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Application of Geospatial Technology for Village Information System (VIS) : A Case Study of Soundalga Village of Belgavi District, Karnataka (INDIA)

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ABSTRACT

VIS (Village Information System) is an application based on Geo-Spatial technology. Village is a micro level unit for resource mapping and its planning for effective management. Village is also micro unit for socio-economic and demographic study and its planning. VIS is recently applied in geography for micro level study especially in planning and development. Present research attempt to visualize the micro level information of the Soundalga village in Belgavi district of Karnataka state using Geo-spatial approach. The study made use of Google Earth Pro image tiles of the year 2017 and each tile georeferenced using ERDAS IMAGIN Software. Digitize every aspects related to VIS like Vegetation, Road Network, Drainage system, water facility, Health Facility, Built up area, Land Use & Land Cover, Temples & Bus Stop etc. & join attribute data to each layer like population and household size, types and name of Land Use-Land Cover & other each aspect like Bus, Stop, Temples etc. The results show that out of total area of Soundalga Village 2094.48 Ha area cover by Agriculture, 75.07 Ha cover by Built up and 557.87 ha area is fallow. Soundalga village have one Government Health Center, one ATM, two government banks, 121 wells, 13 temples, 04 medical stores & 02 petrol pumps. This research highlights the importance of Geo-Spatial technology (Remote Sensing, GIS & GPS) to visualize all aspects related to VIS for micro level resource study, planning and its conservation. VIS also helps for socio-economic demographic study and tax assessment.

Keywords: VIS, Geo-Spatial technology, Remote Sensing, Q-GIS, GPS, Google Earth Pro imagery.

I. INTRODUCTION

An Information System can support monitoring procedures as it provides current and changing patterns of land use in the area (Dale, 1999). In the absence of updated and accurate information about all kind of resources at village level, the government and people of the nation are handicapped in planning and controlling their own destiny (Khan et al, 2005). Remote Sensing, the Computer Networks and Databases etc. are the advanced sources for data collection.. Various private and government organization are developing technologies for the betterment of the villages, but Geoinformatics is one technology that has the potential to enrich rural life and bring revolutionary changes (Singh, Harpinder, 2009). Primary and secondary sources are time and resource consuming and more expensive. In the absence of updated and accurate information

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about all kinds of resources at village level, the government and people of the nation are handicapped in planning and controlling their own destiny (Khan et. al, 2005). VIS (Village Information System) is an application based on GIS (Geographical Application System). J. Adinarayana, (2004) defined, "VIS is a computer-based information system that assists the decision-maker to facilitate spatial planning of rural development programs at grass-root or village level". According to Sitender (2012), Management of the information about the village in a web-based environment is called Village Information System (VIS). It deals with both spatial and non-spatial data at village level and comprises of all information related to households, population, infrastructure, amenities, utility services etc. GIS based Village information system (VIS) will help to improve the governance by decentralizing planning at micro level (Pathan, S.K. - 2005). This study of Nimone village is focus on acquire information at village level like Vegetation, Road Network, Drainages, water facility, Health Facility, Builtup, Land Use & Land Cover, Temples & Bus Stop etc. & join attribute data to each GIS layers like population and household size, types and name of Land Use-Land Cover & other each aspect like temples etc.

II. AIM AND OBJECTIVES

The main aim of this study is to develop Soundalga village VIS using Geo-Spatial technology. This database will be helpful for rural planners to implement different development plans of the village.

1) To prepare base map of Soundalga village at the scale of 1:5000 using all necessary layers related to VIS.
2) To Visualize present status of various utility services in the village
3) To study the relationship between village resources and infrastructure distribution.

III. STUDY AREA

Soundalga Village is located in Chikkodi tahasil of Belgavi District, Karnataka State, India. Soundalga Village falls under longitude between 74°21'47.845"E to 74°19'45.016"E and latitudes between 16°29'58.271"N to 16°27'15.141"N. The Northern Boundary of Soundalaga bounded by 'Adimallayya Hill' and southern boundary by Ved Ganga River.

