SCANPOINT GEOMATICS LIMITED

Leveraging IGiS for **IRRIGATION MANAGEMENT**

White Paper 2023

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INTRODUCTION

Ensuring food security for the world's steadily growing population is one of the major challenges. Efficient and sustainable agricultural production is highly dependent on irrigation. Proper management of an irrigation system can reduce water demand, resulting in water savings for other purposes, enhance agricultural productivity, and minimize the environmental impact of irrigation. Managing irrigation is fundamental for irrigation professionals, planners, and managers as it involves multiple tasks and stakeholders with varying objectives. Spatial and temporal variabilities often pose difficulties for traditional irrigation management support systems. To address this challenge, Geographic Information Systems (GIS) has been introduced into irrigation management.

Integrating modern GIS tools with a water allocation model for distributaries and performance characterization is a valuable approach to incorporate spatial variability into management systems. It allows simultaneous analysis of temporal and spatial dimensions. The implementation of such a system can enhance the ability of irrigation managers to allocate water effectively among tributaries, given the limited available water resources, improving their day-to-day operations.

IGiS offers the numerous innovative solutions that can be leveraged to enhance irrigation practices.

Spatial Analysis and Mapping of Assets

Crop Water Requirement Assessment

Water Resource Mapping

Irrigation Planning and Design

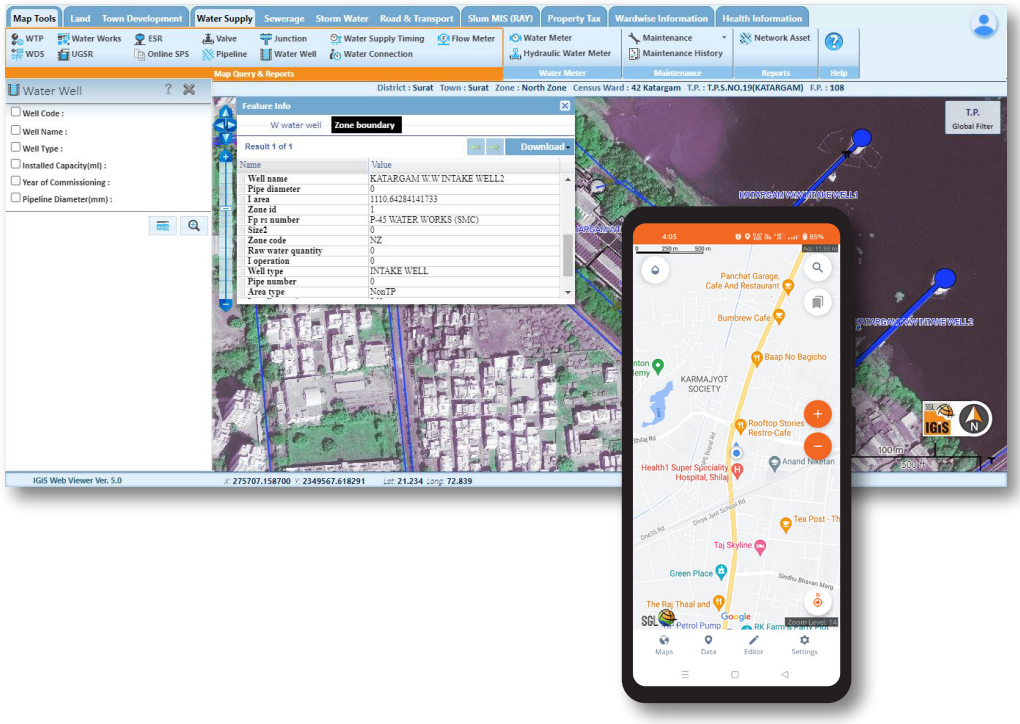
Water Quality Management

Real-time Monitoring and Decision Support

Visualisation and Reporting

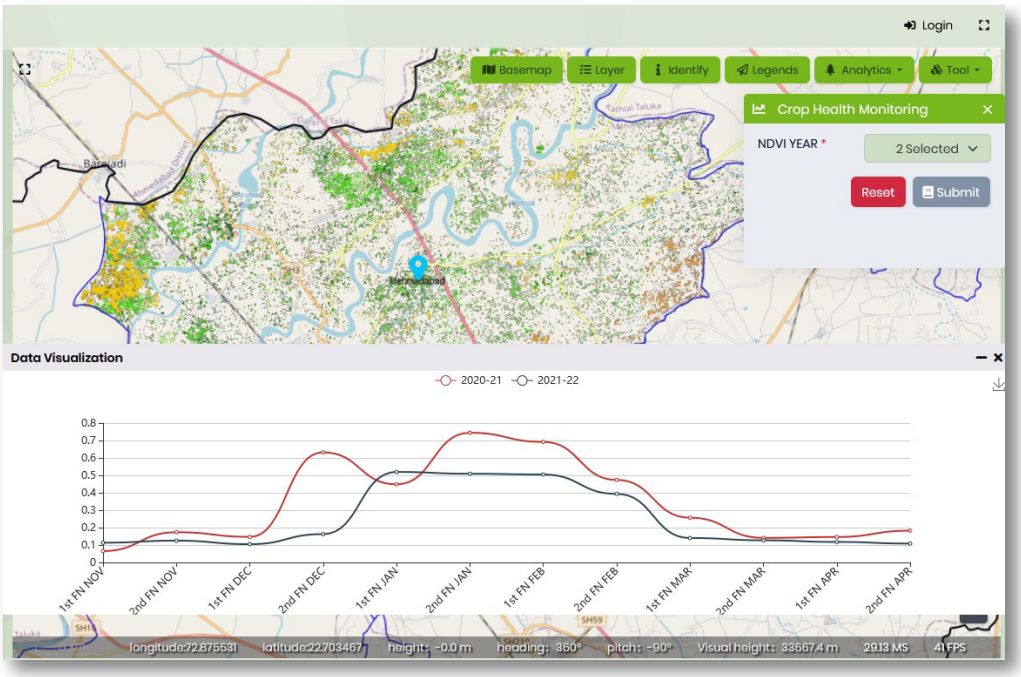
Spatial Analysis and Mapping of Assets

IGiS provides a robust solution for creating accurate and detailed maps of irrigation infrastructure, including canals, pipelines, reservoirs, and other water sources. These maps help in identifying the spatial distribution of the irrigation infrastructure and potential areas for expansion or improvement. The Mobile based GIS application provides comprehensive solution for asset surveying along with locational and attribute information of assets with geo-tagged photographs.



