ENVIS NEWSLETTER

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From the Director's Desk...

Our ENVIS Centre is publishing quarterly newsletters on various issues related to State of Environment to provide informations to the readers and to motivate people in creating awareness in the society. The information being published may help the stakeholders in making necessary decision on various issues.

Through this Newsletter we are bringing informatioon about the technological interventions in Health Care Planning in the state. This may be helpful to other areas of importance in the state. I would like to thank Mr. Sushil Kumar Lohani, IAS, Mission Director and Ms. Mithun Karmakar, GIS Consultant, National Rural Health Mission (NRHM) in preparing this report.

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ABSTRACT

The environmental degradation, socio-economic decline, and extreme weather patterns are contributing to changing pattern of morbidity and mortality and posing serious challenge to public health. The problems of health are increasing in both spatial and temporal dimension to many newer places, especially in the rural areas due to increased risk of disease transmission fuelled by developmental activities, demographic changes and introduction of newer products. However, with advanced knowledge on the principles underlying the disease transmission dynamics, prediction of occurrence of diseases is possible based on environmental factors and satellite-based remote sensing data. Limited physical access to primary health care is also a major factor contributing to the poor health of rural populations in India. Emerging technological developments like Remote Sensing, Global Positioning System (GPS) and Geographical Information Systems (GIS) have now come in handy to address the issues on the disease surveillance, control, monitoring and evaluation. GIS, integrated with GPS and remote sensing, provides an environment for surveying, collecting information and analyzing environmental factors as well as socio-demographic controls responsible for occurrence and dispersal of diseases. In this context, NRHM-Orissa has emerged as a pioneer in the country to incorporate this technology in its planning, monitoring and evaluation process with proven success.

Key Words: Health, Socio-demographic factors, Environmental Factors, GIS, Disease Surveillance

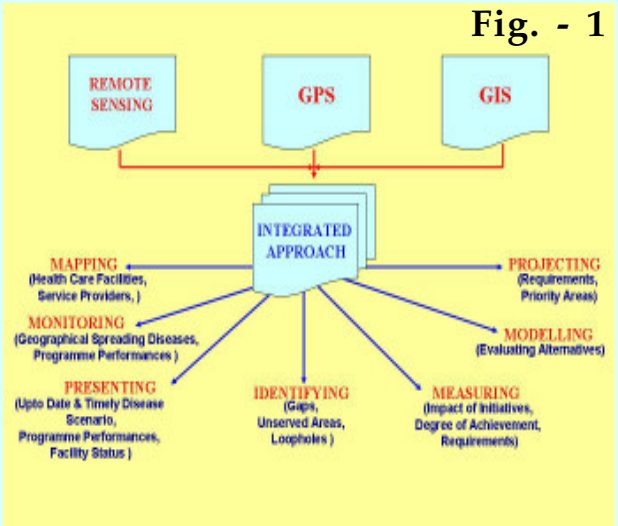
INTRODUCTION

Ever increasing population and lack of adequate health care facilities, particularly for the rural masses are a matter of concern for India. The continued practice of open drainage system, indiscriminate disposal of water and industrial effluents into water bodies, and added to this, the increased migration from rural areas have resulted in large slums in our urban centres creating an environment unsuitable for healthy living and thus aggravating the spread of water-borne diseases like cholera, typhoid, tuberculosis, dysentery and gastroenteritis. The environmental degradation, socio-economic decline, and extreme weather patterns are contributing to changing pattern of morbidity and mortality and posing serious challenge to public health. The problems of health are increasing in both spatial and temporal dimension to many newer places, especially in the rural areas due to increased risk of disease transmission fuelled by developmental activities, demographic changes and introduction of newer products. However, with advanced knowledge on the principles underlying the disease transmission dynamics, prediction of occurrence of diseases is possible based on environmental factors and satellite-based remote sensing data. Limited physical access to primary health care is also a major factor contributing to the poor health of rural populations in India. Emerging technological developments remote sensing, Global Positioning System and Geographical Information Systems (GIS) have now come in handy to address the issues on the disease surveillance, control, monitoring and evaluation. GIS, integrated with GPS and remote sensing, provides an environment for surveying, collecting information and analyzing environmental factors as well as socio-demographic controls responsible for occurrence and

dispersal of diseases (Fig. 1). So our responsibility in the immediate future should be to provide technical information on these, facilitate formulation of policy, preparation of strategic plan, and promote effective linkages with all partners. This article explains how GIS facilitates utilization of resources, preventing disease and promoting health care, working towards the overall rural development and thereby ensure sustenance of the programme at all levels.

