

Application of Geoinformatics for Smart Village Creation

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Abstract

As per 2011 census out of the 121 crore Indians, 83.3 crore (68.84%) live in rural areas while 37.7 crore stay in urban areas. 45.36 crore people in India are migrants, which is 37.8% of total population. People are migrating fast towards concrete jungles of cities, leaving the “soul” empty. According to government estimates, “about 25–30 people will migrate every minute to major Indian cities from rural areas in search of better livelihood and better lifestyles”, and “with this momentum, about 843 million people are expected to live in urban areas by 2050”. This will certainly happen and rightly so Indian government should be take action form today. The growth indices of post-independence democratic India show a widening divide between village development promised and development achieved. Indian villages have experienced minimal development since Independence (1947). Lack of opportunities in villages initiates mass exodus and unmanageable stress on cities. India is rapidly becoming a young country left with large number of rural unskilled people who will need jobs in near future. A smart village will also have power, knowledge, healthcare, technology, strength to achieve any desired goal belong to the developing our nation. In this the geographical information system (GIS), remote sensing (RS) and global position system (GPS) technologies are being used extensively for the purpose all these things include in geoinformatics technique. In this study Vishnupuri village is selected as study area for smart village creation using geoinformatics technique. This study shows that number of tings yet not proper mapped because traditional technologies takes time and large amount of money to complete it. But this study proves that very less time and money is requires to prepare map using geoinformatics techniques. Today Vishnupuri people have to face Education, Health, Employment, Water Supply, Road, Drainage, Gas, Electricity, Agriculture, Waste deposition, Environment and Social etc. problems which can solve through the proper implementation of Smart village action plan.

Keyword: GIS, RS, GPS, Smart Village, Sustainable Development Action Plan

INTRODUCTION

The idea of smart village in the present day seen more important as there is a limit of growth of cities which is required in development of urban jungles where the population ratio per km of land is greater than the given norm. Smart village is very essential for the development. To stopping the movement of people towards the urban areas it is just not to develop the village but also it is a practice of the internal bonding between the people. A smart village should be interactive with the all multi-functional organization and there is to be increase active participation of people in various activities. This study gives the idea about what are the problems which are the people suffering at the present and it give a systematic way for solving these problems. A smart village is one of the inter link which will automatically provide to local areas. A smart village will also have power, knowledge, healthcare, technology, strength to achieve any desired goal belong to the developing our nation. Smart village is a community based initiative sustainable development of villages. Smart Villages access to sustainable energy services acts as a catalyst for development – enabling the provision of good education and healthcare, access to clean water, sanitation and nutrition, the growth of productive enterprises to boost incomes, and enhanced security, gender equality and democratic engagement.

STUDY AREA

Vishnupuri is one of the popular village of Nanded district in eastern Maharashtra. Its latitude and longitude extend is about 19° 05' 5" to 19° 07' 15" North latitude and , 77° 15' 11" to , 77° 17' 53" East longitude covering an area of 11.614 sq. km. It is situated on 357 to 383 meters above MSL. Vishnupuri village North side boundary bound by Thugaon, Kottirth village and Nanded Wagala Corp., East side boundary bound by Pangri village and Nanded Waghala Corporation., South side boundary bound Dhangarwadi and Kupsarwaezdi village , West side bound by Kalhal village. Vishnupuri is is tourist place due to Shankar Sagar (Vishnupuri lift Irrigation Project) and Kaleshwar Temple

OBJECTIVES

Main aim of this study is to prepare sustainable development action plan for vishnupuri smart village. To achieve above aim following objectives are considered.

- **To study the geographical set up of vishnupuri village.**
- **To evaluate development of vishnupuri village.**
- **To determine basic amenity for smart village**

DATABASE & METHODOLOGY

The present study is based on both non-spatial and spatial sources of data. The secondary data has been obtained from the various government departments and institute, such as

- **Survey of India (SOI):** Topographic maps of 1:25000 scale.
- **National Remote Sensing Centre (NRSC) / Indian Space Research Organization (ISRO):** thematic Services, Bhuvan's land use land cover map of 1:50000 scale.
- **India Meteorological Department (IMD):** Climatic data of rainfall and temperature.
- **National Bureau of Soil Survey and Land Use Planning (NBSS & LUP):** Soil map with attribute data.
- **Shuttle radar topography mission (SRTM) and Advanced spaceborne thermal emission and reflection radiometer (ASTER):** Physical data regarding slope, elevation, drainage etc.
- **Google earth:** Google earth satellite images are used for road, built-up area, drainage, river, reservoir, etc. features capture purpose. Tabular and text format secondary data and information which are the basic requirement of the project have been collected from the gazetter of Nanded district, socio-economic review of Nanded district, census handbook of Nanded district, district statistical abstracts. Also published and unpublished records in book, thesis, research paper and report have also been extensively used as data. Require recent data is collected from the various website

Work Methodology:

As per following sequence this work has been completed.

