

Need of Land use/Land Cover Information Using Geoinformatic Techniques for Water Planning and Management System - A Review

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Abstract: Landuse Play an important role in infrastructure planning and management of water resources. As the requirements of human beings are increasing the Landuse/Landcover change become dynamic in nature. The continuous monitoring is possible by conventions surveying techniques; therefore there is urgent need to have tool techniques which provided data temporal and analysis these data. Now a day satellite based geoinformatic techniques such as remote sensing, geographical information system(GIS) and global positioning system(GPS), proven to be cost effective in solving the growing challenges of monitoring Landuse/landcover changes. In this paper, Illustration on the use of Landuse/landcove information using geoinformatic techniques for water planning and management system

I. INTRODUCTION

Many of these problems can only be resolved with high quality field research and analysis performed using Geospatial techniques viz. Remote Sensing (RS) Geographic Information System (GIS) & Global Positioning System (GPS). It provides ample of scopes towards this initiative for proper management of natural resources. The planning and management task is hampered due to insufficient information on rates of land-cover/land-use (LCLU) change. The LCLU changes occur naturally in a progressive and gradual way, however sometimes it may be rapid and abrupt due to anthropogenic activities. (Patel et al., 2013;2014).There are various authors have investigated on water resources such as projections, analysis and planning of water. Some of the important investigations are given below

Dikshit (2002)-“**MANAGEMENT OF URBAN WATER-SUPPLY USING GIS**”-This paper speaks about study, GIS has been developed for water supply management in urban area in a user-friendly environment helps in maintaining the records of leaks and repairs, provide customer information service, automatic billing of monthly charge, provide inputs for accounts section, generate contracts, work orders and daily work schedules for crews and assist in many more regular and advanced decisions.

Jinsheng, et.al(2006)“**APPLICATION OF GIS TO PLAN LONG -RANG WATER SUPPLY FACILITIES BY LINKING LAND USE AND WATER BILLING DATA OF CITY OF CAPE CORAL IN SOUTHWEST FLORIDA**” This paper describes the application of a land use based approach to prepare a long-range forecast of water demand for the city of cape coral in Southwest Florida and comparing it with population based method ,land use based method is quiet accurate, also improves the coordination of the water supply and effective planning in local government. for future water demand after 2030 as shown in Figure 1, the land use based approach yield lower water demand(produced) projections than population based approach because the population would not keep growing as rapidly as it does at the

beginning of developing period. It gives more accurate demand curves for public water supply as compared to other methods. The land-use based approach is related to spatial data, which can be programmed in powerful Arc GIS software, which can be easily updated based on the future changes of city’s development plan.

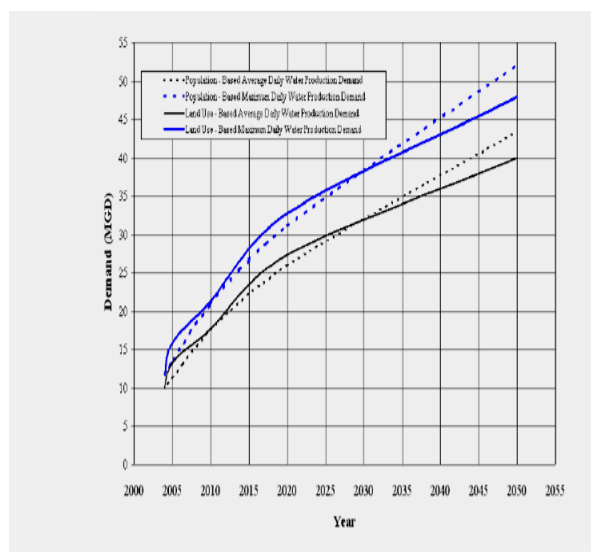


Figure 1: Landuse and Population based Water Demand(Produced) Projections

Laura Baumberger(2007)“**EFFECT OF GIS-BASED DEMAND ALLOCATION ON WATER DISTRIBUTION SYSTEM MODELLING**” This paper is based on preparing the mathematical model of water demand projection based on population information, Land-use information and customer billing Records. Analysing its effect on hydraulic system by pressure contours by three methods and the error statistics ,which assess the overall quality and reliability of the demand allocation method analysis, which presented in terms of measured and simulated of demand allocation with pressure to the consumer. In case of land use information pressure contour are area based, In case of meter consumption pressure contour are point based and in case of population based pressure Uniform. This pressure contour are drawn in the Arc GIS using “spatial analyst tool”. The result of study is area or land-use based method on GIS is suitable for future water demand projection.

Slobodanka(2010)“**APPLICATION OF GPS AND GIS METHODS IN THE PROCESS OF WATER MANAGEMENT**”-In this paper stress has been given on new method which is required for better and reliable analyses in hydrology, as compared to the conventional methods which are time consuming and have significant limitation to handling spatial data. The spatial data are more complex and extensive knowledge of the complex interactions between water, nature and man, and assist in the development of alternatives is

required for future strategic and operational water management and economic activities. It is explained by example of hydro power potential investigation of the recording method of GPS and GIS in water management processes. It has used GPS devices for collection of data regarding the location of wells, their attributes and discussed the further analysis of them using GIS. Landuse/Land-cover change information has a vital role to play at local and regional as well as at macro level planning of natural resources. The planning and management task is hampered due to insufficient information on rates of land-cover/land-use change. The land-cover changes occur naturally in a progressive and gradual way, however sometimes it may be rapid and abrupt due to anthropogenic activities. Remote sensing data of better resolution at different time interval help in analyzing the rate of changes as well as the causal factors or drivers of changes. Hence it has a significant role in regional planning at different spatial and temporal scales.

