

## Chapter 12

# Development of Web GIS Based Framework for Public Health Management System Using ERDAS Apollo 2010

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### ABSTRACT

*This paper proposes a framework for an essential creation of a public health information visualization platform, for Japanese Encephalitis (JE) disease outbreaks in the Gorakhpur district, India. The Web GIS technology is used with ERDAS Apollo 2010 software at customized level, to develop architecture for Web GIS-based public health information systems. A GUI has been created using Java Server Pages (JSP) for its customization. This will help in extending the benefit of GIS and Web technology for public availability in the area for preparation of the health plan in multitier system.*

### INTRODUCTION

Both government and private sector organizations are looking for ways to sustain and improve the health of the public in the world (Najafabadi & Pourhassan, 2009). In this very modern time, health information needs to be updated and shared with people in a quick and efficient way. Web technology is growing a suite for using spatial data on the Internet portals by using web integration tools. This provides new opportunities to advance disease surveillance, control, and public empowerment, to ensure the access of spatial data at local level, for taking health decision for the public (Lu, 2004). Public health information contains geo-referenced data, such as specific location, area code, latitude and longitude, street address, and geopolitical boundaries, which can be visualized through GIS distribution maps (Lu, 2005). It is of practical importance to construct a visible public health information system. The use of GIS technologies for the health planning and management has been studied by many investigators in recent years (Kamel et al. 2001, Johnson & Johnson 2001). GIS has been used for public health area for long time. As early

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as in 1854, Dr. John Snow had used a map to track the original area where the cholera disease erupted in London in first time. From that time, map had been used in the infectious disease controlling and preventing, and it becomes an essential tool in protecting the public health environment (Kistemann, T, 2001). Japanese encephalitis (JE) is a vector-borne disease that occurs in Asia and is the cause of major public health problems in India. The application of Geographic Information Technology (GIS) plays a vital role in the surveillance and control of vector-borne diseases, by providing on information on visualization as public health information.

The Web GIS using Java technologies were explored in implementing GIS systems (WHO, 2003). Generally speaking, the research on Web-based GIS for public health planning and management has attracted much attention. The Web GIS system framework is developed by using adopted multi-tier system architectures, which consists of the server tier and the front tier. The server tier adopts the J2EE-based architecture, while the front tier uses GIS maps to show public health information with geo-referenced information. GIS Mapping and management have become a necessity utilizing modern technological tools. With this data accompanies a great fear within the health domain on how to get by and receive the selective source of information on the JE disease, from local to global level. With an increase in problems created by JE, there is an increasing demand by research on health planners to spread the disease information and provide facilities at public health spheres. This study is for Gorakhpur, Uttar Pradesh, India and the approach, as an effective bottom-up method, should increase the capabilities of planners to discover and solve JE disease health problems.

## **BACKGROUND**

Web GIS technologies, with public health, uses a customized framework of ERDAS Apollo 2010, which has an extensive application prospect in the field of protecting public health and security, by exchanging real-time information. Public health information is added and updated through the Internet with participation of public.

### **Japanese Encephalitis (JE)**

It is found that three billion people live in Japanese Encephalitis Virus (JEV) endemic regions, and the disease incidence is about 50,000 cases and 10,000 deaths annually (Fischer et al., 2008). As per the World Health Organization (Khan, 2011) estimate, JE claims 10,000 to 15,000 lives a year. The epidemiology of JE virus is not well understood and only little research has been done (Upadhyayula et al., 2012). An epidemic of viral encephalitis was reported from July through November 2005 in Gorakhpur, Uttar Pradesh, India (Parida et al., 2005). It was the longest and most severe epidemic in three decades; 5,737 people were affected in seven districts of Eastern Uttar Pradesh, while 1,344 people died (WHO, 2006).

JE spreads directly from person to person. It is transmitted by mosquito vectors between wild and domestic birds and pigs. Mosquitoes are vectors that are the crucial intermediate replicative hosts through birds and pigs (Mackenzie et al., 2004). Man is the dead end (Solomon et al., 2000).

Number of population have grown increasing and concern with acute and chronic care of disease control. It is important to reduce public health problems and develop strategies to reduce the disease burden. GIS through the Internet, is a new technological development in the field of Web GIS and are increased in the use of the Internet is creating new standards and challenges. For public health applica-

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