GIS in Chhattisgarh Health Issues

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Abstract— *This paper is written with an objective to find a solution to Chhattisgarh health issues by using Open Source GIS Software. The climate of Chhattisgarh is Tropical and the weather is hot and humid because of its proximity with the tropic of cancer. Chhattisgarh people suffer from some chronic diseases because of its weather. As, I am staying at Naya Raipur, I have seen that here there is no proper clinic having doctors with certified degree, no pathological labs. It is very difficult to find the nearest doctor or hospital in times of emergency. The purpose of this paper is to solve these issues.*

   Index Terms—*About four key words or phrases in alphabetical order, separated by commas.*

I. INTRODUCTION

Chhattisgarh is one of the 29 states of India. Chhattisgarh was formed out of Madhya Pradesh on November 1, 2000. Chhattisgarh is surrounded by border states Madhya Pradesh, Maharashtra, Telengana, Odisha and Uttar Pradesh. Chhattisgarh is currently having 27 states.

II. CLIMATE

   Chhattisgarh is having a tropical climate. Chhattisgarh is having a hot and humid climate because of its proximity to the Tropic Of Cancer and its dependence on the monsoons for rains. Summer temperature is quite high in Chhattisgarh, it reaches maximum up to 49ºC. The monsoon season starts from late June to October and it's a welcome respite from heat. Winter is quite pleasant in Chhattisgarh, and it's the right time to pay a visit in Chhattisgarh.

III. PREVALENCE OF CHRONIC DISEASES IN CHHATTISGARH

   Chhattisgarh is one of the eight Empowered Action Group (EAG) states of India. Before 2000, it was a part of Madhya Pradesh state of India. The state comprised of 25.5 million people and around 12.8 million (more than half) males as per census 2011. The urban population was around 6 million with half of them were males in 2011. Here below the prevalence of Chronic Illnesses in Chhattisgarh State has been given sex wise and as per their residence too. These rates are based on one Large Scale Annual Health Survey which was conducted in the year 2010-11 for eight EAG States besides the state of Assam, the major

North-Eastern State of India. Here below the prevalence of Chronic Diseases in Chhattisgarh State have been given per one lakh (one tenth of a million) males and females.

Prevalence (Per Lakh*) of Chronic Diseases in Chhattisgarh State of India

Chronic Diseases	Chhattisgarh		Chhattisgarh (Rural)		Chhattisgarh (Urban)	
	Male	Female	Male	Female	Male	Female
Diabetes	690	432	426	249	1634	1105
Hypertension	480	670	263	398	1253	1672
Tuberculosis (TB)	251	137	262	128	213	168
Asthma	511	369	496	339	564	480
Arthritis	452	759	478	757	360	763
Any Kind of Chronic Disease	4106	4107	3609	3521	5877	6262
Other Chronic Diseases	1722	1740	1685	1649	1853	2074

   1 Million = 10 Lakhs

From the above table it is observed that Prevalence of Chronic Illness is much higher in Urban Chhattisgarh (around 5.9% for males and 6.3% for females) than in Rural Chhattisgarh (around 3.6% for males and 3.5% for females).

From the above table it is observed that urban females are more chronic ill than males, whereas rural males are less chronically ill than females. It is found from the above table that Life style diseases namely, Hypertension and Diabetes are prevalent much more particularly in urban part of the State than other chronic diseases and prevalence of arthritics is more in rural areas. It is found from the table, that in rural areas, prevalence of arthritics is most occurring than other listed diseases particularly with females. Asthma is little more prevalent chronic disease in urban areas than in the rural areas with both males and females. Tuberculosis is the last in the list as per its prevalence. Its prevalence is more with rural males than urban males of the state, whereas its prevalence is more with urban females than rural females.

It is seen from the above table that males in both areas are more prone to be Diabetics than females, on the other hand females are more hypertensive than males in both rural as well as in urban parts of the state.

It is also observed from the above table that tuberculosis is affecting more males than females in both the areas.

It is seen from the above table that females in both areas are more affected by **arthritis** than males, whereas males are more down with Asthma than females.

