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Smart Water for Aurangabad City

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Abstract— Cities are expecting dramatic population growth and so it will need new and intelligent infrastructure to meet the needs of their citizens and businesses. The water provided by the Aurangabad Municipal Corporation (AMC) is not sufficient for the use of citizen. In this project we have only considered the water resources available in the different area only in the Aurangabad city. All resources are mapped in the Google map using KML platform .The research also deals with providing a graphical view for the availability of ground water resources of the Aurangabad city in contour form which can provide a way to study their features. The groundwater flow model for the study area was formulated by using input data, such as the location of water resources and appropriate boundary conditions.

Keywords— AMC (Aurangabad Municipal Corporation), GIS (Geographic Information Systems), ICT (Information and Communications Technology), OGC (Open Geospatial Consortium)

I. INTRODUCTION

According to the China Academy of Telecom. Research [1], a smart city is defined as follows: "A city may be called 'smart' when investments in human and social capital and traditional (transport) and modern (ICT) communication infrastructure, fuel sustainable economic growth and a high quality of life, with a wise management of natural resources, through participatory government are successfully implemented". It can be seen from the figure that the following seven components are required for the Smart city:
(1) Smart Energy (2) Smart mobility (3) Smart water (4) Smart Public services (5) Smart building and homes (6) Smart Integration

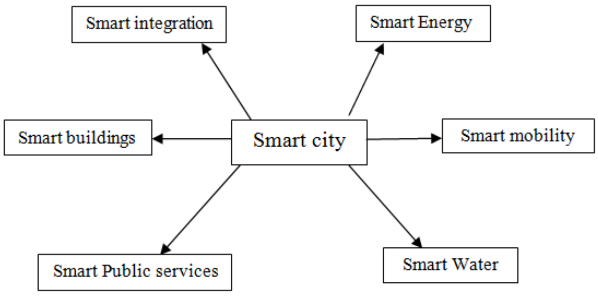

FIGURE1.1 SMART CITY SECTORS

II. A KEY BUILDING BLOCK OF THE SMART CITY OF THE FUTURE

1.1 Smart Water

The underlying communication needs inclusion of sharing sensor information among consumers, producers, and the grid, with various requirements in terms of reliability, real-time behavior, and bandwidth. Those strategies include power quality control, as well as interactive feedback to human users, and will increase the energy efficiency of the entire Smart City, requiring all participants (grids, buildings, and consumers) to be connected by appropriate means of communication.

Figure1.1 Smart city sectors

But cities and firms, we have agreed that the key attribute for a Smart City – the sixth and critical criterion - is that the leadership has a clear and consistent vision of what the future city offers its people, with a commitment to deliver the necessary change. It is a vision which has been developed in consultation with its citizens, creating an attractive environment for business across the city, so that the quality of life of all its citizens is enhanced by anticipating their needs and meeting them, such that firms and people embrace the vision.

1.2 Geospatial Technologies For Water Management

A ground-water system which is a mass water flowing below the Earth's surface in motion. The work is in the long-term, for the amount of water resources available in the region and providing a way to use it in an efficient manner. Modelling results are the design parameters for water management plans which are used by national and multinational decision-makers.

1.3 Water Supply and Groundwater Information of Aurangabad City

The Municipal Corporation of Aurangabad is incurring heavy losses. The corporation offers water to the citizens at subsidized rates. The actual annual cost of 200 liters of water per family once in two days is Rs 3,500 but the charge only Rs 2,000 per annum. The Groundwater use can change dry areas, huge quantities of water were available underground, but due to lack of political will, it remained untapped. [4]

1.4 Mapping bore wall of the Aurangabad city through KML on Google API

The objective is to map the groundwater plans in Aurangabad city. Water supply, including volumes extracted, use of the resource and benefits depending on the quantity and quality status of groundwater resources including constraints on existing use and the potential for further growth. The technologies within the language of open geospatial consortium (OGC) standards in-order to more fully understand urban systems .Working with the KML and Google API for locating the available ground water resources and analyzing their properties for water usage. [5]