Venkatarao.K.(2010)"Sewerage and Water Supply Systems Design for a city with large floating Population (Haridwar, India) using GIS" The present work provides a methodology of planning, and design of new pipelines for water and sewer network based on Land use. Using Landuse based approach for design of pipeline water supply and sewer for large floating population. The ARCGIS tool of GIS is utilized to collect the information and store for future forecasting of water demand . And its integration with hydraulic software such as EPANET help in design and analysis of pipeline

Ufoegbune G. C. et al(2011) "Municipal water supply planning in Oyo metropolis Oyo State, South Western Nigeria" The present work provides a municipal water supply planning based on land based approach to prepare a long range forecast of water supply demand for Oyo metropolis with the aim of providing effective planning , development and operation of water supply and distribution networks which is one of the most essential component of urban infrastructure.

Ji-Hao Lin "SCENARIO SIMULATION OF WATER SUPPLY NETWORK" using epanet and google image Figure 2. first the hydraulic simulation is made in made in epanet and two options are given for the state of pipeline in EPANET : "open" that indicates normal operation of the pipeline or "close" that suggests inability of the pipeline to supply water

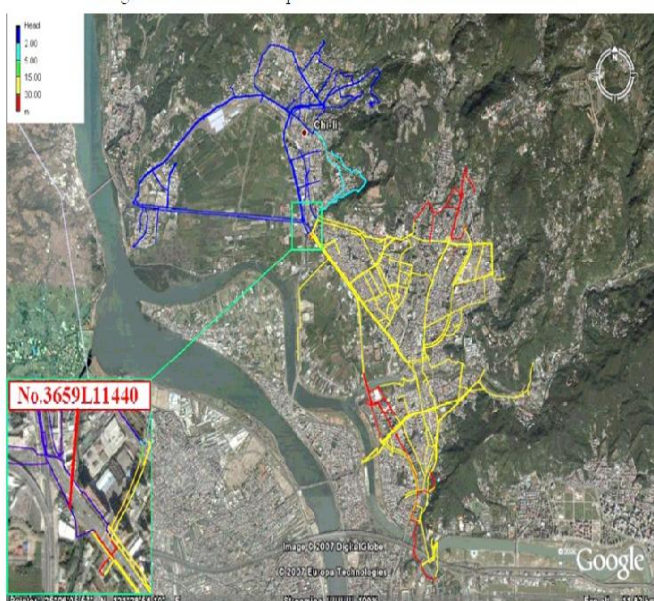
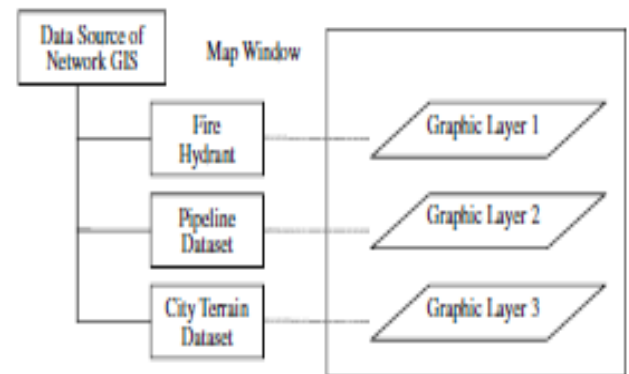


Figure 2: Water Distribution Simulation using Google Earth

Yan.B(2009)"**FUNCTIONAL STRUCTURE AND DATA MANAGEMENT OF URBAN WATER SUPPLY NETWORK BASED ON GIS**" The data management of fast urban WDS is done by Super map,in the form of layers in GIS environment as shown in fig and to represent the entity attribute table in GIS and Data ware house can be make to store the data base as given below in block diagram.



Assela(2010)"**EPANET 2 Application For Pressure Driven Demand Modeling**" In Some Adverse Condition were condition of network with low pressure and high demand situations were negative pressure is developed in the system. EPANET 2 Software in its original form is not suitable for analysis of such water distribution network, due to artificially fixed demand in the original EPANET Software. In Order to overcome such type of problem new modified approach which is based on pressure driven demand analysis which was developed by Cheung et al. (2005)implemented a pressure-sensitive demand version of EPANET using the object oriented modification of EPANET known as OOTEN and utilizing emitter functionality of EPANET. This was a command line tool, not integrated to a graphical user interface. Giustolisi et al.(2008) among others ,have presented new numerical algorithms to handle pressure-dependent demand in networks.

CONCLUSION

Geoinformatic techniques had a wide application in the water resources such as water demand projection; its integration with other hydraulic software has proved to be strong tool for management water resources. Main empathies were given on the projection of water demand based on population and landuse based methods. It further important was given use of landuse based water demand project and how a Geoinformatic technique helps in accurate projection of it.

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