- 1) Pre Field Work
- 2) Field Work
- 3) Data Processing Work
- 4) Data Conversion and Joining
- 5) Data Analysis

Pre field Work:

Pre fieldwork involves literature review, problem identification of water, data collection and demarcation of study area. Preplanning of field works such as making questionnaires, Satellite Image map print etc.

Field Work:

In fieldwork attribute data has been collected by visiting the study area with the help of schedule. Discussion and question answer method has been applied to collect data. Study area consist more than 1252 building. It was not possible to collect each building data due to study budget and time limit, to overcome this problem random

data collection method is applied. Situation of the study area is collected by discussing with authentic and other people.

Data processing work:

- **Data Downloading:** Google Earth, Google map, government report & Censes data has been downloaded via internet.
- **Georeferencing:** Georeferencing means assign the Earth location reference to the image. This task has been done for Google Earth image and Toposheet in global mapper s/w
- **Digitization & Attribution:** Digitization means capturing feature with the help of GIS tool and store in polygon, line and point element. In this study city area, building area, water body, road, drainage, stream, well and places are digitized on map and satellite images. Also some attribution also has been done while digitization such as ID and Name of feature.

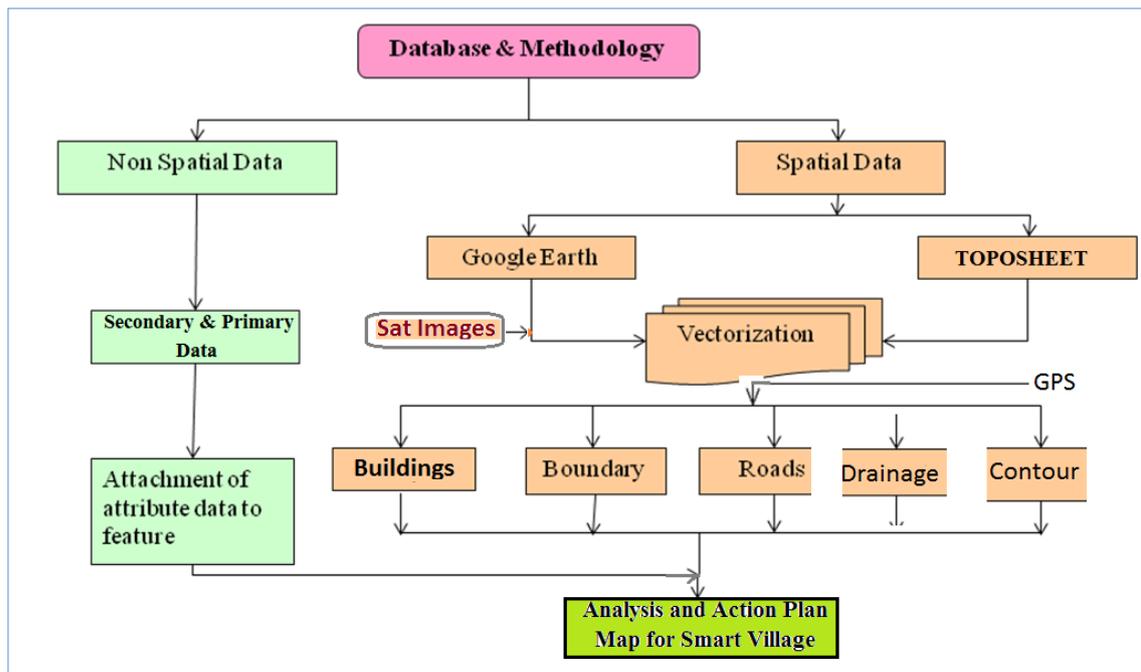


Fig 1. Database Generation & Methodology

- **Data Conversion & Joining:** Data collected from field and other sources has been converted from hard copy to digital format using Microsoft excel s/w. Excel sheet data converted in *dbf* format and this table has been joined to the vector data with the help of unique ID in Arc GIS s/w.
- **Data Analysis:** After completion of desire digital data geographical analysis are applied to get desired result.

