Medical Urgency Response Mechanism In Tribal Area Of East Godavari District, Andhra Pradesh-A Geospatial Approach

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Abstract

The study area consists of Rampachodavaram Revenue Division of Seven mandals namely Addateegala, Gangavaram, Y.Ramavaram, Rajavammangi, Devipatnam, Maredumilli and Rampachodavarmmandals of East Godavari District, Andhra Pradesh is covering an area of 4580.67 sq km. The study area is facing mortality for the last few decades, although PHCs, CHCs, AH and other medical support is increasing. Study identified, polluted water, consumption of stale/contaminated food, consumption of local made liquor, superstitious conditions, adultery, age old practices resulting in huge death rate. The study focused to improve the basic facilities such as road connectivity, ambulance service, more PHCs in the vicinity may reduce mortality rate in the area. In this study, SOI toposheets, IRS-P6 satellite data and ancillary data used to generate thematic information. Existing roads, major rivers and rivulets, problem villages or villages not connected by the road or far off from PHCs have been considered for GIS analysis.The Survey of India toposheets on 1:50,000 are geometrically rectified in Erdas Imagine 9.2. Rectified toposheets are mosaiced and Area of Interest (AOI) or study area has been delineated to generate thematic layers in ArcGIS-9.2. The thematic layers are generated following the standard visual interpretation techniques.

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1. Introduction

East Godavari district is one of the thirteen districts of Andhra Pradesh State located in the north coastal AP Major portion of the East Godavari district is covered by Godavari delta. The total geographical area of the district is 12,805 km2 which accounts for 6.8% of the total area of the State. The district located between the latitudes of 16º 30' N and 18º 20' N and 81º 30' and longitudes of 82º 30' E. The study area is bounded by

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Visakhapatnam district on the north, Malakangiri district (Odisha State) on the northeast, West Godavari on the west, Khammam district (Telangana State) on the northwest and Bay of Bengal on the south and east. The district has a coastline of 144 km. Kakinada is the district headquarters of East Godavari. The district has seven revenue divisions namely Amalapuram, Etapaka, Kakinada, Peddapuram, Rajahmundry, Ramachandrapuram with 65 mandals. Out of 65 mandals 11 mandals are under agency According to 2011 census, the population of East Godavari district is 52.86 lakhs which stands second rank in the State. The density of population is 477 persons per kilometer. The literacy rate of the district is 71.35 percent. The hills are covered with thick soil which supports luxuriant forests. It belongs to Eastern Ghats composed of khondalite suite of rocks. The area is not well connected by roads, due to hilly topography.There are number of pre natured deaths are taking place due to non availability of hospitals, superstitious attitude of local people, and age old practices resulting in huge death rate. The present study focused to reduce mortality rate and to improve the basic infrastructure to the tribals.

