

# Rural Tsunami: A Famine in 21st Century

- A case study of Kalidindi Mandal of Andhra Pradesh in India

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## “GIS make things better for Drought Preparedness and Response”

[This Paper is dedicated to the people, who lost their lives in Drought Disaster in Andhra Pradesh]

### Abstract

*In India, the State of Andhra Pradesh is currently experiencing drought conditions that are unprecedented in the State's recent history. The unchecked exploitation of ground water, borewells loom large in the latest round of farmers' suicides in the state witnesses to “Rural Disaster”. This paper presents the issues related to rural disaster, effective measures for drought preparedness and response. The role of GIS in providing cost-effective information at various stages of the disaster life cycle is also discussed. The Kalidindi Mandal of Krishna District of Andhra Pradesh in India is well known for aquaculture farming, which is currently affected with drought is taken as a case study. In this paper, an attempt was made with regionally differentiated strategy integrating Web Enabled GIS and the Decision Support System (DSS) to provide a better solution for effective disaster management.*

*I believe that the thrust should be on ecological, sustainable use of basic resources such as land, water, and vegetation that can serve the objectives of accelerated growth, employment and alleviation of hunger to put an end to this shameful blot on the country's image and build the nation for sustainable development*

**Keywords:** Rural Disaster, GIS, DSS, AHP and Sustainable Development

### Introduction

Blindly aping the World Bank model of agriculture, Andhra Pradesh had pumped in huge finances to push an industry-driven agriculture that has not only exacerbated the crisis leading to an environmental catastrophe but also destroyed millions of rural livelihoods, which echoes to “Rural disaster”. As a result, the state had turned into capital of shame for farmers' distress, visible more through the increasing rate of suicides in the rural areas.

The ground realities are far removed from the rhetoric and the statistics that have bred immunity against compassion. We are all part of a global food system, which perpetuates poverty and deprivation. The claims of improved technology for agriculture ignore the stark realities like increasing indebtedness, growing poverty, resulting in human suffering and hunger.

The state government insists on using the term "drought conditions" and not famine. It called that the farmers' suicides were due to man-made disaster rather than natural disaster due to failure of the state and its machinery. The state government should be aware of the fact that while drought conditions are caused by the vagaries of nature, a famine is not a natural phenomenon. Most of the agricultural laborers have lost opportunities for gainful employment and small and medium farmers have been forced to leave their land fallow for want of water.

Remote Sensing and GIS plays an important role in rural development and drought preparedness and response. Planning and implementation of complex development goals and drought response efforts often require spatial analysis and map creation capabilities. Data for these efforts is often in a variety of formats like maps, databases, spreadsheets, images etc. from multiple agencies and multiple sources. The regionally differentiated strategy for drought preparedness and response in integration of GIS and decision support system helps to access the information in a spatial and visual medium and allows improving decision-making and promoting better disaster management.

### Different Stages in Disaster Management Lifecycle

There are five important phases of disaster management namely disaster prevention, disaster mitigation, disaster preparedness, disaster response, and disaster recovery. Of them, disaster prevention, disaster mitigation, and disaster preparedness constitute the pre-disaster planning phase. Pre-disaster planning is the process of preparing in advance, to meet a future disaster. Disaster prevention is the action taken to eliminate or avoid harmful natural phenomena and their effects. Disaster mitigation is the action that deals with reducing human suffering and property loss. Disaster preparedness encompasses those actions, which are taken to limit the impact of natural phenomena by structuring response and establishing a mechanism for effecting a quick and orderly reaction.

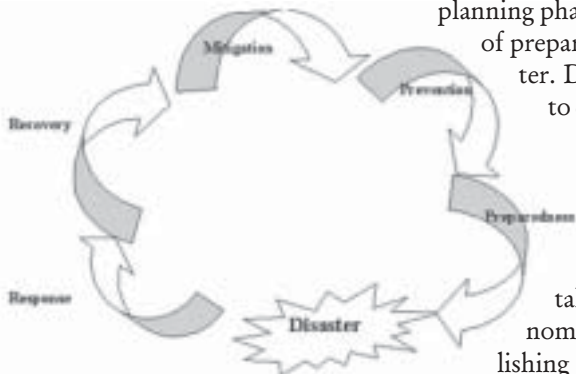


Figure -1

Disaster response covers responding to disasters by various organizations, providing many services that need to be mobilized on a moment's notice, and functioning for an indeterminate period in a coordinated manner under stressful and difficult circumstances, and may be demobilized after the emergency has abated. The ability of an agency, or a group of agencies, to manage emergencies, rather than just react to crises, is critically dependent on the availability and flow of real time and archived information from monitoring systems, thematic databases, and decision support systems that are linked through national networks. Disaster recovery is the last phase of disaster management and is concerned with providing relief after the disaster has struck. It deals with providing food and shelter to the disaster victims, restoring normal conditions and providing financial and technical assistance to rebuild.

