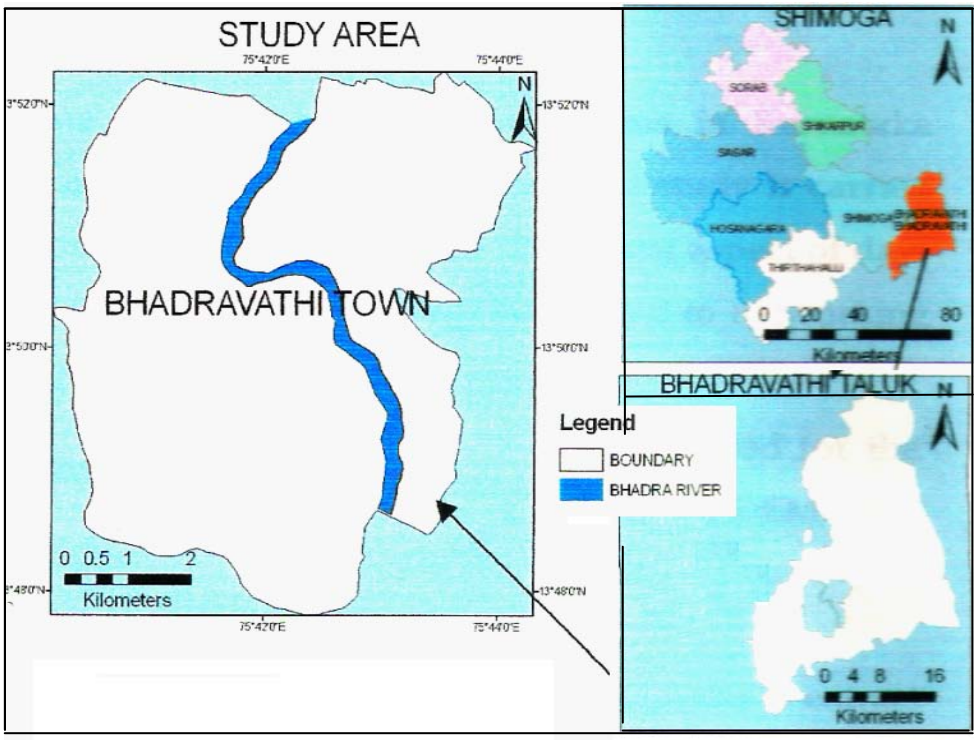
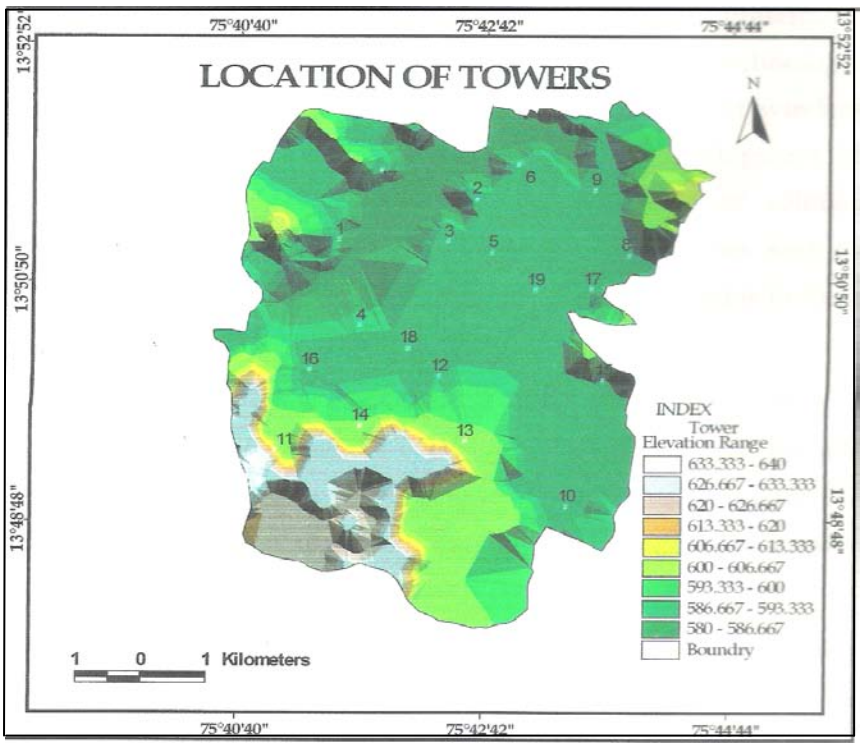