Location of the Study Area

The area of investigation covers an area of 4580.67 sq km and total population is 218,385 in this area and it is located on 65G/10, 11, 12, 13,14, 15; 65K/ 2, 3, 6,7 of Survey of India topographic sheets on 1:25,000 scale. The study area consists of 7 mandals. The area is bounded between 16°30' and 18°20'of the northern latitude and 81°30' and 82°36'of the eastern longitude.
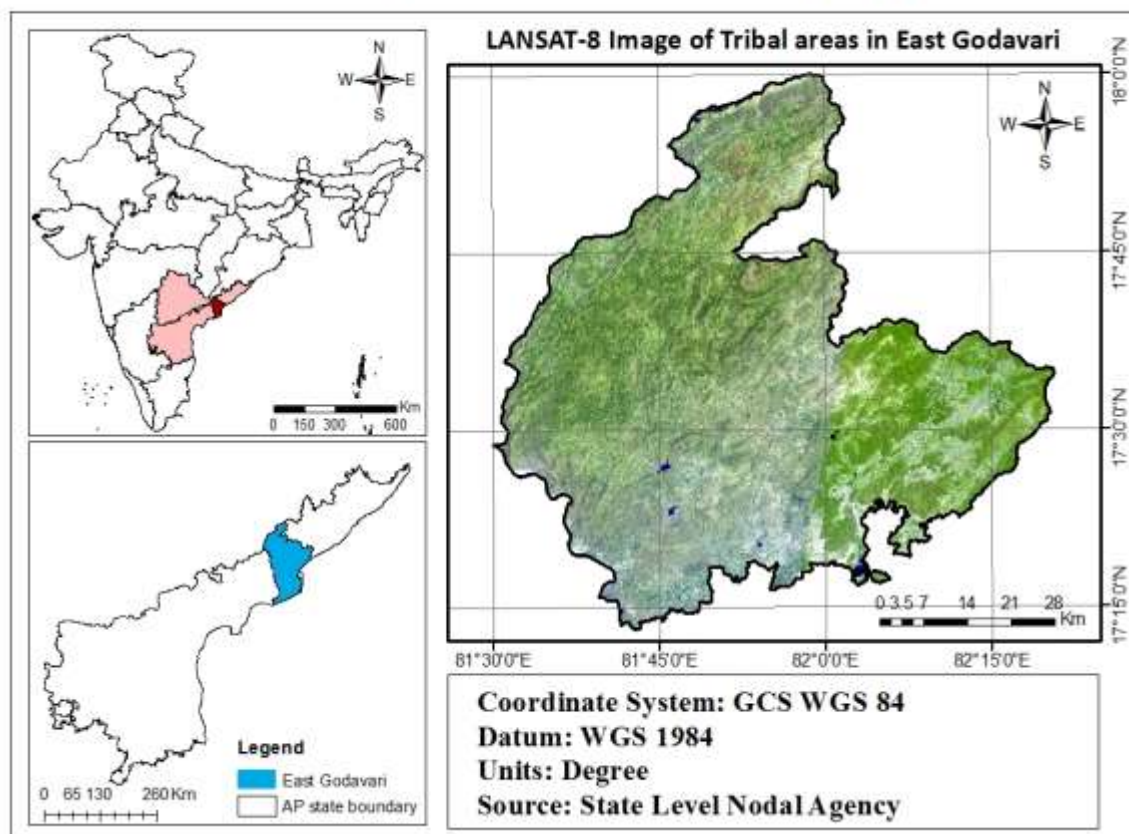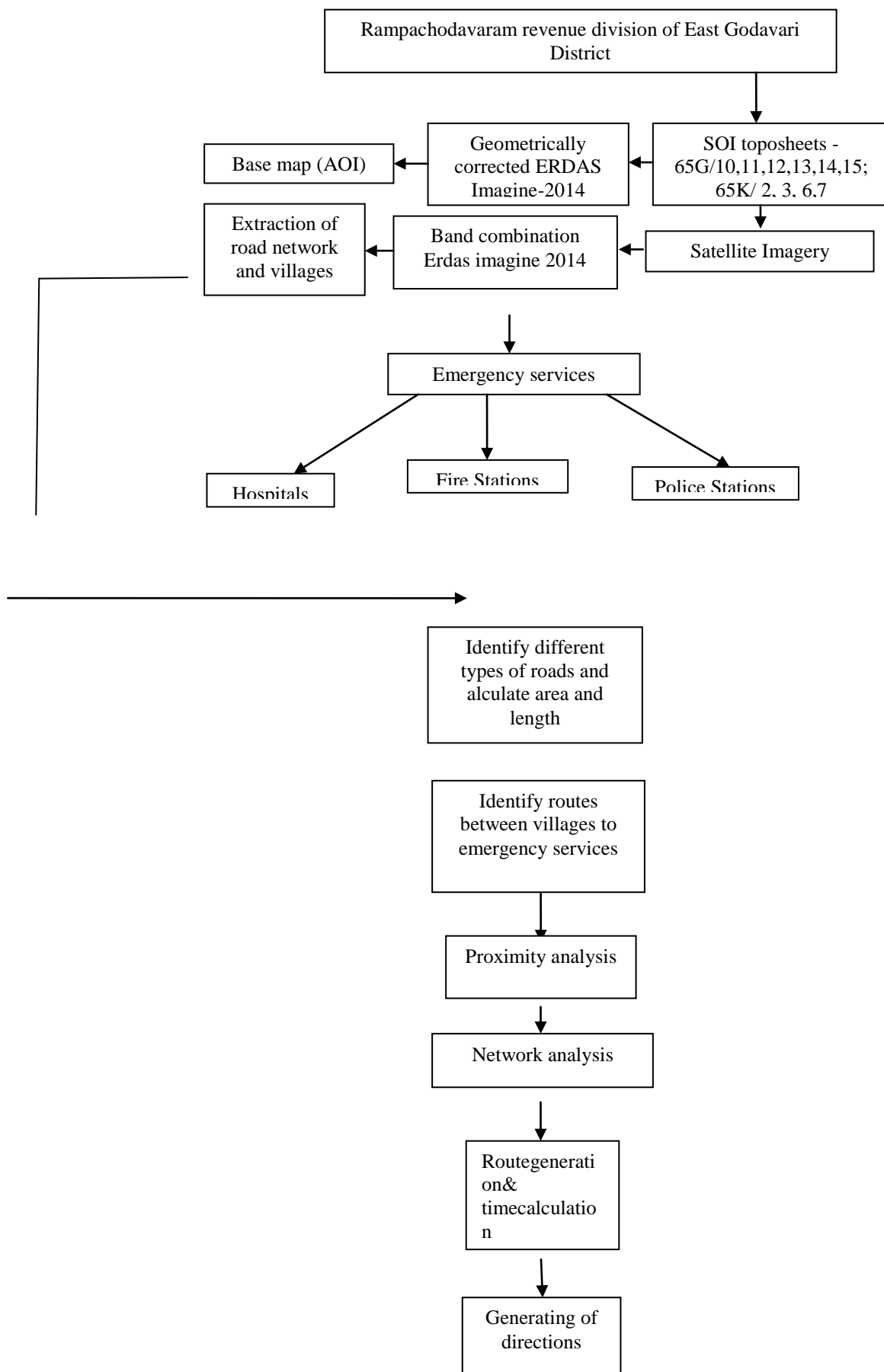