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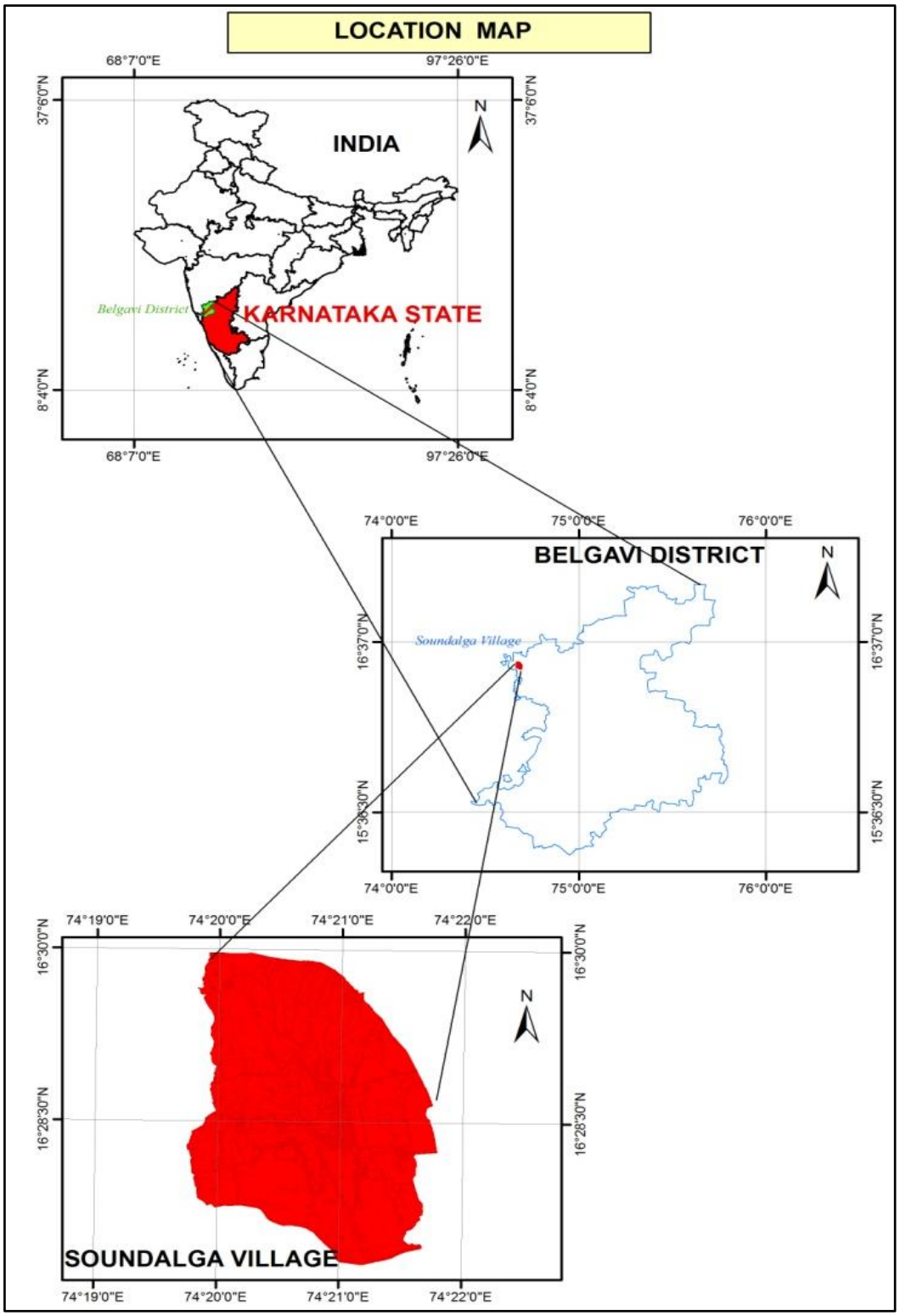

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IV. DATA USED:

Table. 1.1 (a, b)Data types and sources.