Crop Water Requirement Assessment

The availability and accessibility of water are major constraints to agricultural production in water-scarce regions, making it crucial to address water stress issue promptly. IGiS technology provides inbuilt functions to analyse different type of data like climate, soil, crop etc. used for agriculture-based studies. The platform provisions to estimate the spatial and temporal distribution of irrigation water requirements in an area, taking into account the current crop pattern. This information can be used in subsequent hydrogeological studies to evaluate the potential dynamic and temporal evolution of water stress resulting from agricultural activities. It is crucial to have such information available for effective management of water resources, optimum irrigation schedules and water allocation strategies.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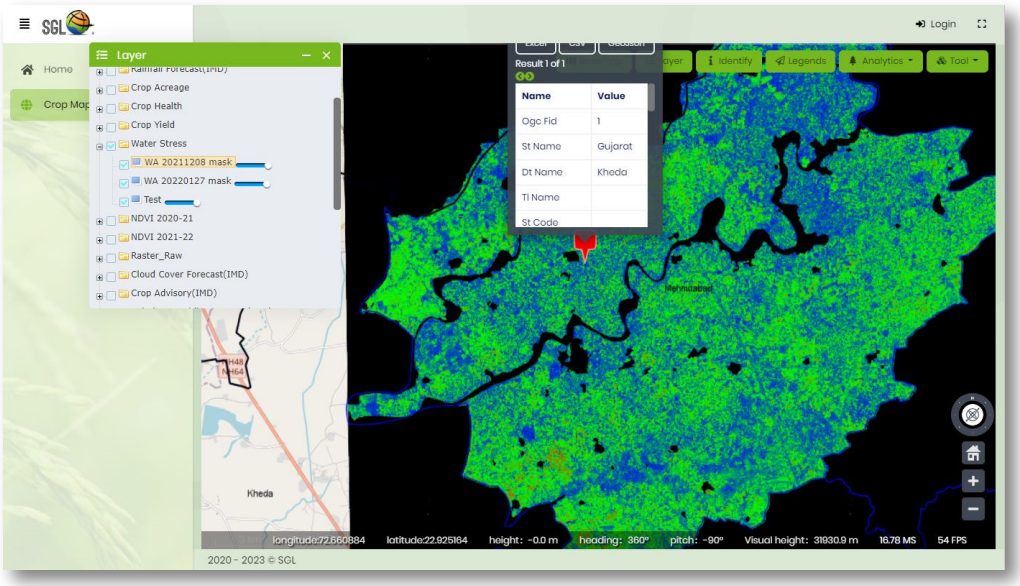