III. DATA COLLECTION

The objective is to traverse the current role that groundwater plans in Aurangabad water supply, including volumes extracted, use of the resource and benefits depending on the quantity and quality status of groundwater resources including constraints on existing use and the potential for further growth. The entire bore well, according to the areas will be located on the map of the Aurangabad city which will give a preside view for the user thought which we can make a decision and can provide water in the dry water area. A program which makes provision for the initiation of ground water management studies at the local level is desirable to focus activities on demonstrated need. According to the properties of bore well water availability within the region and the grouping of their features can be made depending upon which we can mapped the bore well within the area and a decision could be made accordingly.The representation of the data in contour forms so that the proper combination of the availability of water within that area could be studied for avoiding inconsistence of water.The KML quickly understands the power of spatial data and to bring more and more spatial data to KML.

IV. LITERATURE REVIEW

The Cities is a complex systems, single data source are sufficient for the information needs required to map, monitor, model, and ultimately understand and manage our interaction within such urban systems. Remote sensing technology provides a key data source for mapping such environments. [6]

In Northwest China develop and utilize groundwater resources for the frangible ecological environment. The development of groundwater level information model basic fact that the surface soil, water moisture is observed related to the shallow groundwater level. [7]

Manage groundwater resources to meet the needs of future generations for Good decision-making tools. Groundwater is an important part of the hydrological cycle and should be managed in an integrated way with other water resources. Groundwater can be located very efficient and ground water management is made sustainable with modelling and monitoring system [8] Urban Bangladesh which dealing with the water shortage due to water scarcity, water quality of major rivers and canals is under threat. Surface water bodies in most cities have become the receptacles for the city's sewage. [9]

The report presents a case study on groundwater governance in Kenya, The study were to describe groundwater resource and socioeconomic settings for four selected aquifers; describe governance arrangements for groundwater management in Kenya.[10]Surface water flows within the small streams, which feed the main river draining. Groundwater moves through aquifers from areas of recharge to areas of discharge determined by the geological structure.[11]

A model such as the real world system for water resources simulates the relevant excitation-response, which are very complex, there is a need for simplification in making planning and management decisions. [12]

In Egypt groundwater is considered the unique water resource for the irrigation purposes. The management of these groundwater resources is of crucial importance for Wadi El-Farigh where freshwater supply is naturally limited.[13]

The Resource Conservation and Recovery Act of 1976(RCRA) technically competent and independent are the regulatory agencies with would typically be the state environmental and health agencies, the Environmental Protection Agency, and possibly the Nuclear Regulatory Commission.[14]There is urgent an need for coordinated efforts from various Central and State Government agencies, non-Governmental and social service organizations, academic institutions and the stakeholders for evolving and implementing suitable ground water management strategies in the country. [15] The purpose of this study is to describe groundwater availability in the Central Valley. he development of the CVHM comprised four major elements: (1) a comprehensive Geographic Information System (GIS) to compile, analyse and visualize data; (2) A texture model to characterize the aquifer system;(3) estimates of water-budget components by numerically modelling the hydrologic system with the Farm Process (FMP); and (4)simulations to assess and quantify hydrologic conditions. [16]

This study attempts to highlight the importance of hydrological information to the methodological basis of groundwater assessment is rather weak and hence ,the assessments may have limited use for the farming communities. There is a secular trend in groundwater development over the years. This trend is only broken due to severe droughts or very good monsoons. Regional variations indicate that Telangana had a late entry in the case of mechanisation and enrgisation of groundwater exploitation, though it has overtaken the Rayalaseema Region by mid nineties.[17]Ground water is a critical component of the nation's water resources. Globally, ground water resources dwarf surface water supplies. [18]Remote sensing with its advantages of spatial, spectral and temporal availability of data covering large and inaccessible areas within short time has become a very handy tool in assessing ,monitoring and conserving groundwater potential .A study was conducted to find out the groundwater potential zones in Kancheepuram dist., Tamil Nadu, India.[19]

