INTEGRATED LAND MANAGEMENT INFORMATION SYSTEM

Enhancing Land Governance with
Digital Integration and Transparency

Streamlining land records for transparency and efficient governance with Digital land management for secure and accessible property rights

Introduction

Land Management Information Systems (LMIS) are digital platforms that integrate, store, analyze, and display land-related data to support decision-making in land administration. These systems serve as critical infrastructure for governments and organizations managing land resources, combining geographic information systems, database management, and specialized tools for property registration and spatial planning. Land banks complement these systems as institutional mechanisms that acquire, hold, manage, and redevelop vacant, abandoned, or foreclosed properties. They act as intermediaries to convert problematic properties into productive use, addressing issues of urban decay and rural land abandonment.

Approximately 70% of land rights remain undocumented, affecting an estimated 2 billion people. The World Bank estimates that only 30% of the world's land is formally registered with a clear legal title. In developing nations, this figure drops to as low as 10%. Land banks manage over 250,000 parcels in the United States alone, while the European Land Bank Association oversees more than 175,000 hectares across the continent. In China, rural land banks have consolidated over 3 million hectares of agricultural land since 2008. As urbanization accelerates, with 68% of the global population projected to live in urban areas by 2050, these systems will become increasingly vital for sustainable land management and development.

The Need for Land Management Information Systems

Land Management Information Systems (LMIS) have become essential in an increasingly urbanized and digitally connected world. These sophisticated systems respond to the critical need for transparent, efficient, and comprehensive land management by transforming fragmented, paper-based records into dynamic, accessible digital platforms. By integrating geospatial technologies, database management, and advanced analytics, LMIS provides comprehensive solutions that overcome traditional limitations in land governance.

The primary imperative for implementing such systems lies in their ability to resolve long-standing issues of land documentation, ownership verification, and property administration. They enable real-time tracking of land parcels, facilitate accurate boundary delineation, and create robust mechanisms for preventing encroachment and resolving disputes. Moreover, LMIS supports economic development by providing precise and verifiable land records that enhance investment confidence, streamline property transactions, and facilitate effective urban and rural planning.

For organizations like the Shree Jagannath Temple Administration, these systems represent more than technological upgrades—they are strategic tools for preserving institutional memory, protecting assets, and generating potential revenue streams. By digitizing historical records and creating comprehensive land inventories, LMIS transforms complex land management challenges into opportunities for transparent, data-driven decision-making, ultimately contributing to more sustainable and efficient land governance.

Challenges

Data integrity and integration - Ensuring accurate, complete, and consistent data across multiple sources and legacy systems while maintaining historical records alongside current information.