Infact Orissa is one of the leading States in implementing GIS based health sector planning in India. The scope of GIS assumes significance as most of the activities envisaged in NRHM Programme, health determinants, diseases surveillance, etc are being monitored and planned through a GIS based health information System. Some of the initiatives taken up by the health department under National Rural Health Mission, Orissa by applying GIS technology, are discussed here.

Fig. - 1



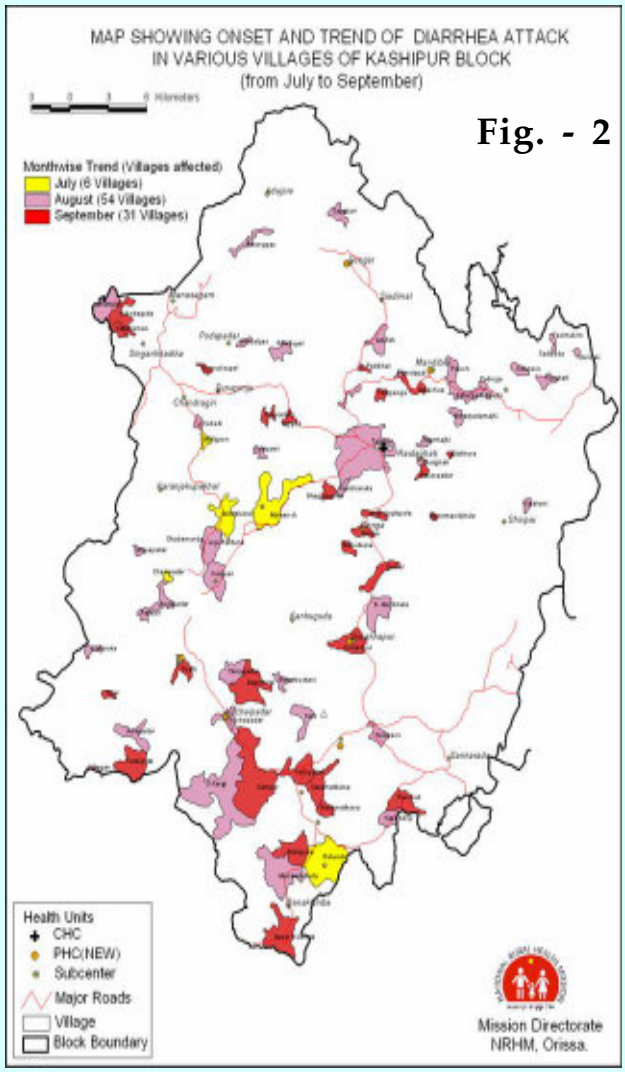
Analyzing the Spatial Dimension of Incidence of Diseases

Based on secondary data sources available with various Cells under Disease Control Programme, spatial dimension of various diseases like TB, malaria, diarrhea, leprosy, HIV, polio, etc, are being mapped. Based on the GIS analysis, action plan on the steps to be taken in terms of allocation of more resources to endemic prone areas on priority basis, training of health personnel, public awareness campaign, etc are being made.

Case Study: Kashipur, Diarrhea outbreak

During last year (2007), diarrhea took the shape of an epidemic in Kashipur block of Rayagada district killing 51 people and affecting more than 5000. In order to prevent such epidemic this year a detailed action plan by the Health Department was prepared in which GIS based analysis (undertaken by NRHM Orissa) played a significant role in identifying the vulnerable Villages (Fig. 2) and preventive steps to be taken to counter the occurrence of diarrhea this year.