Figure 1 Location map of study area Forest cover

FORESTE: The total forested area in the district is 3.26 lakh ha, which accounts for 30% of the total geographical area. The forests of the district are confined to the northern hill tracts which form part of Eastern Ghats and mangroves in delta area. The mangrove forest is confined to the Kakinada bay in the Godavari estuary.

Flowchart

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┌─────────────────────────────────────────────┐
│ Rampachodavaram revenue division of East     │
│ Godavari District                            │
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| Base map (AOI) | ← | Geometrically corrected ERDAS Imagine-2014 | ← | SOI toposheets - 65G/10,11,12,13,14,15; 65K/ 2, 3, 6.7 |

| Extraction of road network and villages | ← | Band combination Erdas imagine 2014 | ← | Satellite Imagery |

Emergency services

- Hospitals
- Fire Stations
- Police Stations

Identify different types of roads and alculate area and length

Identify routes between villages to emergency services

Proximity analysis

Network analysis

Routegeneration& timecalculation

Generating of directions

Methodology

The Landsat satellite data downloaded from the website www.usgs.gov.in. The data mosaiced in Erdas Imagine-2014 and digitization is carried out in Arc GIS-10.3 software. Survey of India toposheets 65G/10, 11, 12, 13,14, 15; 65K/ 2, 3, 6,7 were performed geometric rectification in Erdas Imagine 2014. The study area (AOI) is delineated on mosaiced satellite images. The emergency services and roads are extracted. Proximity analysis of services and buffer analysis of roads is carried out. The network analysis is performed to generate routes, time and direction

How GIS Works:

GIS stores information about the world as a collection of thematic layers those can be linked together by geography this simple but extremely powerful and versatile concept has proven invaluable for solving many real-world problems ranging from tracking delivery Vehicles, recording details of planning applications and modeling.

Objective

1. Mapping of roads, villages, AH, PHC, CHNC, SC, police stations, fire stations area using the recent satellite images

2. Performing clean and topology for the Road shape file
3. Proximity analysis of services such as PHC's and roads
4. Network analysis builds the Road shape file
5. Generating new route by Network Analysis.
6. A Network analysis to cover service areas along with route and direction table.