Spatial Data			
Sr. No.	**Used Data**	**Spatial Reference**	**Data Source**
1	Google Earth Pro Imagery	1:10,000	Google Earth Pro Software
2	Village Boundary	JPEG image	**Website:** http://www.censusindia.gov.in
3	DEM- Cartosat 1	30 M Resolution	http://bhuvan.nrsc.gov.in/data/download/index.php

Non Spatial Data		
Sr. No.	**Used Data**	**Data Source**
1	All Attribute Data	http://www.censusindia.gov.in
2	Village Boundary	**Website:** http://www.censusindia.gov.in

V. SOFTWARE USED:

a) ERDAS imagine: Used for georeference to images

b) Q GIS 7.2.2 : Used for Area Digitization, Map Prepretion.

c) Microsoft office Excel 2007: Is used for making tables and graphs

d) Microsoft office Word 2007: Used for research paper writing

VI. RESEARCH METHODOLOGY

In this study, both primary and secondary data are used to develop the information system. At first take the boundary map of Soundalga village in JPEG format through http://www.censusindia.gov.in Web site & georeference to JPEG map using ERDAS Imagine software & Create a boundary map of Soundalga village in shape format which is supported format to Q GIS. For satellite data download Google Earth images from Google Earth Pro & georeference to them using ERDAS Imagine software. Google Earth Pro Imageries are georeferenced using datum WGS, 1984 and Northern UTM zone 44. To correct distorted or degraded image data to create a more faithful representation of the original scene, image rectification and restoration process is necked which is always termed as preprocessing. The image of the study area was clipped by overlaying Village boundary over the geo-referenced image and extract the image using the Extraction Tools of Q GIS software.

Create GIS data layers like Vegetation, water facility, Builtup, Land Use & Land Cover etc. layers in polygon. Temples, Health Centers, Wells, Schools, Banks, Shops, ATM

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& Bus Stop etc. layers in Point. Road Network, Drainages, Canal networks etc. layers in line. Join attribute data to each GIS layers like population and household size, types and name of Land Use-Land Cover & other each aspect like Bus Stop, Temples etc.

