

Geo Land Information System (GLIS)

Enterprise Web-GIS for Land Administration

GLIS is a registered, enterprise-grade Web-GIS platform for land administration, cadastral management, and revenue operations. Designed for government departments—including Revenue, Municipal Authorities, and Urban Planning agencies—GLIS integrates spatial and non-spatial data to support end-to-end land record digitization, parcel management, mutation processing, and decision support.

As a core component of LRMIS, GLIS modernizes traditional workflows, reduces manual intervention, enhances transparency, and minimizes land disputes across Pakistan.

GLIS is a registered proprietary software product of SSBACHA TECHNOLOGIES Pvt. Ltd. All intellectual property rights, source code, architecture, and workflows are fully reserved. Unauthorized reproduction, modification, or distribution is strictly prohibited without formal written authorization from ssbacha.net.

CORE FUNCTIONAL CAPABILITIES

Role-Based Access Control (RBAC)

A robust Role-Based Access Control (RBAC) framework ensures secure user authentication and authorization. Configurable roles (Administrator, Editor, Viewer) define permissions for viewing, editing, exporting, and approving data, ensuring compliance with government data governance and security policies. Allows saving complete project working environments, similar to ArcGIS MXD files, including layers, symbology, and configurations.

Map Viewer and Advanced Editor

GLIS provides a high-performance, browser-based map viewer and editor supporting point, line, and polygon geometries. Users can digitize, edit, and validate spatial features directly within the web interface. The module supports creation and export of GeoJSON, KML, Shapefile formats, along with specialized handling of Massavi (village sketch) maps for urban and rural revenue estates. The interface is fully mobile-responsive, enabling field staff to access maps on tablets and smartphones.

File Import, Export, and Overlay

GLIS supports seamless import, editing, and visualization of Shapefiles, KML, GeoJSON, and GDB-derived layers as well as GLB file. Users can overlay multiple datasets with adjustable opacity on base maps to support comparative visualization, verification, and spatial analysis. GLIS also support GLB file format.

Tatima Cut (Parcel subdivision boundary) Module

The Tatima (Parcel/polygon) Cut module enables precise digital subdivision of land parcels based on ownership shares, inheritance rules, and approved mutation records. Parcel boundaries are automatically recalculated with built-in topology validation, ensuring spatial accuracy and maintaining a complete audit trail for legal verification.

Georeferencing Support

The Map Viewer and GIS Editor allow users to georeferenced raster images, enabling alignment of scanned maps and historical revenue sketches with real-world coordinates.

Thematic Mapping

Professional map styling and thematic mapping tools enable users to visualize spatial data patterns based on attributes such as land use, ownership type, or revenue classification.

Mouza Index Grid Generator

GLIS includes an advanced Mouza Index Grid Generator designed to standardize spatial referencing within revenue estates (mouzas). This module automatically generates structured index grids over mouza boundaries using configurable measurement systems, enabling efficient parcel identification and navigation.

Key capabilities include:

- Automated grid generation with customizable cell sizes (metric, traditional Karam units)
- Intelligent clipping of grids to mouza administrative boundaries
- Systematic alphanumeric or numeric grid labelling (e.g., A1, B2, C3)
- Export of generated grids as GeoJSON or Shapefile or KML

This functionality significantly improves spatial indexing, field survey coordination, and massvie map.

Printing, Measurement, and Map Output

GLIS includes built-in map printing capabilities allowing users to generate standardized layouts with legends, scale bars, and north arrows. Interactive measurement tools enable accurate real-time calculation of distances, areas, and perimeters.

Customizable Layout Designer

Beyond standard printing, GLIS includes a Layout Designer that allows users to create custom map layouts with flexible arrangements of legends, scale bars, north arrows, title blocks, and other cartographic elements, according to user own template and size.

Enhanced Fard and Khasra Document Generation

The Fard and Khasra Document Generation Module is an automated, legally compliant system for producing official land ownership and parcel documentation. The module retrieves verified spatial and attribute data directly from the central geodatabase and generates printable, revenue PDF documents with embedded cadastral maps and parcel geometry.

Key capabilities include:

- Read-only backend API integration with the existing CLRMIS to ensure data authenticity and system interoperability
- Hierarchical search workflow enabling users to locate land records by: [District](#) → [Tehsil](#) → [Patwar Circle](#) → [Mauza](#) → [Khasra Number](#)
- Automatic visualization of the selected Khasra parcel on the map upon search completion
- Interactive parcel selection to initiate Fard preparation with embedded Khasra and Karam boundary dimensions.
- Secure generation of standardized Fard documents with parcel boundary, ownership details, and official revenue formatting

This module significantly reduces processing time, eliminates manual errors, and ensures consistency between spatial data and land records in SDC or ARC or Saholat Canters.

Multilingual Interface & Customizable Settings

GLIS provides a multilingual user interface with flexible settings that can be tailored to meet specific organizational and departmental needs.

GLIS Converter

The GLIS Converter is an integrated geodatabase ingestion and conversion engine capable of reading Esri File Geodatabases (GDB) directly. It supports conversion of GDB feature classes into Shapefile, GeoJSON, and KML formats without the need for external software.

This capability allows GLIS to operate as a self-sufficient GIS platform, ensuring data consistency, reducing dependency on third-party tools, and simplifying data onboarding workflows.

Table Management

GLIS provides an interactive data table with Query Builder, Join Sheet, and Export tools for flexible data filtering and extraction. Users can Add Conditions to refine records and Select Results on Map to instantly highlight corresponding spatial features.