Contact key health personnel

Contact personnel within your health department that have emergency response roles andresponsibilities. Examples include:

• Administration/Leadership
• Emergency Response Coordinators
• Environmental Health Specialists
• Epidemiologists
• Safety and Health Specialists
• Laboratory Personnel
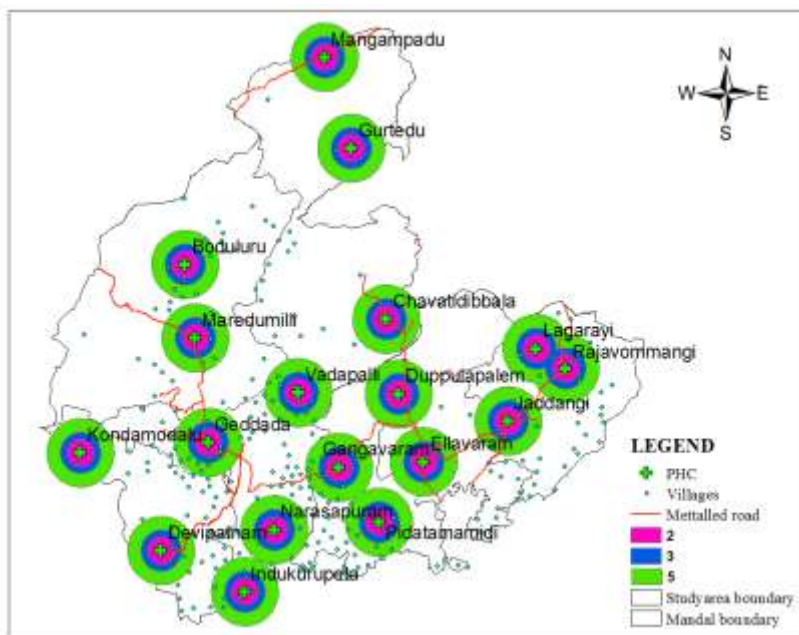• Mental and Behavioral Health Personnel
• Medical Officers/Nurse

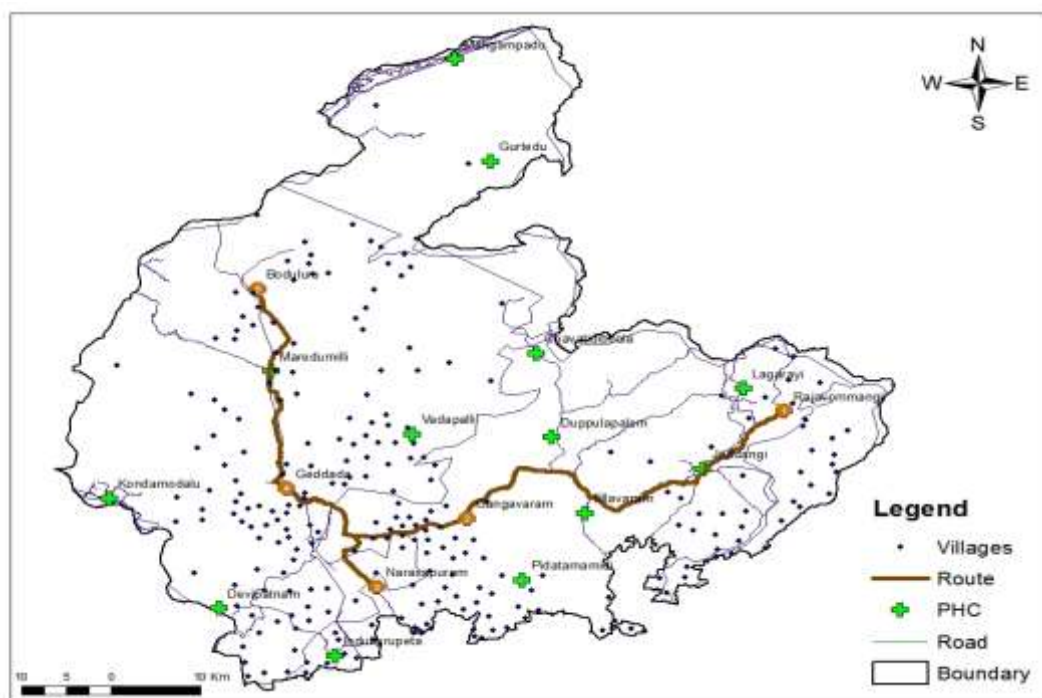Figure:Study area PHC O-1,2-3,4-5 km Distance boundary Map

Figure:Boundary map With Phc,Roads and Habitation(villages)

SPATIAL ANALYSIS

Buffering usually creates two areas: one area that is with in a specified distance to selected real world features and the other area that is beyond. The area that is within the specified distance is called the buffer zone.A buffer zone is any area that serves the purpose of keeping real world features distant from one another. Buffer zones are often set up to protect the environment, protect residential and commercial zones from industrial accidents or natural disasters, or to prevent violence. Common types of buffer zones may be greenbelts between residential and commercial areas, border zones between countries, noise protection zones around airports, or pollution protection zones along rivers.