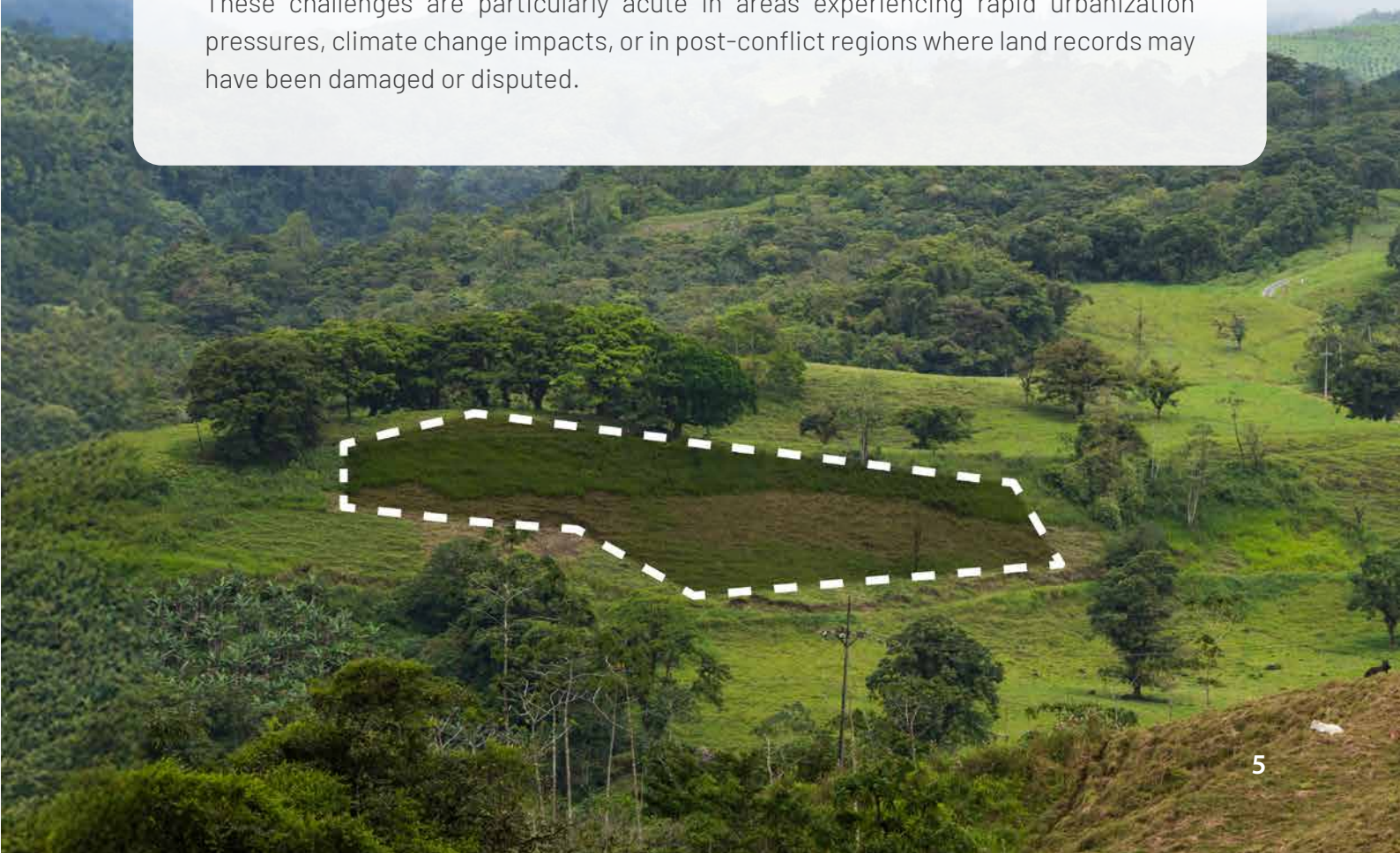
Legal framework complexities - Navigating diverse land tenure systems, property rights definitions, and regulatory environments that vary significantly across regions and countries.

Technical infrastructure limitations - Addressing insufficient hardware, software, network capabilities, and technical expertise, particularly in rural or developing regions.

Representation of informal land rights - Properly documenting and incorporating customary, indigenous, and informal land tenure arrangements that fall outside formal legal frameworks.

Resource constraints - Managing limited funding for system development, maintenance, and operation while balancing competing priorities for land administration resources.

These challenges are particularly acute in areas experiencing rapid urbanization pressures, climate change impacts, or in post-conflict regions where land records may have been damaged or disputed.



Features & Benefits

Centralized Digital Repository:

The Centralized Digital Repository is a data warehouse containing a comprehensive list of all digitized documents, including temple details and land transactions.

Correct and Updated Info:

The application enables users with administrative privileges to verify the accuracy of data collected from various sources, update it in a timely manner, and maintain its originality and uniqueness. The provided data includes details of land and sales, land ownership, transactions, and land use types. The administrative team verifies and maintains the authenticity of the land information daily, and general citizens can review the preserved data details.

Improved Accessibility:

The system allows role-based accessibility for easy and secure access. This accessibility ensures that users only have access to the information and functionalities necessary for their specific roles. This approach simplifies the user experience by presenting only relevant options and enhances security by restricting access to sensitive data and critical functions. The secure authentication process ensures that only authorized users can access the system and perform actions by their designated roles. This process involves three levels of validation and authorization.

Land Transaction Processes:

This encompasses the purchase, sale, or leasing of land, and it is crucial to ensure the landholder holds a secure title to minimize risk. Restricting land transactions can also limit credit availability and may lead to informal transactions, which further complicate the process of establishing the actual landowner.

Transparency and Accountability:

Transparency is the cornerstone of our commitment to precise data and comprehensive views. It ensures that all documents and data uploaded into our application are held with utmost clarity and openness.

Accountability measures further bolster our dedication to ethical data practices. By adhering to strict moral standards, we ensure that every piece of information is handled responsibly.

Historical Data Preservation:

Preserving historical data involves safeguarding all information related to the assets of the Lord Jagannath temple that has been gathered and stored over time. This can include records, documents, images, videos, and databases.

Efficient Record Management:

This controls the entire lifecycle of the data/ records stored, from the moment they are created through their final disposition.