IV. GIS AND HEALTH

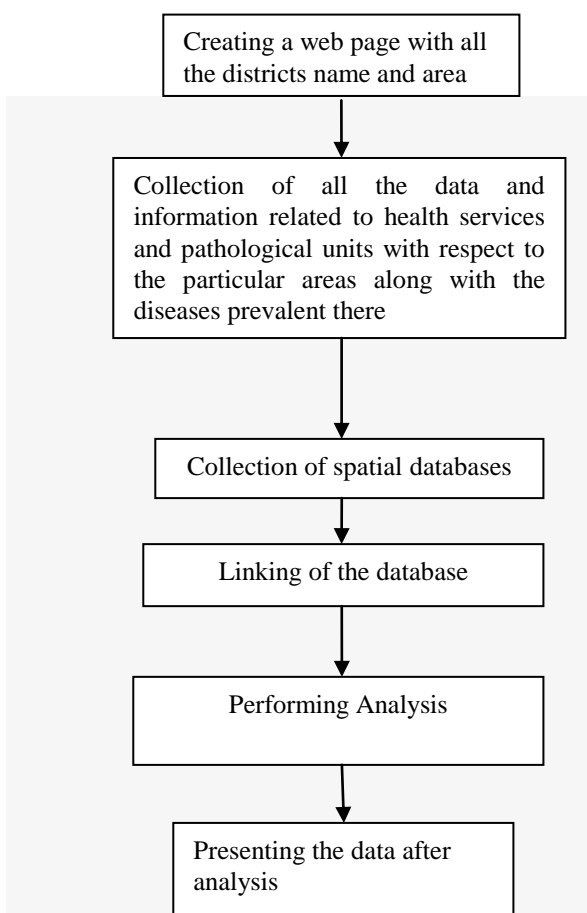GIS in health can be divided in two categories:-

1. Epidemiology
2. Health Care

Epidemiology is the study of the occurrence of disease, especially in relation to environmental features. This is an area in which analytical traditional tools are used.

The use of GIS in health care is more concerned with the accessibility of clinics and hospital services to the common people.Our Project is a combination of both the aspects of the use of GIS.

V. METHODOLOGY

The overall diagrammatic view of our project is shown in the Flow Chart Diagram below:-

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┌─────────────────────────────────┐
│  Creating a web page with all   │
│   the districts name and area   │
└─────────────────────────────────┘
              │
              ▼
┌─────────────────────────────────┐
│ Collection of all the data and  │
│ information related to health    │
│ services and pathological units  │
│ with respect to the particular   │
│ areas along with the diseases    │
│ prevalent there                  │
└─────────────────────────────────┘
              │
              ▼
┌─────────────────────────────────┐
│ Collection of spatial databases  │
└─────────────────────────────────┘
              │
              ▼
┌─────────────────────────────────┐
│     Linking of the database      │
└─────────────────────────────────┘
              │
              ▼
┌─────────────────────────────────┐
│      Performing Analysis         │
└─────────────────────────────────┘
              │
              ▼
┌─────────────────────────────────┐
│ Presenting the data after        │
│ analysis                         │
└─────────────────────────────────┘
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The purpose of this paper is to lower the impact of these chronical diseases by creating awareness among the common people.

Creating awareness about the kind of food they should take for a particular disease.
Creating awareness about the number of clinics they have in their area, the departments that are there in those clinics, the specializations of the doctors who are there in those clinics, the number of pathological labs.
I am staying at Naya Raipur for the last 1 year and I didn't found any proper clinic and any proper pathological lab, for every small problem of me, my 3 years old baby or my husband I have to go to Raipur, which is quite far from my place.
GIS will give us the idea where the particular clinic is available with the particular pathological lab. It will give us the location where it is available.

VI. GIS OPEN SOURCE SOFTWARE

A Geographic information system (GIS) lets us visualize, question, analyze, and interpret data to understand relationships, patterns, and trends. Geographic information systems (GISs) and geographic science (GI Science) combine computer – mapping capabilities with additional database management and data analysis tools. In our project we have used the following Software's:-

1) *ASP.NET*
2) *QGIS*
3) *PostGres*
4) *GeoServer*

A brief description of the above software's is as described below:-

1) ASP. NET :-

ASP.NET is an open-source server-side web application framework designed for web development to produce dynamic web pages. It was developed by Microsoft to allow programmers to build dynamic web sites, web applications and web services.