In a GIS Application, buffer zones are always represented as vector polygons enclosing other polygon, line or point features. Buffer Analysis is a basic GIS spatial operation. It automatically builds zones with a certain width around point, line, or region geometric objects according to a specified buffer distance. For example, in an environmental protection project, a zone can be drawn to include areas within a certain distance of a polluted river to represent the contamination area; a zone with a certain size can be drawn around an airport to define a non-residential area for public health concerns.
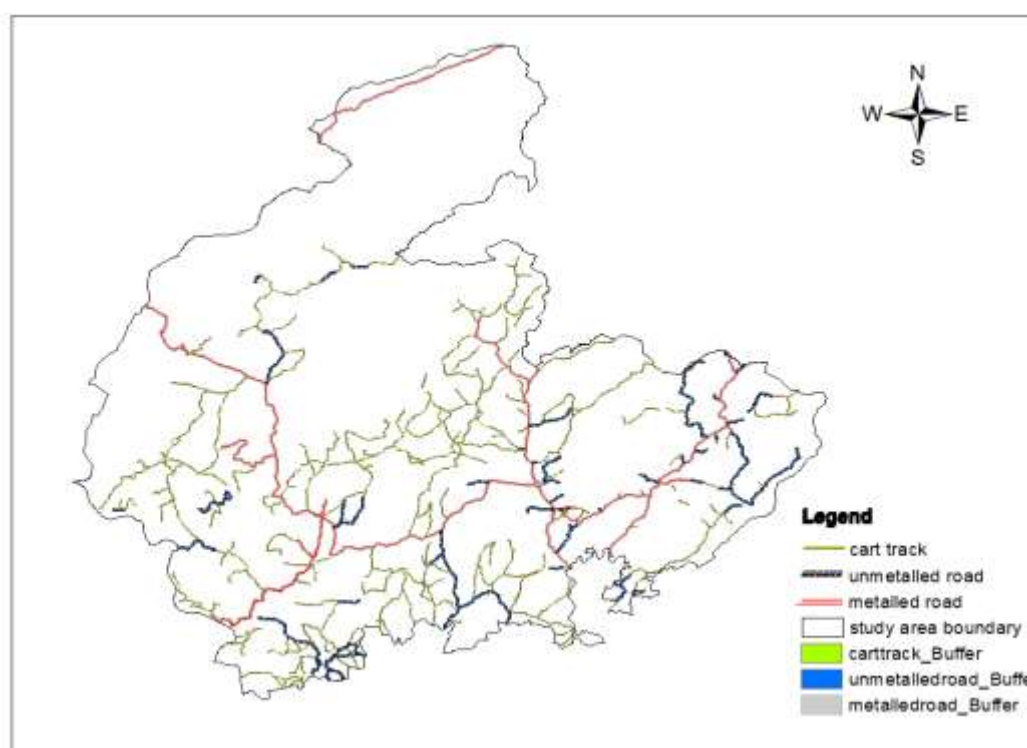
Figure: Analyzed map From village to Hospital of Various types of roads in Study area.

Discussions and Conclusions

We introduced the ArcGIS transportation data model for Rampachodavaram revenue division which consists of 1 AH, 2 CHNC, 18 PHC, 95 sub centers, 1 fire station, 11 police stations covering a population of 218,385 through the well-established vector data structure. The total study area occupied is 4580.91 sq.kms. The total length of main roads in AOI is 325.12 kms. The total length of unmettaled is 190.15 kms and the length of cart tracks road is 732.48 kms. When road network is affected by disasters then dynamic new road network can be generated.The updated alternative road network information can be sent which makes it easy to travel to the villages and all villages can be covered by alternate routes.Network analysis is used for identifying the most efficient routes or paths for allocation of services. This involves finding the shortest or least-cost manner in which to visit a location or a set of locations in a network.

References

The main references are international journals and proceedings. All references should be to the most pertinent and up-to-date sources. References are written in APA style of Roman scripts. Please use a consistent format for references – see examples below (9 pt):

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