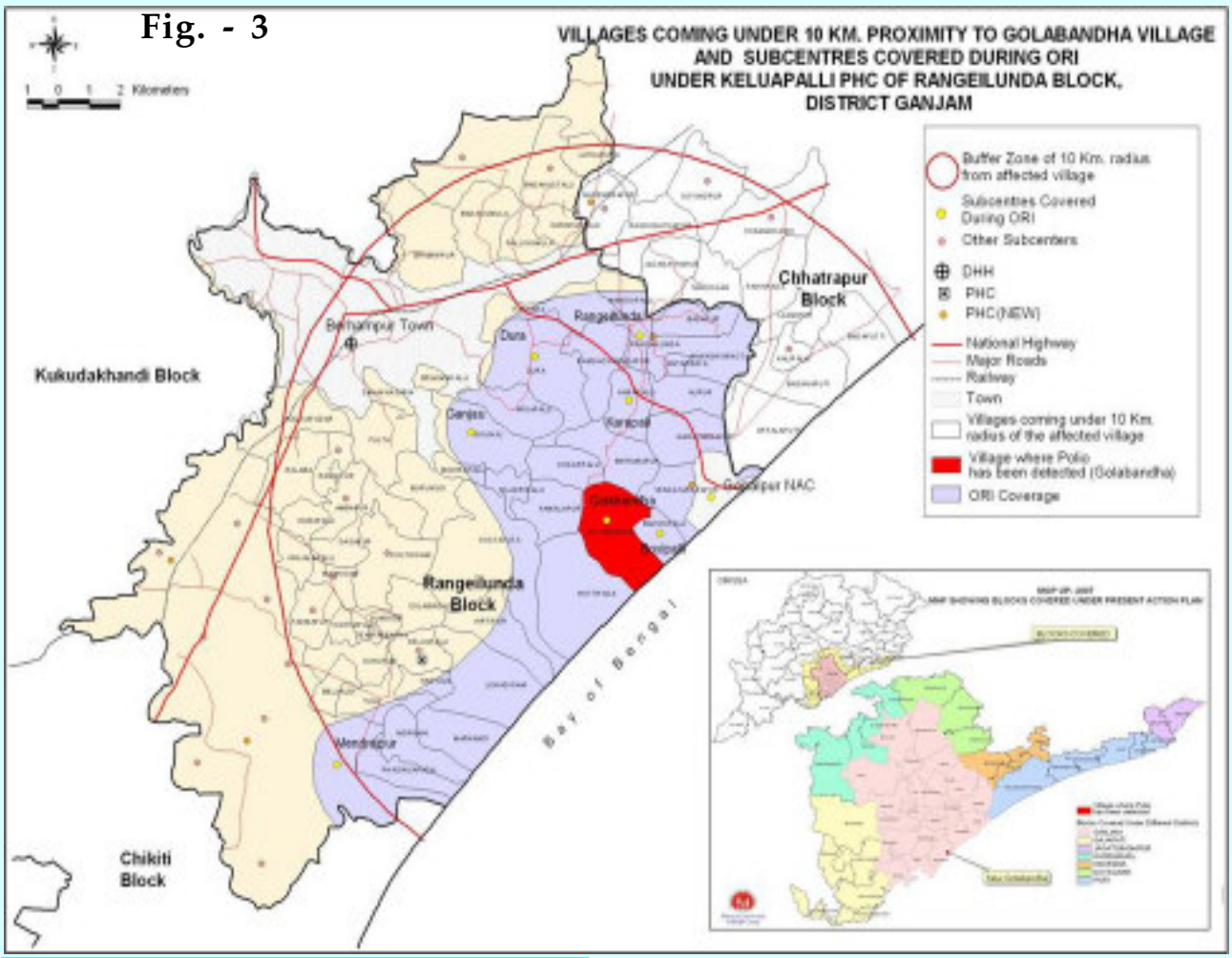
Fig. - 2



Case Study: Polio Mop Up

A case of wild polio virus was detected in Bhubaneswar urban slum area on April 2008. So, in order to plan a responsive mop up on polio vaccination, the National Polio Surveilance Programme, Bhubaneswar unit was provided a detailed GIS based analytical map showing slum area, urban healthcare facilities, important landmarks, roads, etc which helped them in planning the booths for polio mop up. Similarly, Polio was detected in a village called Golabandha under Rangeilunda block of Ganjam District for which detailed GIS based analysis was done (Fig. 3), which proved to be very effective for the concerned officials to plan mop up programme.