Collaboration and Integration:

These are essential to efficient record management. The application offers a digital platform for collaborating on information gathered from various sources.

Case Snippet: Shree Jami

About

The temple of Lord Jagannath at Puri is a significant religious shrine of national importance in Odisha, where millions of devotees donate land and property to Lord Jagannath.

However, the managing committee of the Shree Jagannath Temple Administration (SJTA) has expressed concern over the disorganized land records and suggested developing a Web- and mobile-based GIS application to integrate all databases and geographically represent Lord Shree Jagannath's landed properties. The total landed property of Lord Shree Jagannath spans more than 3,000 villages across 20 districts in 107 Tehsils of Odisha, which needs to be digitized, certified, and integrated into a web-GIS platform.

Challenges

The Shree Jagannath Temple Administration (SJTA) in Odisha faced several significant challenges in managing temple lands before implementing a comprehensive Land Management Information System:

- Fragmented and dispersed record-keeping across multiple formats (paper and partial digital) and government departments, with historical documents dating back centuries in traditional scripts, creating significant information silos and administrative bottlenecks.
- The absence of a centralized database and proper spatial records for tracking ownership, boundaries, and legal status of temple lands makes it difficult to monitor and reclaim encroached properties.
- Inadequate surveying, mapping, and documentation of temple properties led to unresolved boundary disputes and encroachment issues due to poor evidence management.
- Limited capacity to generate revenue from temple lands due to poor inventory management and lease tracking systems, coupled with delays in processing land transactions.
- Insufficient technological infrastructure and skilled personnel to implement modern land management practices, alongside inadequate mechanisms for regularly updating land records when changes in ownership, use, or value occur.

These challenges severely hampered SJTA's ability to manage its extensive land holdings effectively, resulting in potential revenue losses and difficulties in fulfilling its administrative responsibilities.

Solution

The Shree Jagannath Temple Administration (SJTA) manages all assembled landed properties for proper record-keeping, utilization, and revenue generation through land leases, land sales, and transfers. Besides, many landed properties are used under shared cultivation, generating revenue (Rajbhag Collection) for the temple administration. The land administration aims to promote transparency and disseminate land information to the public, thereby maintaining trust. The Managing Committee of Shree Jagannath Temple suggested developing a Web and Mobile-based GIS Application software to integrate all Land Records and related documents of Shree Jagannath Temple, facilitating the dissemination of map-based information on landed properties in the form of a Land bank. The information facilitated through the developed system can be utilized by the SJTA authorities for improved management and decision-making, aiming to optimize the utilization of available landed properties and track revenue generation and land transactions.

In the Shree JAMI application, citizens identify the land pending under the SJTA and then self-register for the allotment process. In the web application, citizens can view the plots available in the SJTA land bank, which allows registered users to apply for land purchase. Later, the SJTA Authority will evaluate the land application form and submit the verification report and information on land valuation. The citizen must pay the application fees after the SJTA authority has completed all the verification processes. At the end of the payment process, SJTA has the authority to allot the land to the applicant.