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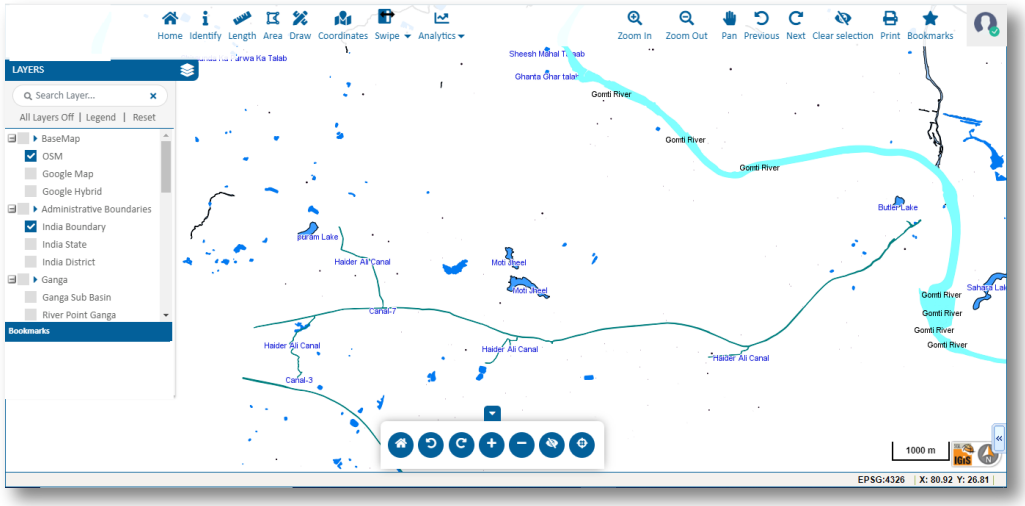
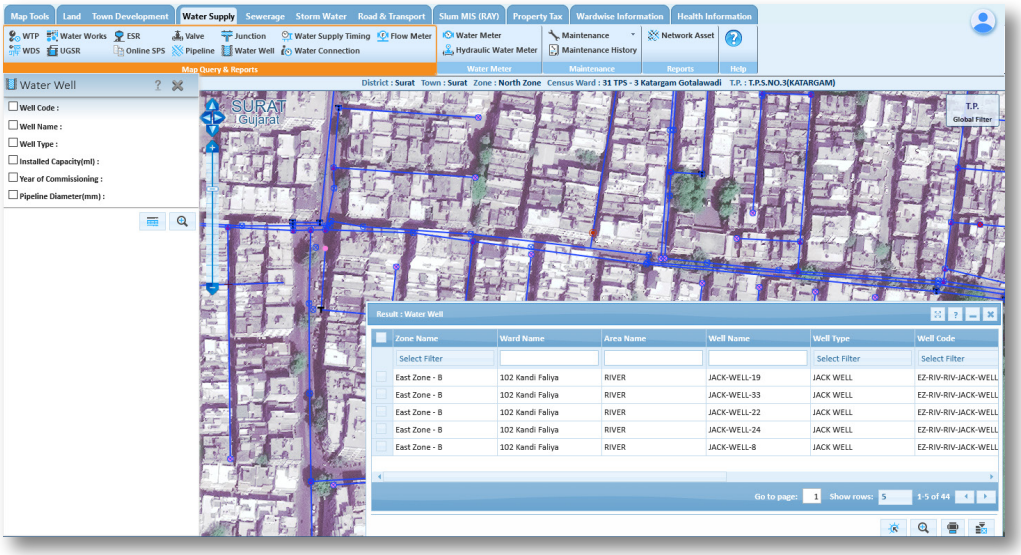
Water Resource Mapping

IGiS facilitates the creation of comprehensive maps and spatial databases for water resources such as rivers, lakes, reservoirs etc. In addition, it provides potent water indices, advanced change detection and segmentation tools that enables extraction of the water bodies directly from satellite imageries. IGiS based solution provides effective tool for monitoring irrigated land across various locations and climatic conditions. It quantifies the rate of irrigation expansion and associated irrigation water consumption. This information can be used to initiate decisive irrigation management programs based on the available water resources.