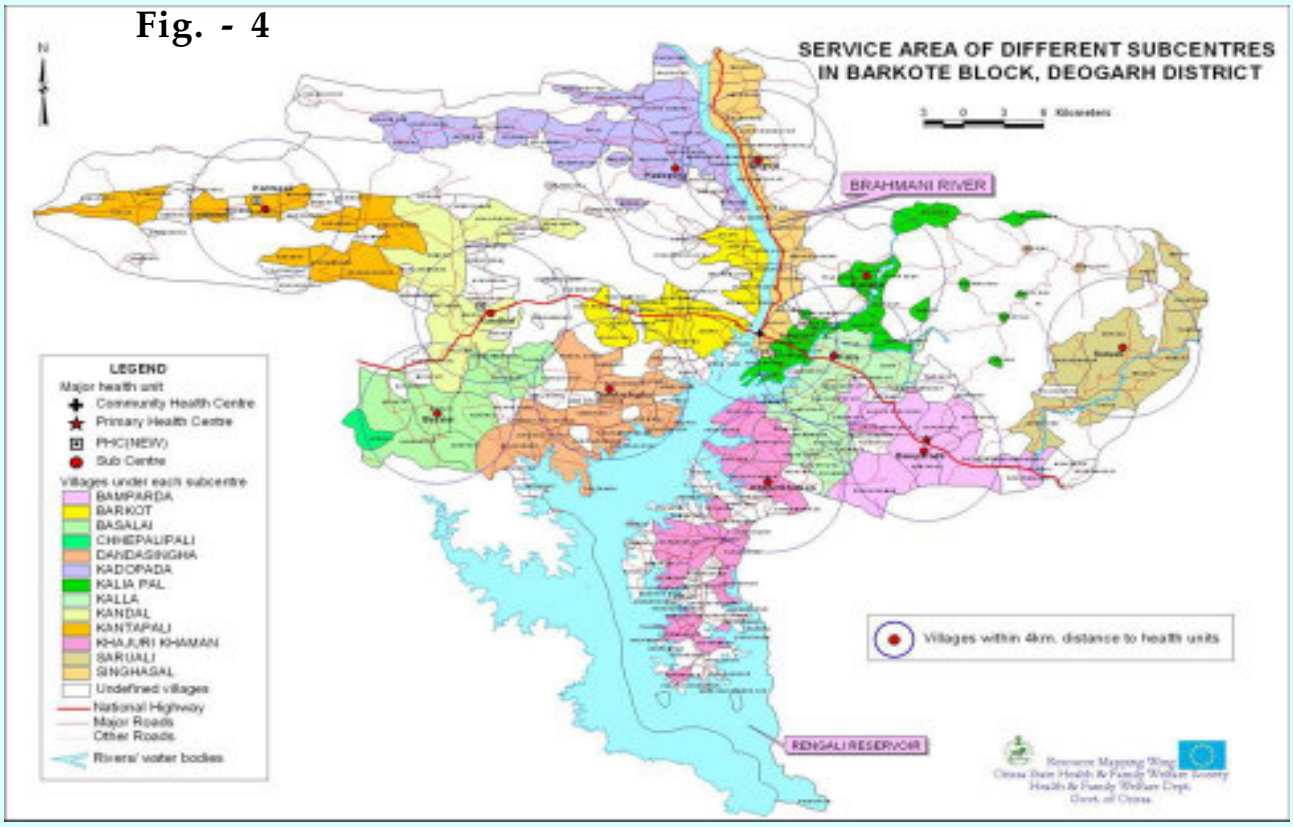
Fig. - 3



Anlyzing service area coverage of health unit & identification of underserved areas

In order to analyze the area coverage of each subcentre and its proximity & accessibility, sector maps were prepared for each block of Deogarh district. It helped in finding those villages which remain underserved or inaccessible in terms of getting basic health care facilities. This also helped in allocating additional resources to these underserved villages through Mother NGOs. Underserved subcentres of 17 districts have been mapped (Fig. 4).