Technology Stack

Web Application

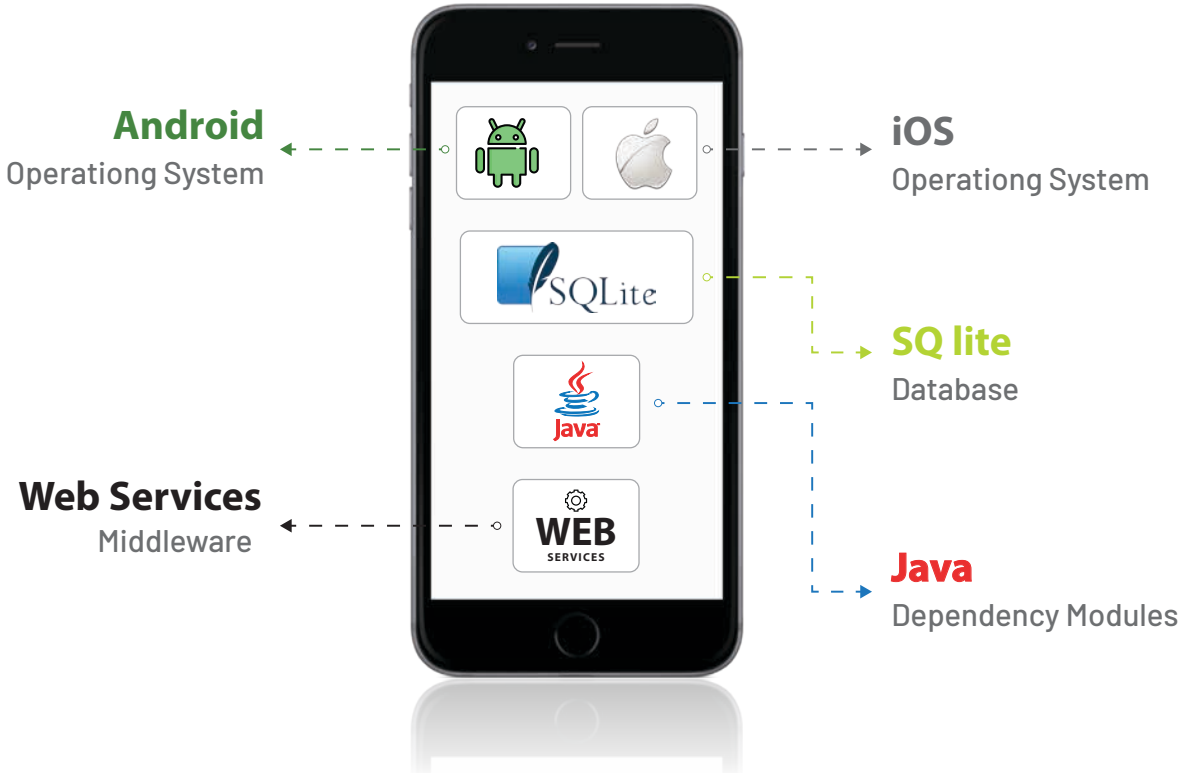
Operating System (Linux)