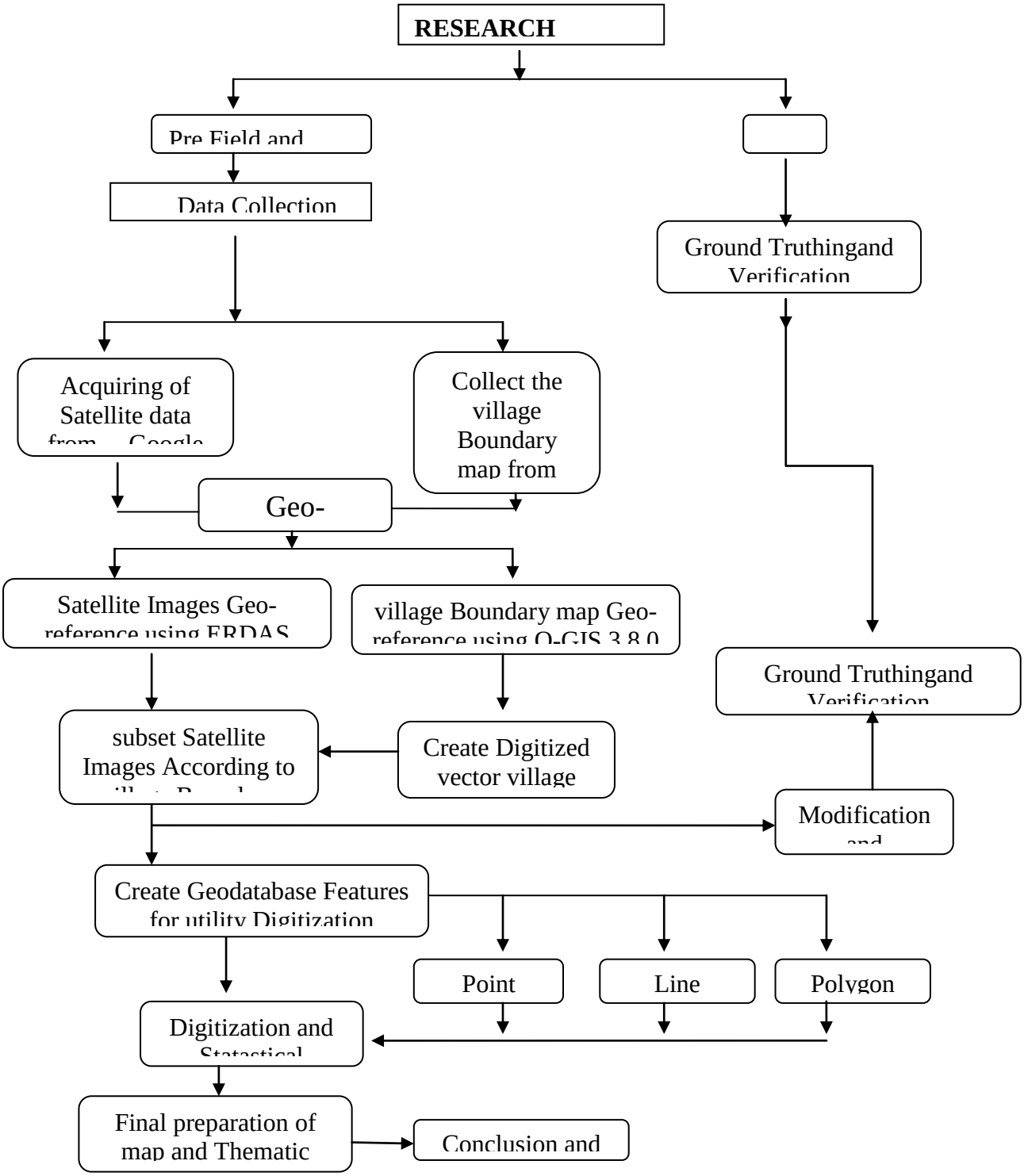

Figure: 1.2 General Methodology

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VII. RESULT & DISCUSSION

Soundalga village located along National Highway No. 04 & along the cost of Wedganga river with 1394.3 ha. Land area & 7789 population. Agriculture is main occupation of the village. Approximately 847.60 ha land area falls under this category. Main crops grown in rabi season is Sugar Cane and Groundnut & Soybean in kharif season. land use of the vllage is followed by Built up area which covers 75.07 ha land.

Soundalga village have two Primary Schools, one High school with Name New English School, Two Government Banks (Corporation Bank & BDCC Bank), One ATM of Corporation Bank, four Private Banks Like Arihant Co-Op Society, Mahatma Basweshwara Co-Op Society, Bireshwara Bank LTD. & Arihant Co-Op- Society.

Dendritic Drainage Pattern are found in Soundalga Village. Wedganga River is flowing from south of the village & delimit the southern boundary. Generally two Main drainages flowing from eastern and Western Side of the Village and delimit the both side boundaries respectively. A hill with 2409 feet height and 2083 meter length located to north side of the village and delimit the northern boundary.

Soundalga have three main drinking water sounces that's are River (Wedganga), Wells & tubwells. In the village 121 wells are found.

"Shree. Narshinh" is Gramdaivat of the village. There are 12 main Temples.

Good road network are found in the village. National Highway No. 04 is pass through the village. Approximately 27222.08 meter road constructed in the village. Roads Cover 43.23 Ha area out of total area of the village. .