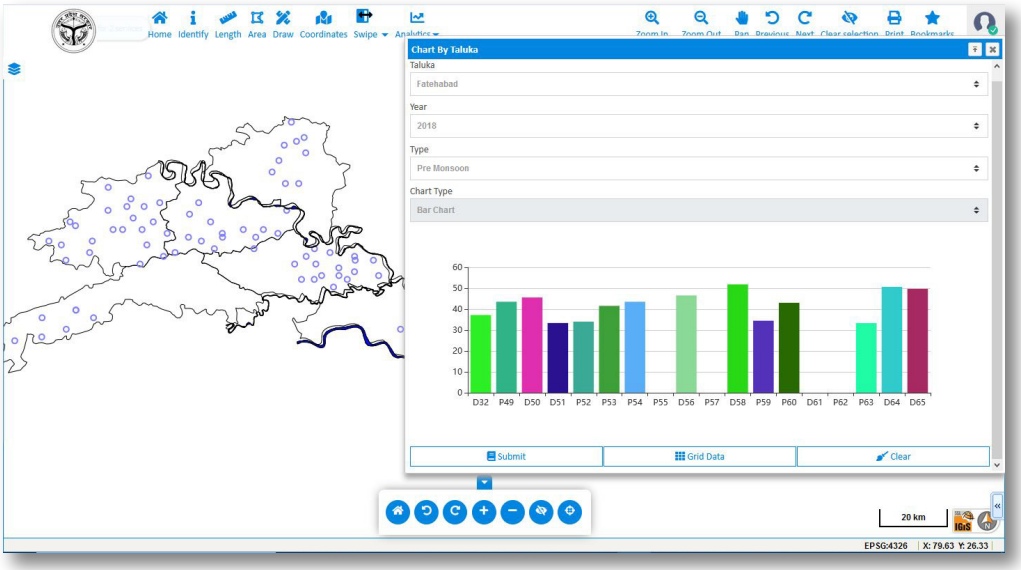
Irrigation Planning and Designing

Effective water management in irrigated fields is essential for global water resource management and competitiveness. To reduce significant water losses from over-exploitation of water resources, various cost-effective and efficient methods are required. The integration of GIS and GPS based wireless technology and sensors in IGiS can result in an unprecedented water management. IGiS tools aims at precise application of the right amount of water at the right time, location, and quantity. It also streamlines the spatial datasets for effective decision-making.



Water Quality Management

Continuous monitoring of water quality is imperative to prevent any future catastrophic event that could negatively impact the quality and quantity of water resources. GIS has proven to be a valuable tool for monitoring and analysing data and has become an essential aspect of water quality management. IGiS platform is built on SOA architecture, therefore it provides flexibility to integrate IoT sensors. By using sensor information in real time / Near to real time, IGiS provides solution for mapping, tracking and monitoring the quality of water used for irrigation. User can also identify potential sources of water contamination. It can provide information related to the impact of irrigation in downstream water pressure / leakage etc. for better water quality management.