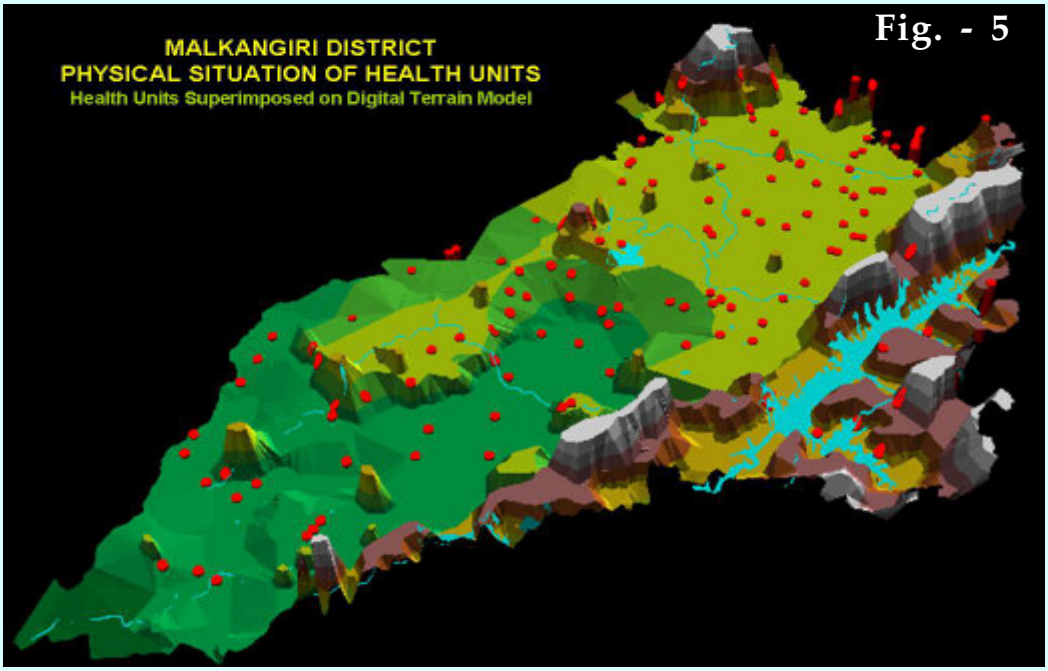
Fig. - 4



DigitalTerrain Modeling in Health Care Planning

Digital terrain modeling is the method of representing terrain, which along with landuse / landcover, plays a vital role in evaluating physical accessibility of health care facilities in respect to their location and situation, so that proper intervention can be ensured. In this context Fig. 5 and Fig. 6 represent an attempt made by NRHM to perform the similar task for Malkangiri district in order to identify the Subcentres lying in physically inaccessible areas and to initiate specific health activities in collaboration with NGOs. The same has been planned to be done for the whole state.