2) QGIS:-

QGIS (previously known as **Quantum GIS**) is a cross-platform free and open-source desktop geograph ic information system (GIS) application that supports viewing, editing, and analysis of geospatial data.

QGIS functions as geographic information system (GIS) software, allowing users to analyze and edit spatial information, in addition to composing and exporting graphical maps. QGIS supports both raster and vector layers; vector data is stored as point, line, or polygon features. Multiple formats of raster images are supported and the software can geo reference images.

QGIS supports shape files, coverage's, personal geo-databases, dxf, MapInfo, PostGIS, and other formats. Web services, including Web Map Service and Web Feature Service, are also supported to allow use of data from external sources.

QGIS integrates with other open-source GIS packages, including Post GIS, GRASS GIS, and Map Server. Plugins written in Python or C++ extend QGIS's capabilities. Plugins can geocode using the Google Geocoding API, perform geoprocessing functions, which are similar to the standard tools found in ArcGIS, and interface with Postgre SQL/Post GIS, SpatiaLite and MySQL databases.

3) POSTGRESQL :-

PostgreSQL, often simply **Postgres**, is an object-relational database management system (ORDBMS) with an emphasis on extensibility and standards compliance. As a database server, its primary functions are to store data securely and return that data in response to requests from other software applications. It can handle workloads ranging from small single-machine applications to large Internet-facing applications (or for data warehousing) with many concurrent users; on Mac OS Server, PostgreSQL is the default database and it is also available for Microsoft Windows and Linux (supplied in most distributions).

PostgreSQL is ACID-compliant and transactional. PostgreSQL has updatable views and materialized views, triggers, foreign keys; supports functions and stored procedures, and other expandability.

PostgreSQL is developed by the PostgreSQL Global Development Group, a diverse group of many companies and individual contributors. It is free and open-source, released under the terms of the PostgreSQL License, a permissive software license.

In our case, PostGre Sql contains the data of the chronical diseases prevalent in each area, diet they should take to prevent those diseases, Maps of each area, hospital, clinic, doctors available in each hospital and pathological labs.

4) GeoServer :-

In computing, **GeoServer** is an open-source server written in Java that allows users to share, process and edit geospatial data. Designed for interoperability, it publishes data from any major spatial data source using open standards. Geo Server has evolved to become an easy method of connecting existing information to virtual globes such as Google Earth and NASA World Wind as well as to web-based maps such as Open Layers, Google Maps and Bing Maps. Geo Server functions as the reference implementation of the Open Geospatial Consortium Web Feature Service standard, and also implements the Web Map Service, Web Coverage Service and Web Processing Service specifications.

VII. WHAT IS SPECIAL ABOUT GIS

Given that there are systems that can handle spatial data, database management and data analysis, the major driving force for the adoption of GIS for use in mapping, analysis and evaluation of chronical disease occurrence patterns can be viewed in terms of the following advantages over other conventional methods.

− Information retrieval

With a GIS one can 'point' at a location, object or area on the screen and retrieve information about it from off-screen files. One can query a GIS about the status of the area with relation to other areas. This kind of analytical function allows one to draw conclusions about the area. It also increases the speed of working and reduces the costs.

− Topological modelling.

A GIS can recognize and analyses the spatial relationships among mapped phenomena. Conditions of adjacency (what is next to what), containment (which Organizations are found in which area) and proximity (how close certain facilities are) can be determined with a GIS.

-Networks

If all health facilities in an area were co-ordinated or related by roads, then a GIS can determine the distance and time one can take to reach a particular health facility from his home. A GIS can simulate the shortest routes to reach certain facilities.

− Overlay

Using maps of population and maps of infection, a GIS can produce a new map layer or overlay that ranks the regions according to infection rate.

− Data output

A critical component of a GIS is its ability to produce graphics on the screen or on paper that convey the results of analysis to people who make decisions about resources. Graphical, digital and statistical information as well as maps can be generated thereby allowing the viewer to visualize and understand the results of analysis or simulations of special events.