The plotting of SAR values in USSL diagram indicates that all the samples have low SAR value. Finally above said results are taken into GIS platform. To understand the spatial distribution of unsuitable zones, ArcGIS was employed. The present work reveals that groundwater in the Lower Bhavani sub-basin area is of good quality and is suitable for all uses including inter brain water transfer in the region. [20]

V. WORK FLOW

Mathematical methods and numerical modelling are of great significance for groundwater management. Numerical models allow the analysis of the present conditions and the evolution of groundwater systems, as well as an estimation of the impact of factors such as temperature and salt dependent water density in the flow field. Furthermore, they can simulate and predict the spreading of solutes in groundwater as shown in Figure 3.1.

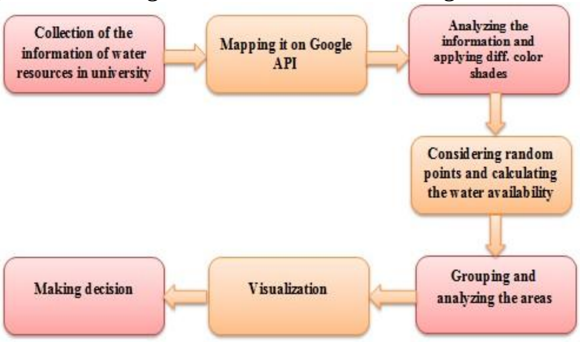

Figure 3.1 Process Flow diagram

The project work deals with the area of the focuses of ground water resources and they are represented through the KML file which is an OGC std an open sources. The kml give a way to mapped the spatial date of the ground water resources on Google API along with the detailed information of water resources along with the proper location of the resources is also highlighted .The proper detail are mention in different colors so it become easy to distinguished between the water resources are and no water resources area.

3.1 Water Modelling

A. Technique of Finding the Availability Water Management

A survey is done for finding the ground water resource in the university area and accordingly 70 such water resources found. The Groundwater resource such as bore well, well, dam available in university area are mapped on Google earth. The KML allows to map the spatial data on which the various water resources are located so to calculate the availability of water resource at a particular point certain assumption have been made.

The university area is best area which completely depends upon ground water usage, the model deal with plotting all available water resources in that area and analysis them according to the need for a near location where the water resources are not available or which are not sufficient for the usage. All the spatial data will be located on the Google earth and accordingly the water flow can be monitored which will give an exact usage and non water resources area in the university.

VI. CONCLUSION AND FUTURE WORK

The factors of the smart city are smart energy, Smart mobility, Smart water, Smart Public services, Smart building and homes, Smart Integration. The smart water is proper management of water for vision for the smart city. Water is most precious natural resources and to be utilized in the proper way. The goals to develop plans for water resources management and efficient water usage. Geospatial technologies for water management are required for geospatial hosting. KML is the international standard the OGC and Google have agreed to harmonize KML and GML further GML is Geography Markup Language an XML based encoding standard for geographic information. The language allows

Internet browsers the ability to view web-based mapping without additional components or viewers. The Google API is the specification used by software components to communicate with each other. An API may describe the ways in which a particular task is performed. Mapping the places of the city and also providing a better view for the users a smarter the information about the city.

The project identifies major topics of Smart Cities that will influence the ICT environment, as covered by NetWorks. All these domains raise new challenges in security and privacy, since users implicitly expect systems to be secure and privacy-preserving. Smart Cities need to be able to integrate themselves into national, regional and international infrastructures. Requirements address a number of technologies, beyond the ones related to mobile and fixed networks. The needs for mobility in urban areas result into a number of problems .The information being managed in this area can be relevant to other domains, which increases its potential.

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