Fig. - 5



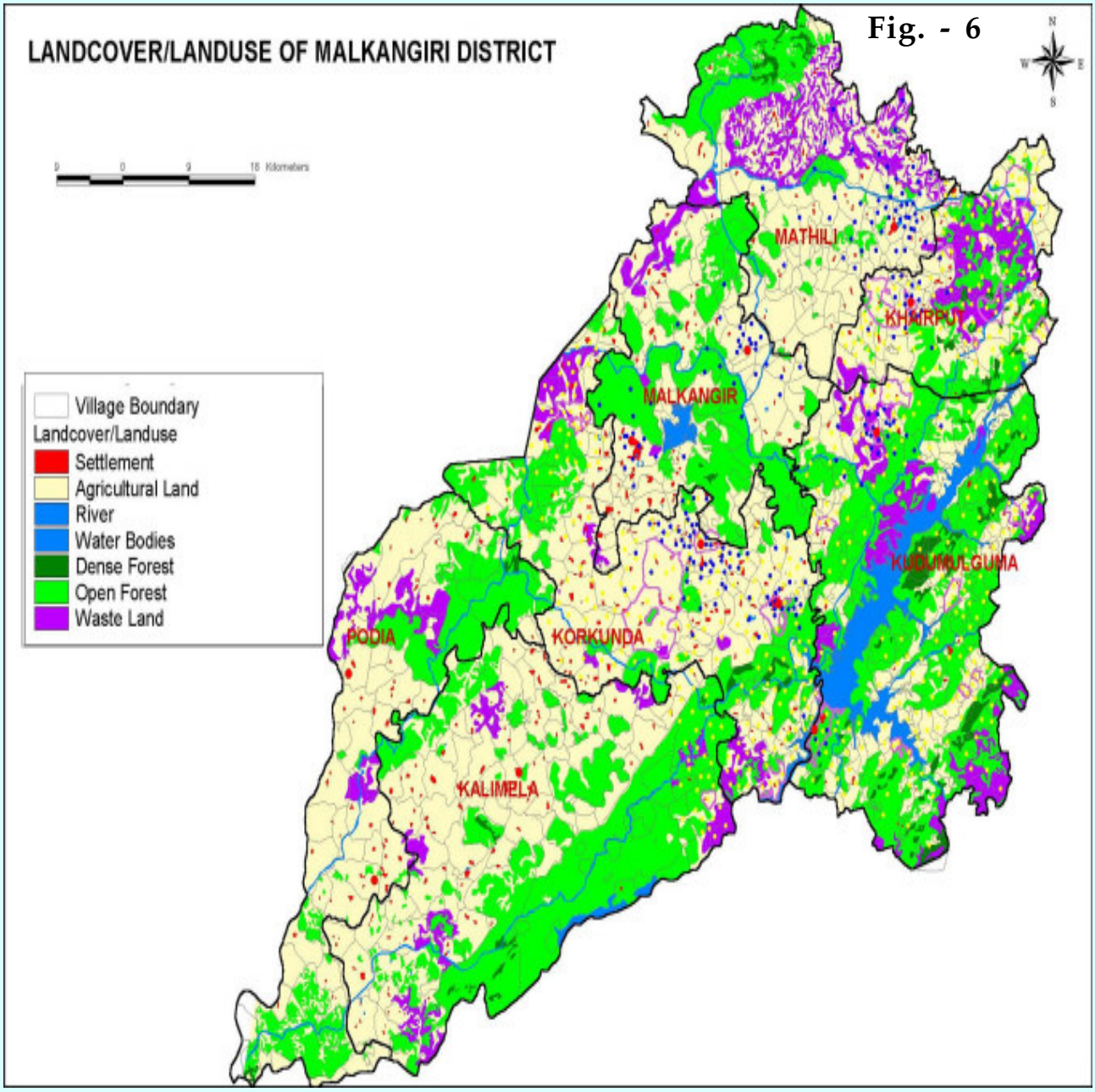


Fig. - 6

Urban Health GIS

Provision of assured and credible primary health services of acceptable quality is a priority for both the Central and the State Governments in view of the increasing urbanization and growth of slums and low income population in the cities. In this regard Mission Directorate, NRHM, Orissa has developed Urban health GIS (Fig.7) for 8 class-I urban centres of Orissa namely, Bhubaneswar, Cuttack, Berhampur, Rourkela, Puri, Sambalpur, Balasore and Baripada, using advanced techniques of Global Positioning System (GPS), Remote Sensing and GIS (Geographic Information System).

Methodology

An integrated approach of GPS survey, Remote Sensing data and GIS with reference inputs from authentic secondary sources was used for carrying out the activity. The following layers of information were generated:

Administrative Boundaries: Municipality/ Urban area boundary, Ward Boundaries

Transport Network: Roads, Railways,

Water Bodies: Natural Drainage, rivers, Ponds.

Health care Facilities: Government, Private, NGO run.

Other Important Locations: Slums, Police Stations, Institutions, Administrative offices, Monuments, Railway Stations, Market, Major Squares, Industrial area, etc.

Attribute database: Data related to facilities available in each of the surveyed health units was also collected through a questionnaire format developed by Mission Directorate. The format is available in the NRHM Orissa website for future updation by respective health units and for new additions to the current database.

Rationale

The Urban Health GIS helps in:

- Analyzing the availability and density of health care services and facilities
- Analyzing proximity and accessibility of health care services and facilities to urban residential areas, slums areas, important institutions and admini-strative offices.

- Analyzing the specialist services available in various govt./ private health units and their geographical concentration.
- The survey will also help in identifying the various AYUSH (Ayurveda, Yoga, Unani, Siddha and Homoeopathy) institutions available in the urban areas and the various health care treatment provided by them.
- Identify Potential private partners for either tier to improve the quality and standard of health among the urban poor, to capitalize on the skills of potential partners, encourage pooling of resources, and to reduce the investment burden on the government.
- It will help in Strengthening Monitoring and Evaluation of urban health care system by regular updation of the database.
- The database is available in the NRHM Orissa website so that every health concerned person can know *Where is My Doctor* ?.

Conclusion

One of the primary goals of public health, and of many health care providers, is to maximize the impact and effectiveness of limited resources in improving health care. However the most important problem is the availability of health care planning organizations equipped with rich database and planning tools. In the area of public health and health care management, geographic information system (GIS) technology has emerged as a powerful tool for integrating and communicating information, a tool that offers significant advantages over traditional methods for health surveillance as well as to develop a spatial analysis and modeling support system for forecasting future health care needs and planning health management programs. In this context, NRHM-Orissa has emerged as a pioneer in the country to incorporate this technology in its planning, monitoring and evaluation process with proven success.

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