GLIS Language Support

GLIS includes a province-level multilingual framework designed to ensure inclusivity and accessibility across diverse linguistic regions. All system components—including menus, forms, tools, labels, and messages—are fully localized, enabling government officials and field staff to operate the platform in their preferred regional languages with clarity and confidence.

Symbolization, Labelling, and Layer Saving

GLIS features an advanced symbolization and labelling engine that enables professional cartographic styling of spatial layers in accordance with standardized mapping conventions. The system supports comprehensive visual classification of cadastral and topographic features through an intuitive interface, allowing users to apply consistent and interpretable symbology across diverse datasets.

The platform includes a rich Design Pattern Library with predefined styles features:

- Hierarchical representation using differentiated line styles, colours, and widths
- Specialized fill patterns and styles for rivers, canals, lakes, and drainage networks
- Texture and colour schemes for terrain, land use classification, and cadastral categories

This capability enables effective visual differentiation of parcel types—such as urban versus rural classifications—and supports clear representation of land-use attributes for decision-making and official mapping outputs.

Saving Symbolized Layers

GLIS supports persistent storage of symbology and labelling rules. Any styled layer—along with its cartographic configuration—can be saved as a reusable layer in the backend PostgreSQL/PostGIS database. This enables:

- Consistent visualization across sessions and users
- Reuse of standardized symbology for official mapping outputs
- Centralized management of cartographic styles for all spatial layers

Collaborative Workspace Management and Sharing

The GLIS Workspace Management System supports functions similar to ArcGIS MXD files, enabling the sharing of spatial data layers and complete workspaces among team members within the GLIS platform, facilitating collaboration across departments.

Users can create multiple project-based workspaces and share standardized workspace templates across departments. This reduces repetitive setup and ensures consistency.

3D Visualization & Analysis Capabilities

GLIS includes integrated 3D geospatial visualization and analysis tools to support urban planning, land administration, and infrastructure development.

Core 3D capabilities include:

- 3D visualization of land parcels with ownership attributes
- Building height and urban density analysis
- Terrain, slope, and elevation modelling
- Hydrology and drainage flow analysis

The 3D engine enables immersive spatial analysis, allowing decision-makers to evaluate development scenarios, infrastructure impact, and environmental risk with greater clarity and precision.

GLIS AI Assistant

GLIS includes an integrated, multilingual AI Assistant trained on an extensive GIS and land settlement knowledge base. It helps users understand complex GIS concepts, land settlement procedures, and revenue terminologies.

As a key innovation, the AI Assistant allows natural language, action-based interaction with the system. Users can perform GIS and cadastral operations by typing intuitive commands such as:

- “Select Khasra number 119” – instantly locates and highlights the parcel boundary.
- “Size of parcel” – provides the complete parcel/plot size in marla, jirab, acre, murabah, etc.
- “Apply symbology by landuse type” – automatically generates and applies color-coded symbology according to parcel classification.

This AI-driven interaction streamlines workflows, improves usability for non-technical users, and brings a new level of efficiency and intelligence to land administration processes.

Technology & Deployment Architecture

GLIS is developed using a modern, scalable, open-source technology stack and supports flexible deployment models to meet institutional requirements.

Deployment and architecture highlights:

- Web-based frontend with high-performance browser GIS tools
- PostgreSQL / PostGIS spatial database backend
- API-based integration with LRMIS / CLRMIS
- Support for containerized and on-premise deployments
- WebGL-based 3D rendering
- Scalable architecture suitable for provincial and national rollouts

This design ensures institutional data ownership, operational scalability, and compliance with government IT and data governance policies.

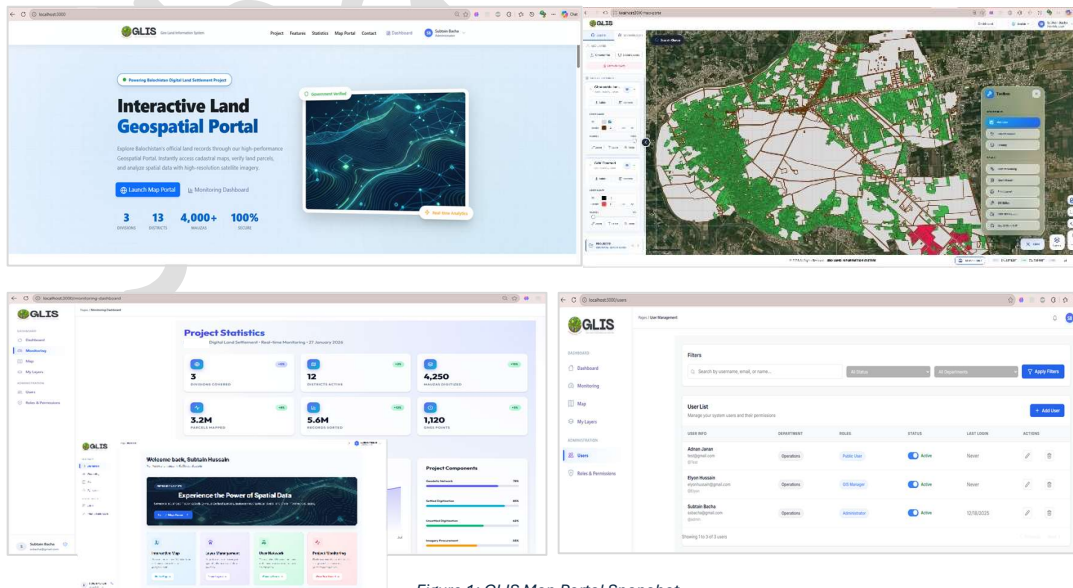


Figure 1: GLIS Map Portal Snapshot

Power of Spatial Data:

Leverage advanced mapping tools to visualize land parcels, manage geographical layers, and drive informed decisions.