## Case Study

In this article, Kalidhindi Mandal in Krishna district of Andhra Pradesh state in India has taken as a case study as shown in Figure -1.

### i. Geographical Area:

India, which lies between 804' N and 3706' N latitude and 6807' E and 97025' E longitude, has a total geographic area of 32,87,782 km<sup>2</sup>. Andhra Pradesh state in India, lies between 12°41' and 22°N latitude and 77° and 84°40'E longitude. Krishna District in Andhra Pradesh lies between 150 43' and 170 10' of the Northern latitudes and 810 33' of Eastern latitudes. From the Northwest to the Southeast it extends over an area of 8734 km<sup>2</sup>.

### ii. Description of Study Area:

Kalidhindi Mandal, which is adjacent to the Bay of Bengal, is well known for Aquaculture farming in Krishna District of Andhra Pradesh. Coastal aquaculture practices in Kalidhindi Mandal lead to organic pollution as well as nutrient loading in coastal waters. This form of pollution is different from that of industrial pollution, since the waste materials are biodegradable. Unlike agricultural wastes no toxic material like pesticides are used in aquaculture. The cultivated aquatic organisms, especially shrimps are more susceptible to coastal pollution rather than contributing to the pollution load. Kalidhindi Mandal is affected by coastal pollution and loses their total crop or end up with poor growth of the cultivated organisms due to the poor quality of water. Increased siltation and sedimentation of coastal water is consequence of deforestation, mining and inappropriate agricultural practices in this area causes to degradation of soil, depletion of water level, which reflects the drought conditions in this mandal.

## Web based GIS for Drought Preparedness and Response

The Web-based GIS can be used in many ways for effective disaster management. Also, the applications of the Web-based GIS can range over the entire disaster management cycle. Integration of the GIS, Web technology and the Decision Support System (DSS) technique such as Analytic Hierarchy Process (AHP) with regionally differentiated approach taking in to consideration of soil conditions, rainfall intensity, ground

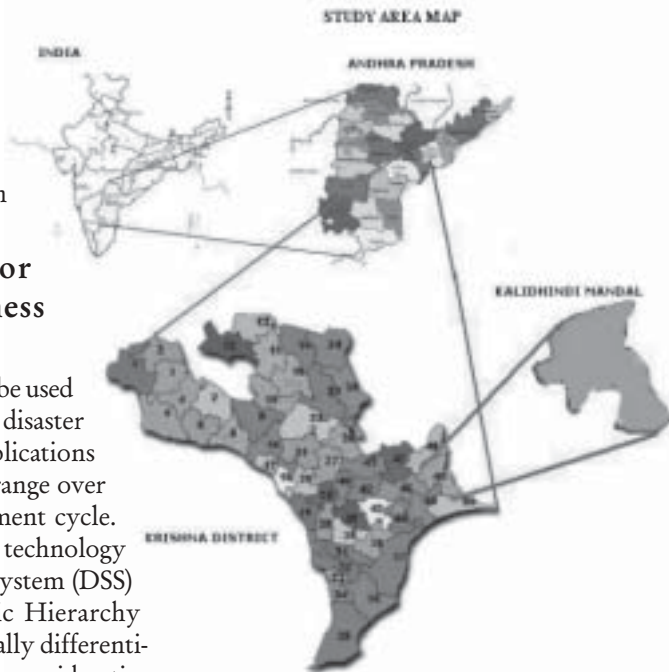


Figure -1: Study Area of Kalidhindi Mandal of Krishna District in Andhra Pradesh State, India.

water conditions, demographic data, infrastructure data etc can be used to significantly increase the usage and accessibility of the spatial data, which is a key requirement before, during and after any disaster. The application functions very much like a "Whiteboard in the Sky" in which a number of agencies can share event information via the web. The approach allows several agencies operating on different technology platforms and using different communication channels to use the web in order to collaborate while managing the drought preparedness and response etc. It provides a platform for exchanging ideas, knowledge and the latest update during the event of any disaster, which is of utmost importance. Also, Web-based workflow management is integrated with the GIS data and applications to manage the multiple activities of the various agencies involved in the disaster management. In a community's daily operations, a Web GIS collects, maintain and store vital map information related to infrastructure, rainfall intensity, soil conditions and ground water etc, all of which is displayed graphically and supported with associated database records. The information is managed by different agencies and used in daily workflows. The information is collected across an entire community and shared among the responsible entities, thus a disaster management network is created.