Database Server

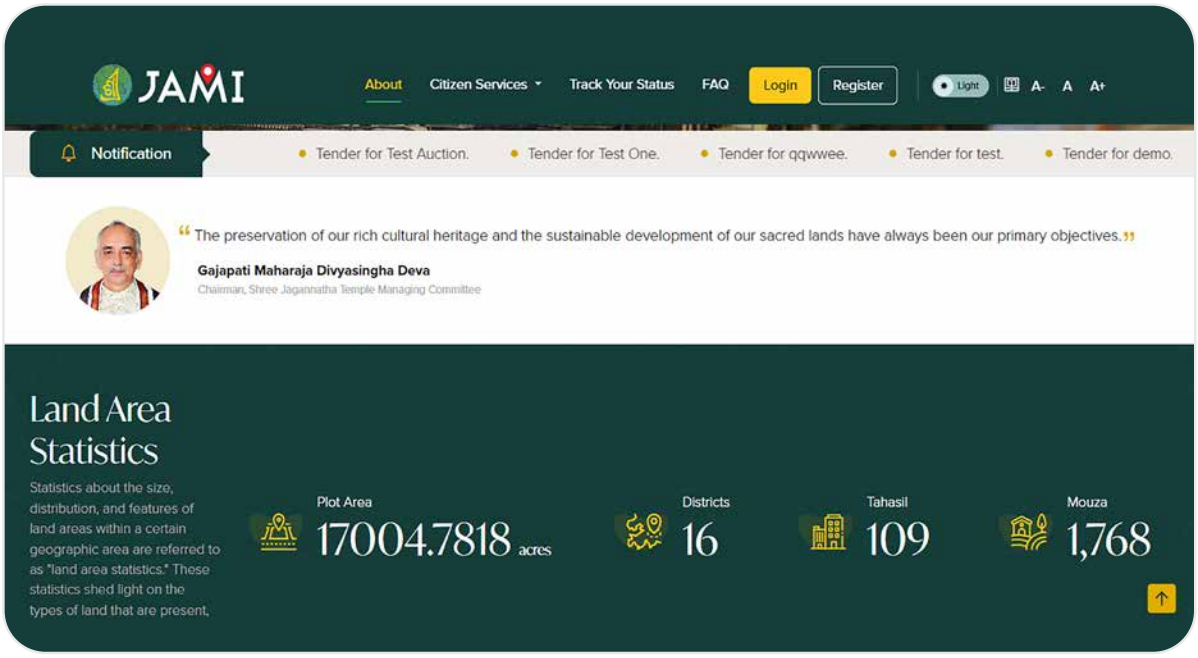
Web Server

Platform/Language

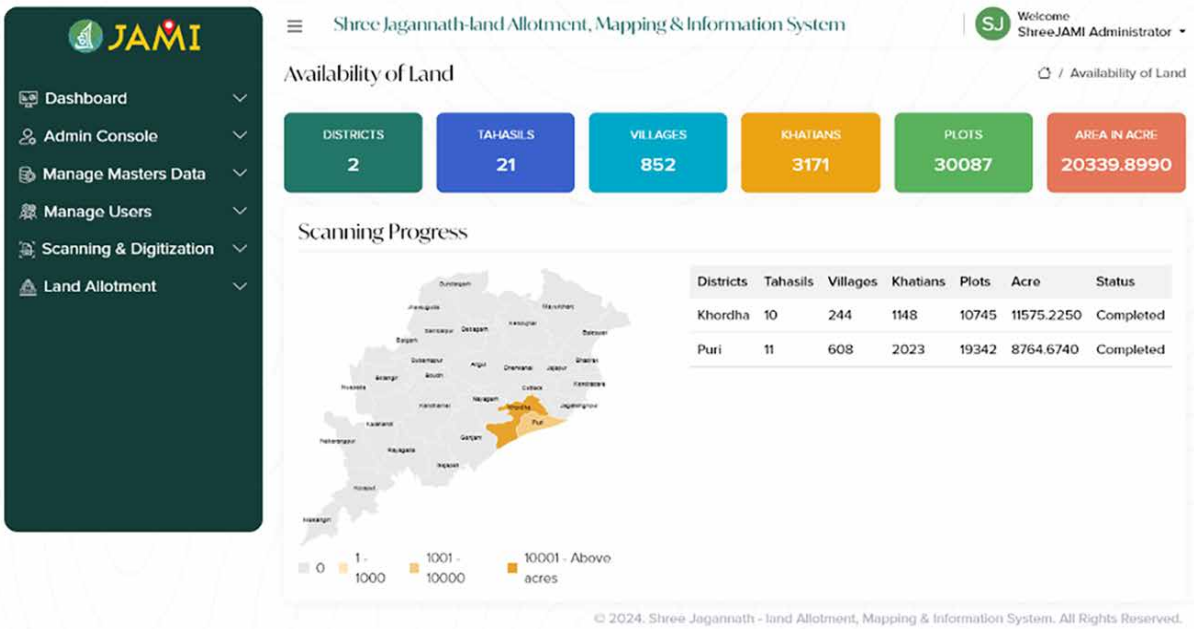
Mobile Application



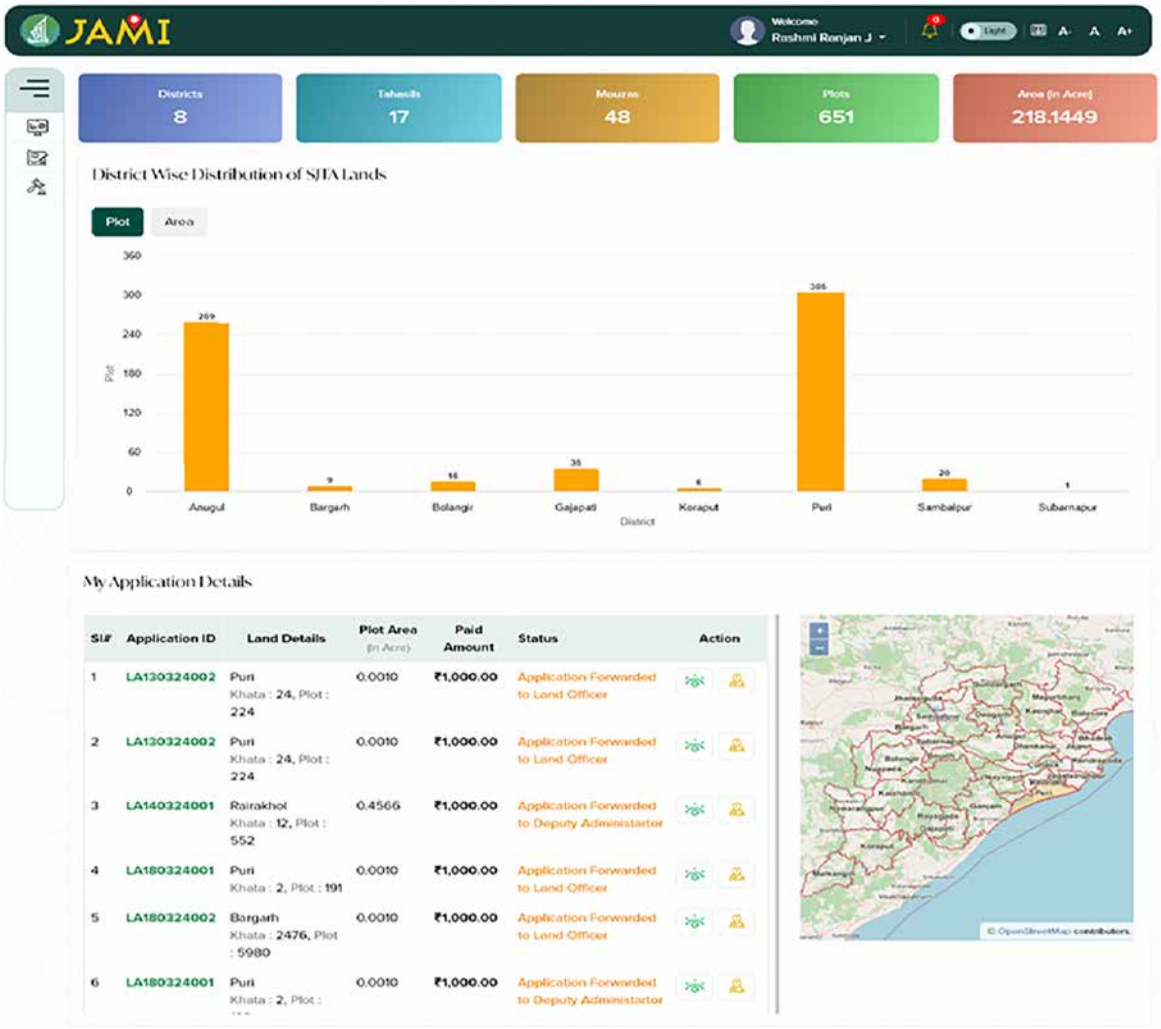