CONCLUSIONS AND SUGGESTIONS:

Today better livelihood and information technology will offer effective solution for rural area. There are successful technologies available, which can be implements in rural areas. There is tremendous pressure on urban landscapes due to migration of rural people for lively hood. Smart Villages will not only reduce this migration but also irrigate the population flow from urban to rural area. ICT/IT and GIS are the unbreakable pillars to support the whole process of village development. Smart village concept will have potential to uplift the grass-root level of the country, hence adding feather in the overall development of India. Failure to utilize Information Technology tools for rural development is because of lack strategy, unfocused planning and above all monitoring and execution of the activities. All these activities need to be addressed based on the varying rural situations. A specially designed suitable framework for rural areas on the grounds of science, technology, engineering, regulations and management will play important role to build next generation smart village. Benefits of the smart village efforts are foreseen to be tremendous. Smart village concept is having high replication potential in other countries of developing world. The concept of smart village may also be extended to small towns and also townships surrounding the big cities. For smart village creation Geoinformatics play important role. This study proves that someone can create action plan for Indian village in limited budget and time with the help of Geoinformatics. Some sample maps are given below.

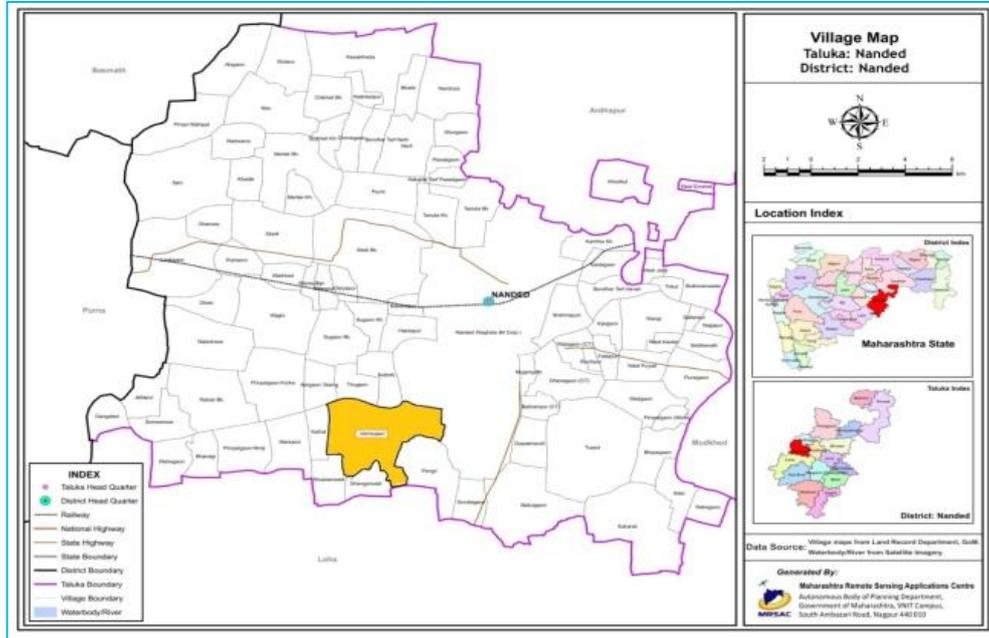


Fig. 2: Study Area Location Map

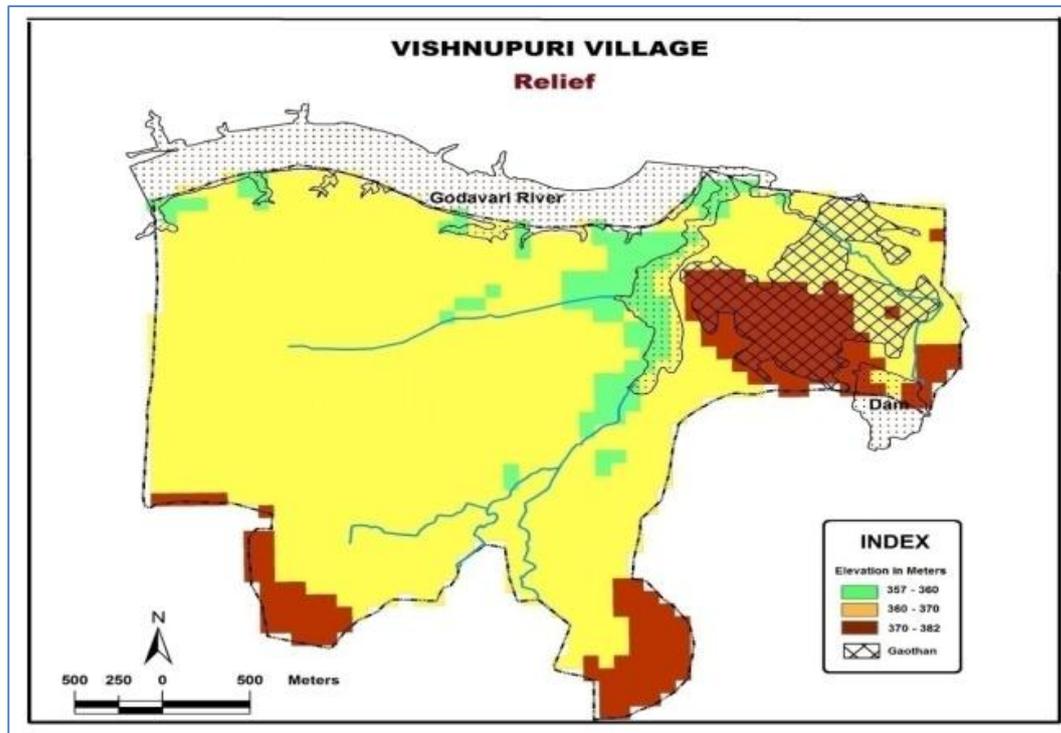


Fig. 3: Vishnupuri Villages: Drainage

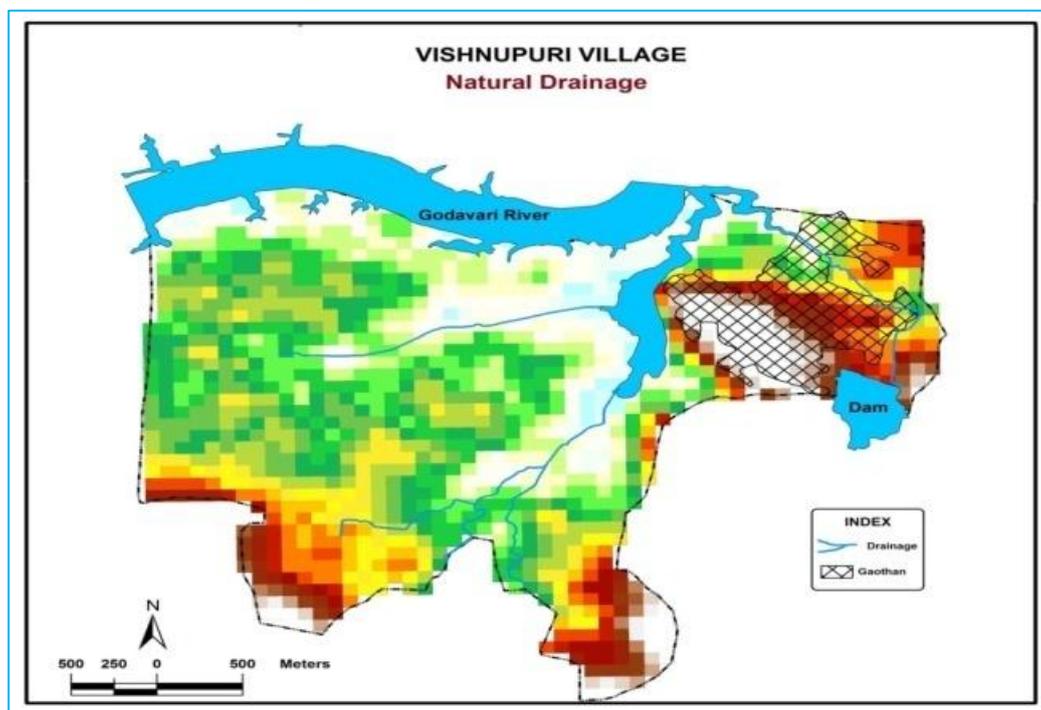