VIII. GIS DATA CAPTURE AND EDITING

This refers to the identification, collection, digitization and correction of errors for the data necessary in the building of a GIS database. Two types of data are used. They include:

Spatial data: Spatial data refers to the land related data

i.e. boundaries, roads, river etc.

Non spatial / attribute data:- Attribute data refers to the non-land related data i.e. population statistics, NGO information, hospitals and clinics.
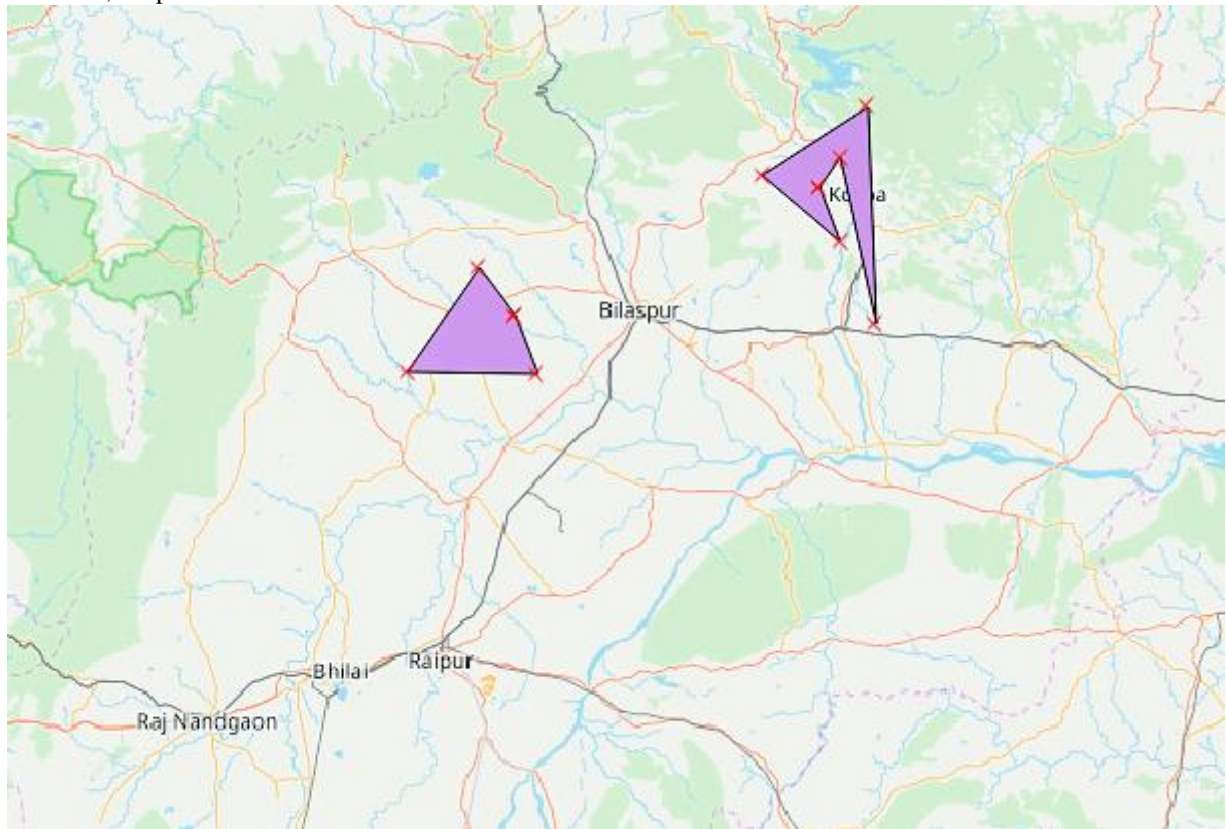
CONCLUSION

This paper has addressed the problem of common people of Chhattisgarh with respect to weather, food etc. which affect the common people health wise. It addresses the availability of hospital, clinics and pathological units in each area. It also addresses the diet they should follow to eradicate those diseases. In addressing those issues, we have taken the help of GIS Software's, ASP.Net, PostGreSql. It gives the geographical map of the particular area where a particular disease is most prevalent along with hospital and pathological unit of that particular area.

REFERENCES

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