Dashboards



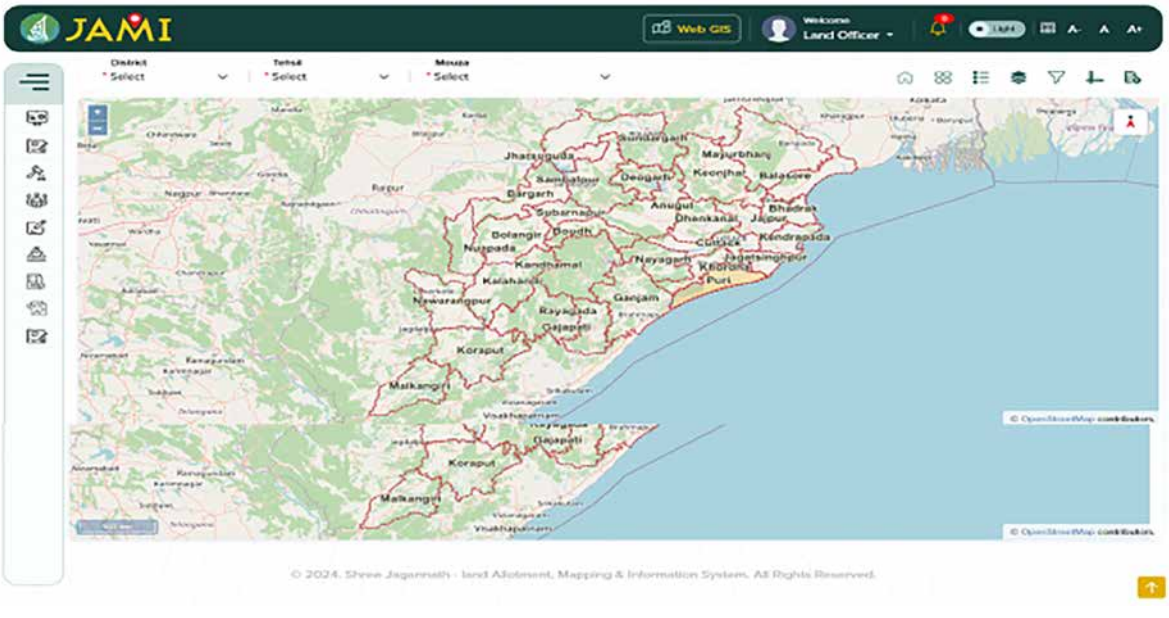
Admin Dashboard



Citizen Dashboard



Web GIS



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