Good Health Center & medicals are available in the village. There are one government health center, five privet health clinics like Nilekar Clinic, Sidhi Clinik, Magadum Clinic, Patil Clinic etc. & four Medical shops like Amit Medical, Suhas Medical, Sanjivani Medical, Shanta Medical & Nath Medical.

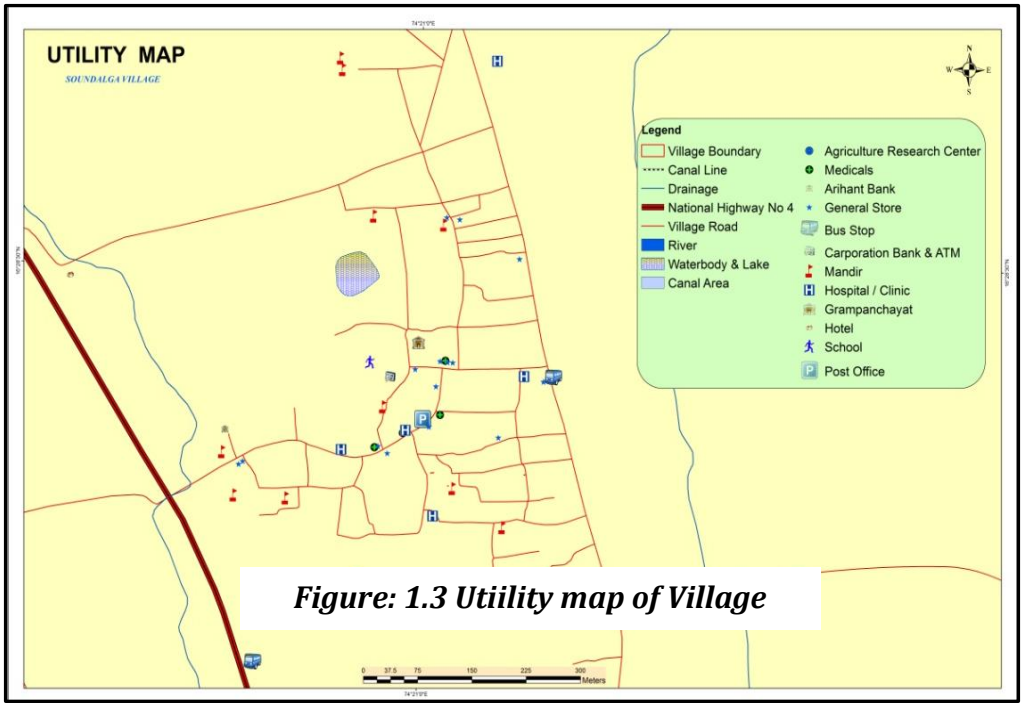

Figure: 1.3 Utiility map of Village

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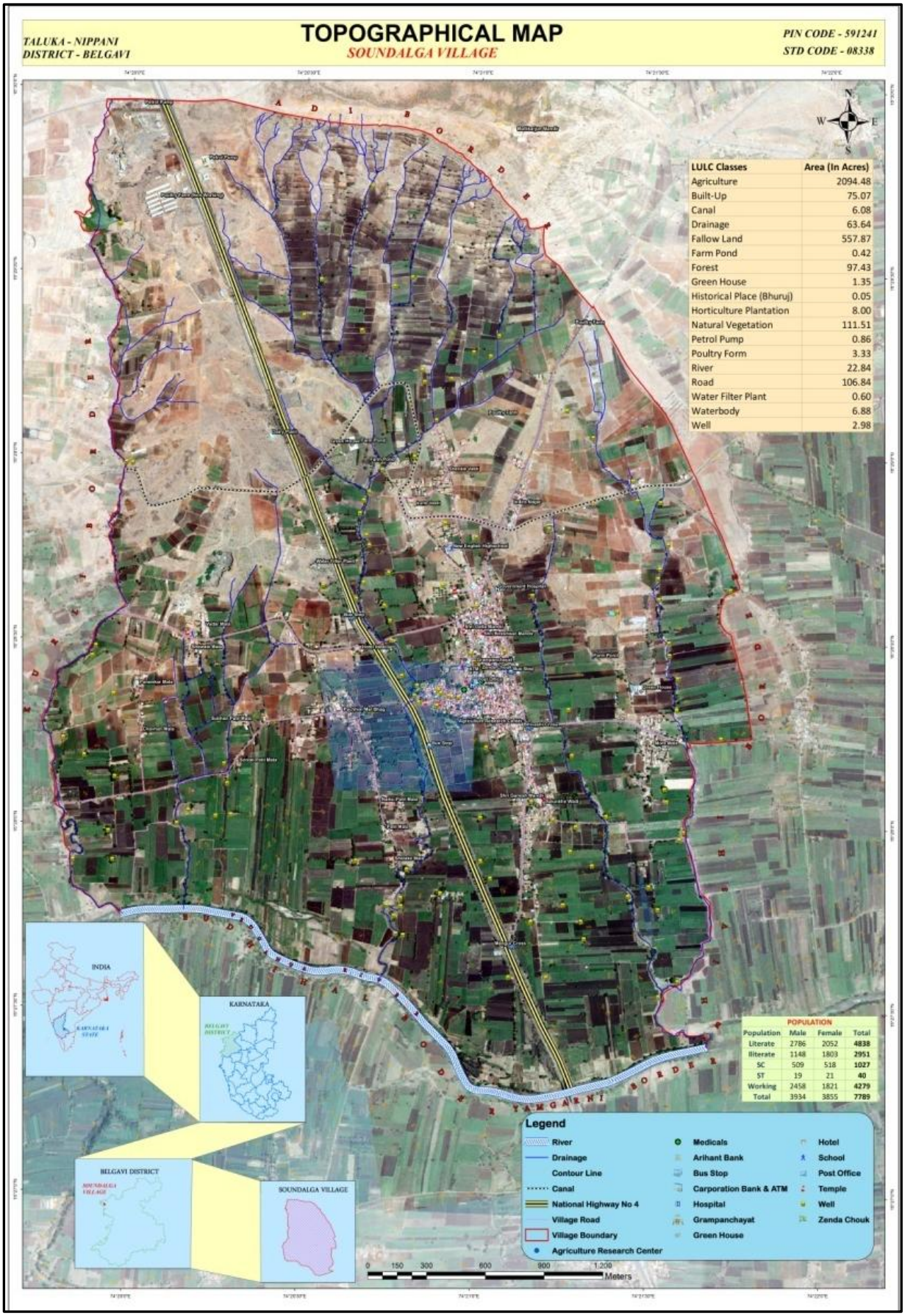

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Figure: 1.4 Topographical Map of