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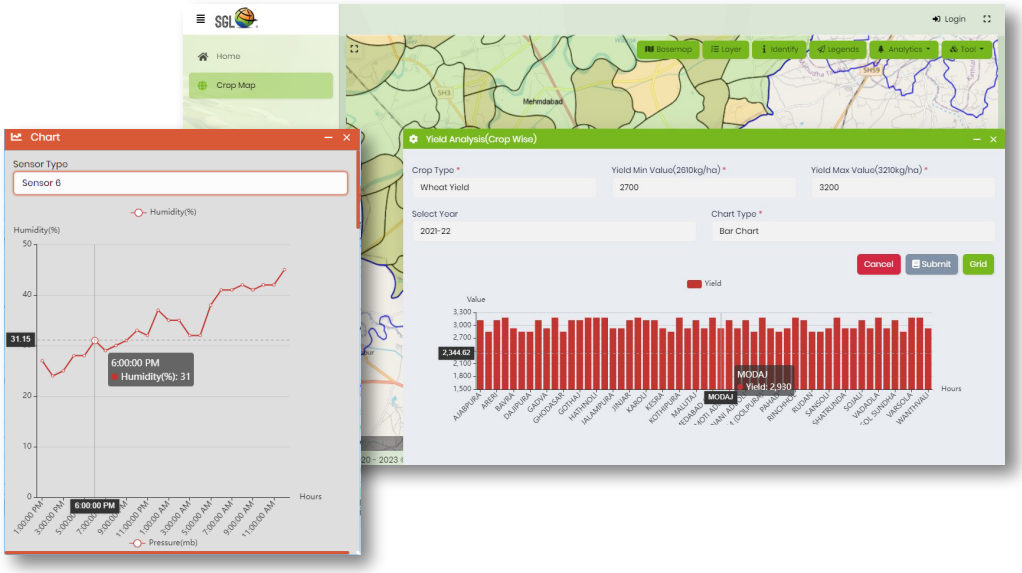
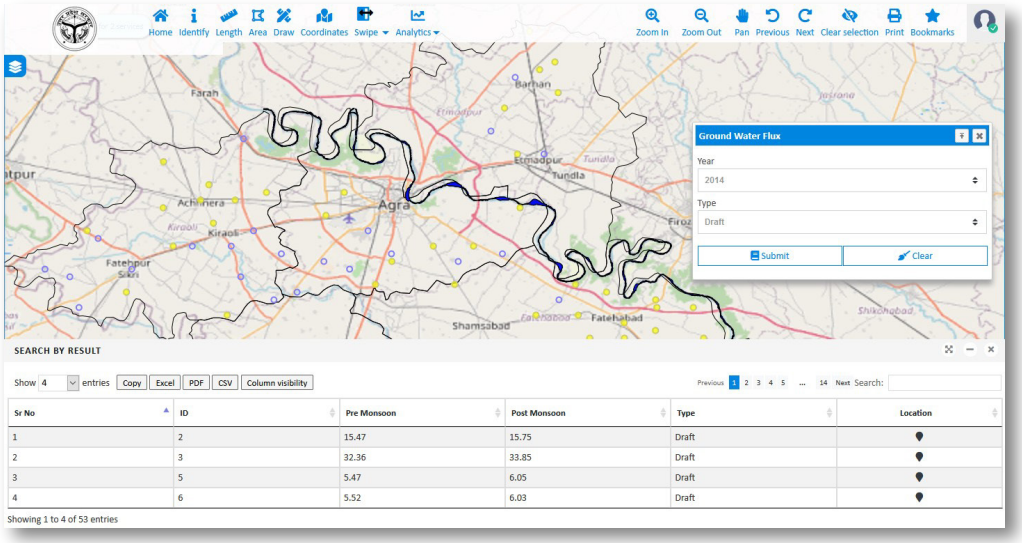
Real-time Monitoring and Decision Support

In addition to generating and analysing data from remote sensing, IGiS has the capability to incorporate real-time information from sensors and IoT devices. This enables the ongoing monitoring of soil moisture, water flow, and weather conditions. This approach, based on data, facilitates rapid decision-making and adaptable irrigation management.



Visualisation and Reporting

IGiS provides a range of effective visualization tools that display complex irrigation data in accessible formats like maps, charts, and reports. The presentation of data and information in a graphical or pictorial format, as opposed to traditional reports, facilitates a better understanding of the content. This aids in conveying essential information to stakeholders.



CONCLUSION

In summary, the integration of GIS and Remote Sensing technology in irrigation enables stakeholders to achieve efficient water usage, increase crop productivity, and establish sustainable management practices for improved irrigation management. Organizations can adopt IGiS technology to create data, perform different analyses, and achieve their goals.

ABOUT

Scanpoint Geomatics Limited

Scanpoint Geomatics Ltd. is the leader in the Indian Geomatics Industry. We pioneer the nation's geospatial domain through IGiS. An indigenous technology that brings GIS, Image Processing, and Photogrammetry together on the same platform under the Make in India Initiative. We are proud of our partnership with the Indian Space Research Organisation (ISRO). With an innovative approach and over two decades of rigorous research and development, the duo developed the IGiS platform. Backed by ISRO's domain expertise, we aim to push forth innovation and uplift the global geospatial domain.

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