Fig. 4: Vishnupuri Villages: Natural Drainage

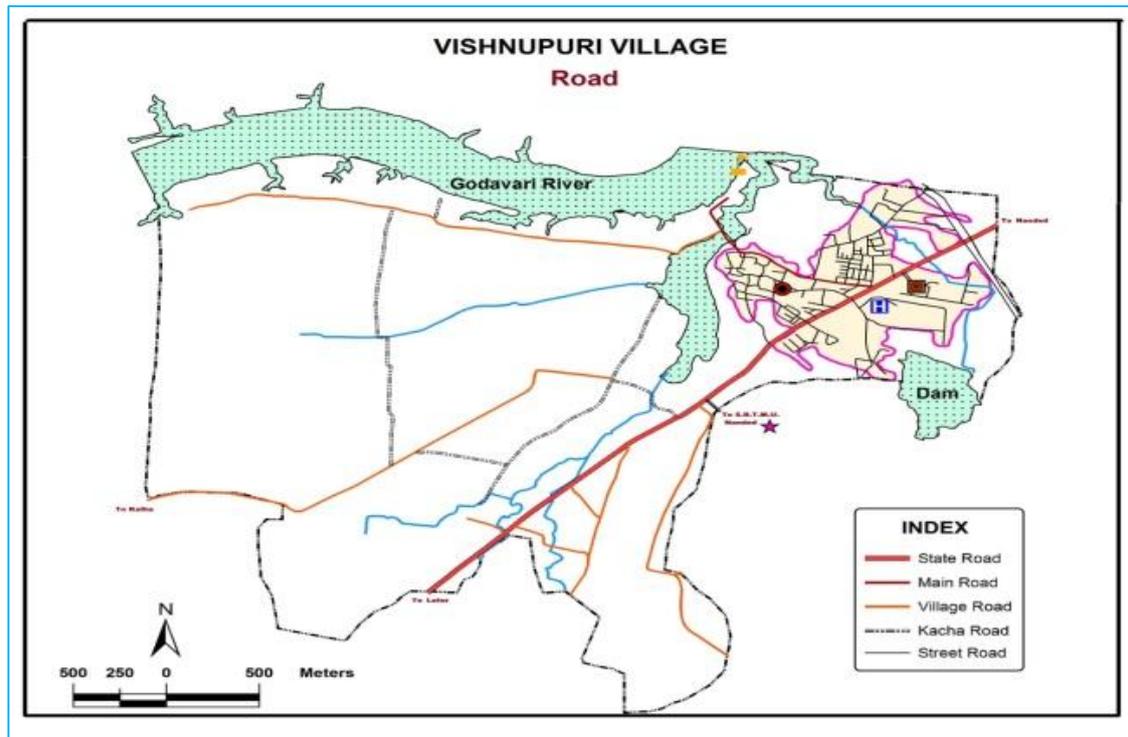


Fig. 5: Vishnupuri Villages: Road Network

Vishnupuri is one of the surrounding towns of Nanded City. Vishnupuri village is a need to design smart services which are independent in providing the services and employment and yet well connected to the rest of the world. There are technologies available and they are successful elsewhere. But the failure comes from lack of strategy, integrated planning and execution. There is no doubt that Vishnupuri village people need smart village services. Today Vishnupuri people have to face Education, Health, Employment, Water Supply, Road, Drainage, Gas, Electricity, Agriculture, Waste deposition, Environment and Social etc. problems which can solve through proper implementation of Smart village action plan. Following some findings of this work are described which can help to make Vishnupuri a Smart village.

Higher section of education facility is well developed in Vishnupuri but not a primary and secondary section. It is very poor in concern to quality of education. Theses thing should be improve by applying modern education. Health facility is well developed in Vishnupuri. Vishnupuri is one of the best villages for health infrastructure only services of health center need to improve such as regular services and hospitality. There health facility development is very nice. Vishnupuri is one of the best villages for health infrastructure only services of health center need to improve such as regular services and hospitality. Drinking water supply system is not available in this villages most of people use won bore well or common water. Currently they are using costly water. There 80 % people are facing water supply problem. Water is there but water supply system is not there. Permanent water supply system should be developed from

Vishnupuri barrages. Vishnupuri village is rich in road development and connectivity only somewhere road repairing and main road winding task is require. Somewhere street level road connectivity needs to create. Communication system of Vishnupuri village is well developed due to their higher education institutes development. Most of places Wi-Fi connectivity is found it indicate well communication development. Banking facility is very nice in this village. Vishnupuri is one of the best villages for banking infrastructure only services of banking center need to improve such as regular services and hospitality. Indoor and outdoor sport's ground should be developed in villages. There are five sport's grounds located in this area but it is belongs to higher level institution only. Function hall, meeting hall, training hall, Water Park and garden facilities are not development separately. It should be developed separately as per good connectivity and suitable location. There power supply system and its service are not good. Vishnupuri is not only villages but also town. Hence there power line should be underground. Street lights are not present all over settlement. So whole should be covered by LED streets light. Current waste management facility and whole system of Vishnupuri village is very poor. It is very serious issue. Eco-friendly waste management is needed at grampanchayat level. There is need to collect separate dry, wet, decomposable and recycle waste. All collected waste should be dispatched outside of village regularly. Dry burning waste they can use as fire materials, decomposable waste can be use for decomposed.

Vishnupuri village animal health center facility is well developed but its regular services and hospitality have to improve.

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