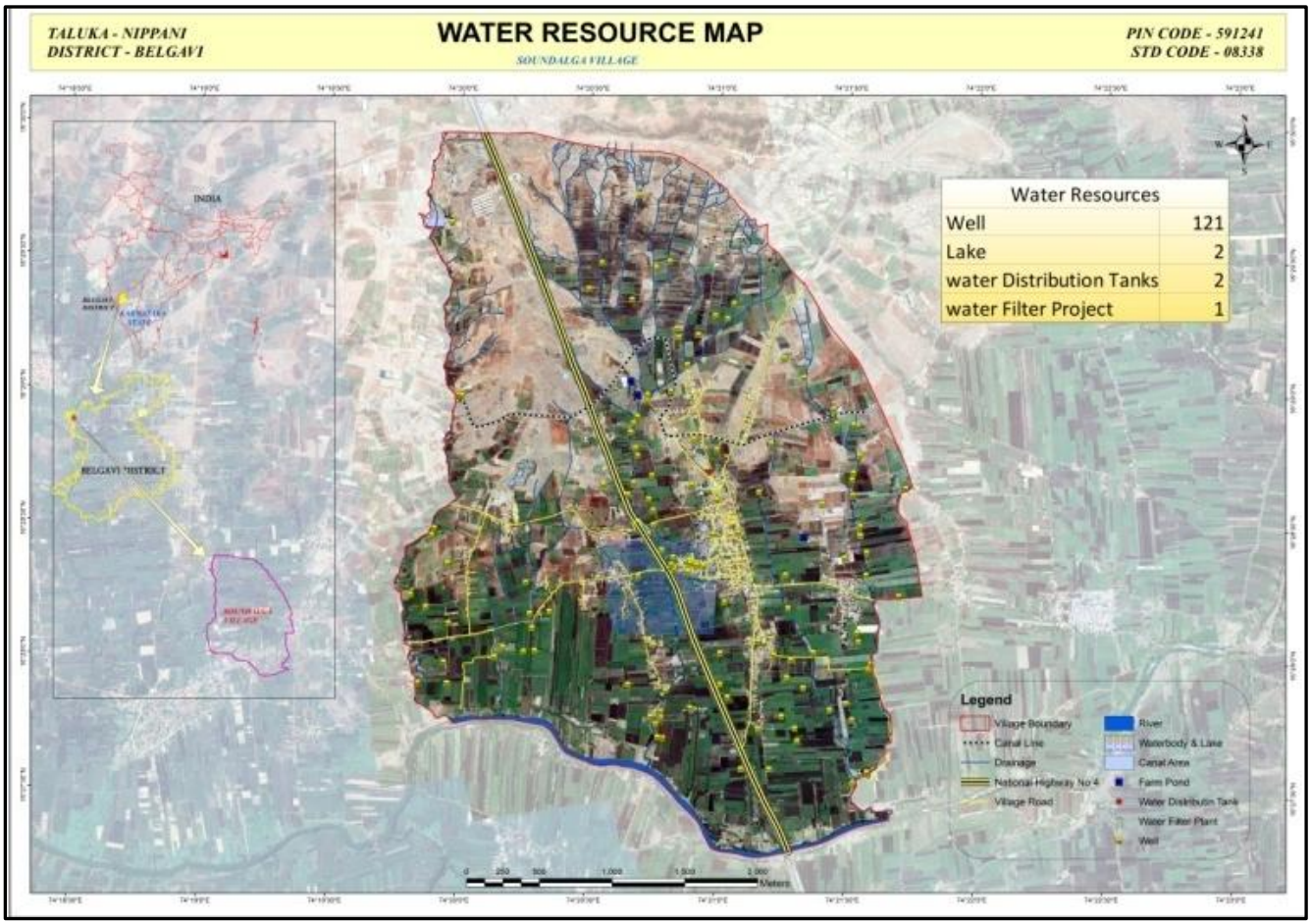

Figure: 1.5 Water Resource Map of village

VIII. CONCLUSION:

VIS is the micro level study of local resources and demography along with their socio-economic status for effective resource development and management. VIS also used for socio-economic and demographic study at micro level and find the solution with precise level. VIS useful for natural resource development, management its conservation and optimal utilization for maintain the environmental balance. Advance Geo-Spatial technique including remote sensing GIS and GPS make this work easier with high preciously. In this present study we can conclude that Soundalga is a developing village with good road network, Health centers, Banking facilities & Schools. Economy of the Soundalga is mainly depending on agriculture. Approximately 75% area of the village comes under agriculture activities. Soundalga have a group gram panchayat with Bhivshi village which adjoining to Soundalga. The proximity of national highway NH-4 giving high potential to transportation of the agricultural goods, vegetable in the nearest cities like Nippani, Kagal and Kolhapur. Nearest MIDC area giving employment to soundalga youth and helps for socio-economic development of the village. In future Soundalga village have huge potential for agricultural development,

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better employment, watershed development and integrated development of the village with the help of VIS.

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