The pre-disaster preparedness activities like drought identification, drought assessment, and awareness are aimed at those actions, which are taken to limit the impact of a natural phenomenon by structuring response, and for establishing a mechanism for ensuring a quick and orderly reaction. This is organized very efficiently through the use of GIS on Web, for example by making available the drought maps, as well as the "do's and don'ts" on the Web. It also allows carrying out some basic "what-if" scenario analyses and helps the local administrators to take effective measures.

During the drought, real time monitoring and response needs immediate attention. The latest information is made available through Web giving a detailed picture of the event tracking, forecast of the affected region, the alternative measures, availability of food resources, movement of various agencies like NGOs, Health Care supervisors etc. Thus, they'll take the measures to create psychological awareness in order to prevent the death toll from suicides.

The post-disaster activities like empowerment of rural people with providing food and shelter to the disaster victims, restoring normal conditions and providing financial and technical assistance to rebuild can be effectively coordinated by using Web-based GIS. This includes making the latest information available regarding the spatial coordinates of the affected people and sources of providing relief and rescue, the regional extent of the calamity, and the geopositioning of the "lifelines" like water, food supply and transportation network etc. The use of Web GIS provides an effective solution for this purpose. With the help of Web GIS, the latest information of affected areas, the demographics of the affected area is posted on the web and thus it facilitates all agencies to coordinate their efforts in a more effective manner to empower the rural people and giving a helping hand to save the death toll from suicides.

## **Conclusion**

A web-based GIS integrated with decision support system helps to manage the entire range of spatial, as well as non-spatial data to carry out various governmental responsibilities and services. Data exchange at local, regional, city, state and national levels can be a continuous

and cohesive process, resulting in better management and control of resources.

The State government insists on using the term "drought conditions" and not famine. Those at the helm, after all, should be aware of the fact that while drought conditions are caused by the vagaries of nature, a famine is not a natural phenomenon and suggests the failure of the state and its machinery. The provided 'solutions' are really the causes for the problems in the first place; and behaving like an ostrich is not going to eclipse hunger and death from the politico-economic radar screens. Unless, the State government realizes the facts and figures regarding rainfall, losses in terms of damage to crops and the extent of land left uncultivated and thrive to formulate the strategies for rural empowerment, the state Economic policies like free electricity and enhancing bank credit will remain as proverbial Emperor's clothes.

Policy makers, agricultural scientists, social scientists, academicians and even the civil society groups should recognize the fundamental flaw that forces farmers to their deaths. The idea of industrial farming should keep away since the majority of the population in India makes their livelihood with small portions of land and gainful employment from agricultural sector.

I look forward for "Another World..." where the people can sustain their lives with out hunger, greed and inequity.

#### **References**

- Anand Sagar K, Vijayanand K (2004), "Facets of Disaster Management: Recipe to Relief", Proceedings of Map Asia 2004, Beijing, China.
- Anand Sagar K (2003), "Agmarknet: Rural Empowerment", Geospatial Today, July-August 2003, Vol - 2, Issue-2.
- Anand Sagar K (2004), "Rural Banking: Changing Contours of Rural India", Proceedings of ICT4D conference, NIRD, Hyderabad.
- Anand Sagar K, Vijayanand (2003), "Role of GIS in Good Governance", GIS India, Posted on GIS Portal at [http://www.gisindia.com/article\\_read.asp?id=7](http://www.gisindia.com/article_read.asp?id=7), Site last Visited 08/03/2005.
- Anand Sagar K, Vijayanand K, Satyajith Mohanty (2004), "Shaping the Earth for Sustainable Development: A Multi Linguistic Approach for India", Proceedings of Map Asia 2004, Beijing, China.
- Densham, P.J. and M.P. Armstrong (1994) "A Heterogeneous Processing Approach to Spatial Decision Support Systems", Advances in GIS Research, Proceedings of T.C. Waugh and R.G. Healey (Eds.), Sixth International Symposium on Spatial Data Handling, 1, 2945.
- R K Singh, (2004), "National System for Disaster Management", Proceedings of India- United States Conference on Space Science, Applications and Commerce.
- Symon Francis (2003), "GIS and Risk Assessment - Decision Made Easy", Geospatial Today, July-August 2003, Vol - 2, Issue-2.

#### **Acknowledgements**

I profound my humble sense of gratitude to Mr. Mani V, Head - Program Office, PSI Data Systems Limited, Bangalore for his continuous encouragement and cooperation to bring out this article.

My indebted thanks to Mr. Paneesh Rao, Chief People Officer and Mr. Ramaswamy, General Manager (HR), PSI Data Systems Limited for their support.

My hearty thanks to Miss Reena Periera, Associate Manager (HR), PSI Data Systems Limited for her encouragement towards professional development.