Fig. 2 : Location of Towers in Digital Elevation Model



II. Materials & Methodology

Survey of India (SOI) toposheet no. 48 O/9 SE of the scale 1:25,000 is used for generation of base map and contour map. There are thirty-five wards under the limit of municipal council. IRS LISS P6 imagery is used for updating of road network and to make further analysis. For data generation GPS (Global Positioning system) was used to locate the position of towers. Software used are ERDAS Imagine 9.1, and ARC View 3.2a.

III. Results and Discussion

Wireless communications requires efficient network planning of cellular mobile communication. The

primary operations in the telecommunication network industry include network site identification and planning, signal strength measurements with coverage estimation for the expansion of system (Naveenchandra el al., 2011). In Bhadravathi city there are 19 fixed towers (Fig.2) among them 03 BSNL, 04 Airtel, 03 Hutch, 03 Tata Indicom, 03 Reliance and 03 Spice towers. Their area of influence/coverage area, peak hours of each tower has been discussed.

a) BSNL Tower

Three numbers of towers having an individual tower's coverage area of 8-9 kms with a height of 6080ft. These towers are located in the north, central and western side of the city, but the southern and western part of some are not properly take up the network connection. As there is a gap of the towers in southern and western part, its better to construct towers in these areas (Fig 04).

b) Airtel Tower

Four numbers of towers having an individual tower's coverage area of 9-10 kms with a height of 80 ft. Majority of the towers present in the centre of the city and they cover almost entire city, but in south western part is not covered by Airtel network connection. So it's suggested to have towers in south western part of the city (Fig 05).

c) Hutch Tower

Three numbers of towers having an individual tower's coverage area of 8-9 kms with a height of 70 ft. Located in centre, northern portion and another one is in north western part of the town, west and southern portions are not getting proper network connection, it is better to construct towers in this zones (Fig 06).

d) Tata Indicom Tower

Three numbers of towers having an individual tower's coverage area of 7-8 kms with a height of 40 – 50 ft. Two towers are located in north eastern and southwestern portion of the town. There is no network coverage in north western and south eastern part of the town. It's better to construct the towers in south and eastern and north western part of the city (Fig 07).

e) Reliance Tower

Three numbers of towers having an individual tower's coverage area of 14 kms with a height of 50-60 ft. Located in the south western and north eastern part. Due to lack of well planning of the locations of towers centers of the town, northern portion of the town and southern portion of the town is not getting the network connection. It's proposed to construct towers in north western and south eastern portion of the city (Fig 08).

f) Spice Tower

Three numbers of towers having an individual tower's coverage area of 5 kms with a height of 40-50 ft. Located in northern, western and south eastern part of the town. The network is not available in the north western, north eastern and south western portion of the town to get better facility need of tower in this area (Fig 09).

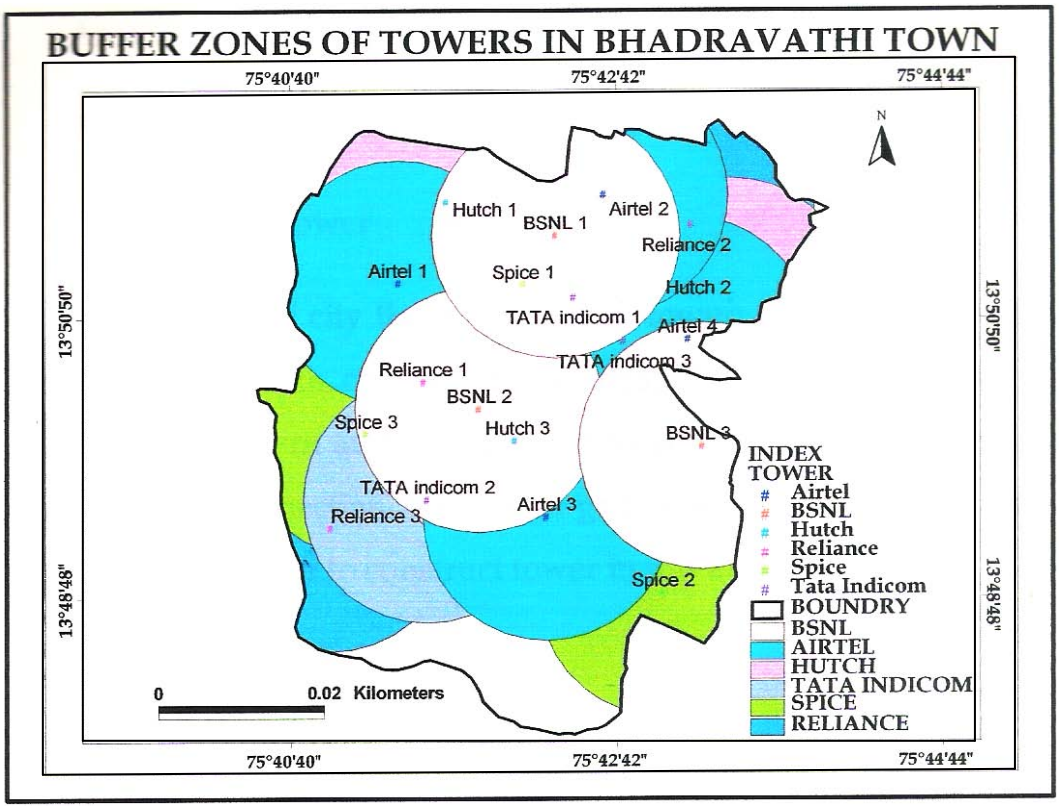


Fig.3 : Buffered zones of all the towers in Bhadravathi Town

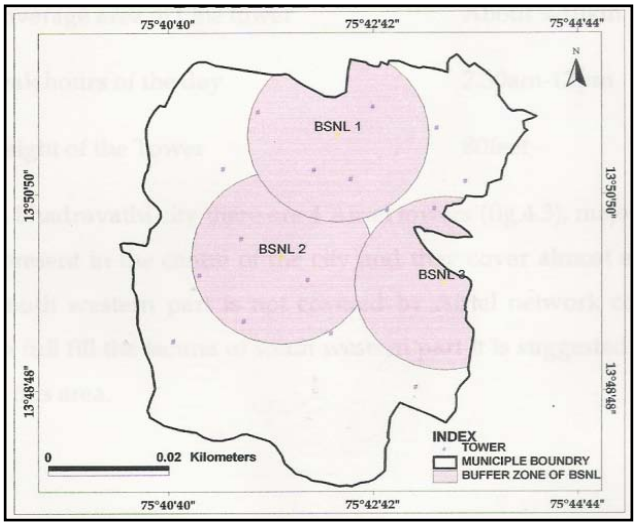


Fig.4 : Buffer Zone of BSNL

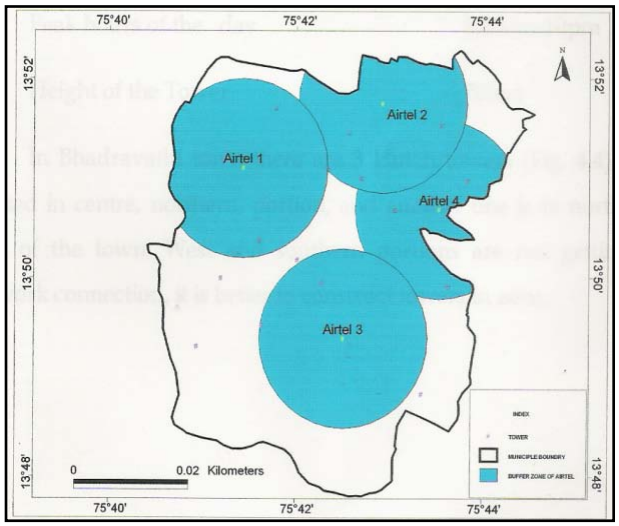


Fig.5 : Buffer Zone of Airtel

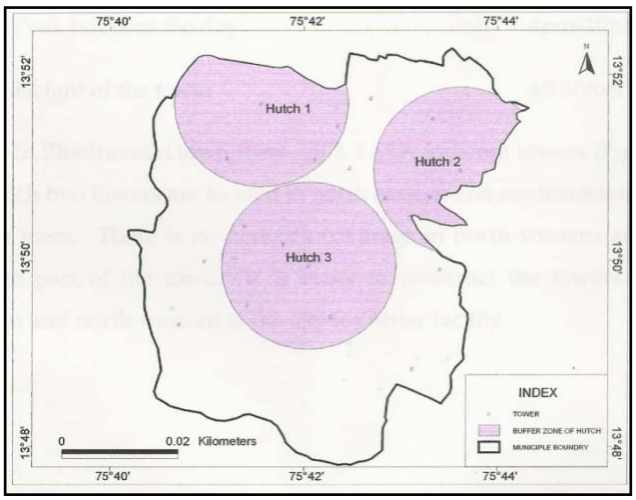


Fig.6 : Buffer Zone of Hutch

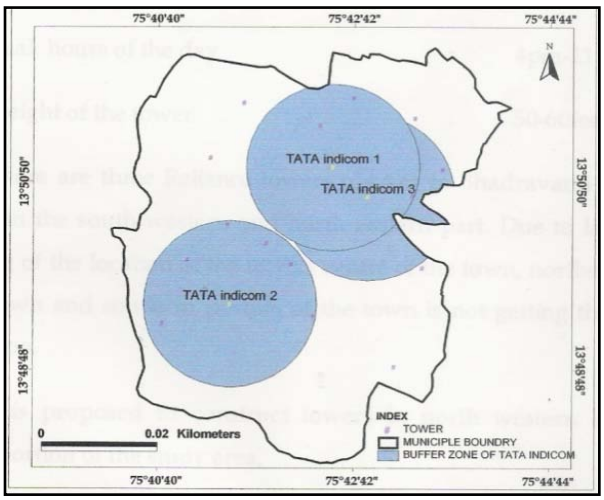


Fig.7 : Buffer Zone of Tata Indicom

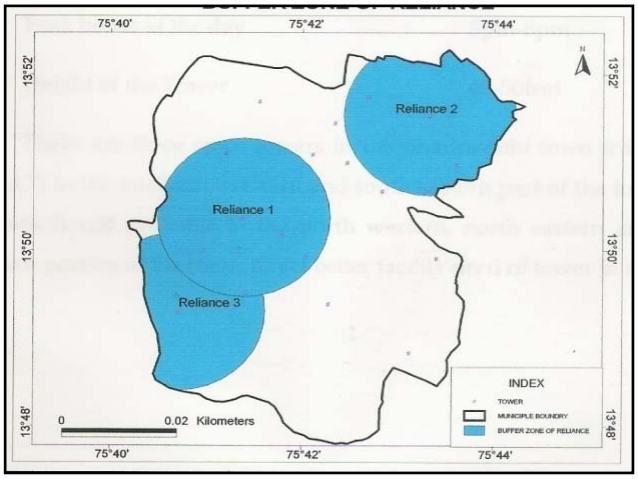


Fig.8 : Buffer Zone of Reliance

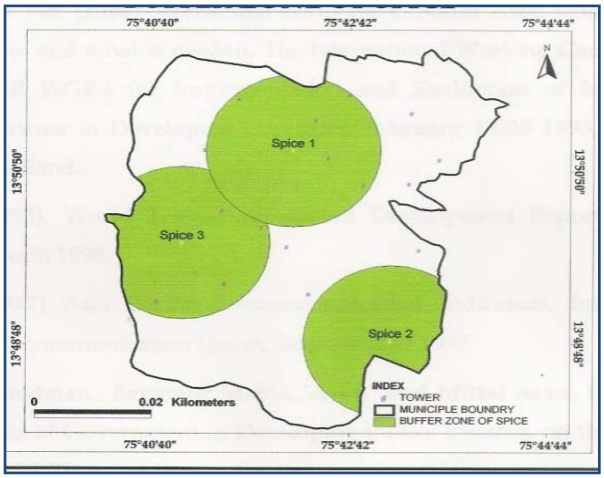


Fig.9 : Buffer Zone of Spice

Getting all the details and making a buffer zone of individual companies buffer has been further buffered to get all network in single plat form as in Fig 3.

IV. Conclusions

Mobile towers constructed without much considering the elevation factor and they have network coverage one above the other of same company and they have left out network shadow zone in southern portion of the city. It's better to construct towers in the southern portion of the city to get better network for better facility.

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