Rural Land Titling
The Mozambique Experience

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COMMITTEE OF EXPERTS ON
GLOBAL GEOSPATIAL
INFORMATION MANAGEMENT

TERRA

Second United Nations World Geospatial Information Congress

TP7B - Supporting national priorities and the SDGs
Delivering national priorities and 2030 Agenda for Sustainable Development.

Terra brings broad experience and financial capabilities to improve land administration in emerging markets

Focus on innovation in decision making, by connecting and visualization of data using spatial technologies

Multidisciplinary capabilities that combine professionals, technology, and science in the domain of land, dealing with land administration, urban planning, property valuations and taxation, data collection, and mobile forms technologies

+ More than 25 years of experience with global presence in **Mozambique – South Africa – India**

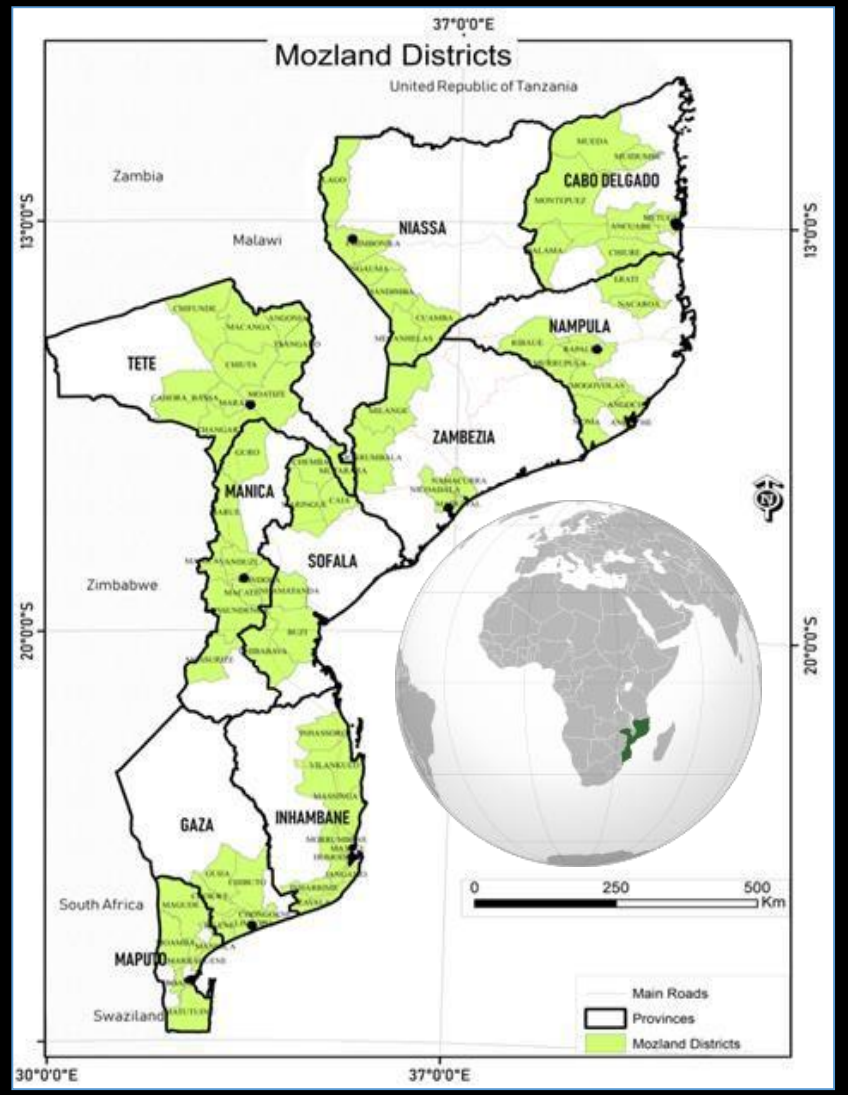
Finance large-scale impact-driven development projects that promote the UN Sustainable Development Goals (SDG's), with large finance company backing for multi-million dollar projects

Terra is currently implementing the **first phase of the land demarcation project "Mozambique Land Administration Project - Terra Segura"** under the World Bank operation

Mozambique

Independence • 1975	Country Area • 800, 000 km2	Coastline • 2500 km
Population • 31 million	GDP • $16 billion	GDP per Capita • $ 550
Rich in Natural Resources	Agriculture and Fisheries Sector main industry	Land is National asset

Title is based on lease with State – long term or perpetual rights



1 Capital

10 Provinces

154 Districts

405 Administrative Posts

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Terra Segura Land Program

Systematic programme	• more affordable • easier to implement • accessible to community	
Land size jurisdiction	• up to 1000 ha – provincial and local administration • up to 10,000 ha – Minister of Lands • over 10,000 ha – Council of Ministers (State)	
World Bank Funded Project	• 2 million titles • 40% women ownership/co-title • 1200 community delimitations and plans	
Geographic reach	• all 10 provinces, excluding any area covered by municipality • 71 Districts targeted	

Program Objectives

- Registration of Land Use Rights and issuance of 5 million DUATs in rural areas
- Mapping the entire territory at scales of 1:50,000 and 1: 25,000
- Establishment of a transparent national cadastral and land registry
- Creating awareness about the importance of acquiring DUATs
- Decentralization of the technical capacity for land management and administration to the districts
- Dissemination of rights and obligations to use and benefit from land among the local communities
- Land use optimization through the transfer of cultivation techniques to increase reproduction levels
- Democratization of land access respecting gender status
- Land tenure security

Geospatial Features

Land Information System

- Upgrade of SIGIT
- Land Repository of Titles
- Geospatial Enabled Database

Base Mapping

- 50cm orthorectified satellite imagery
- Digitisation of administrative and other boundaries
- Improve accuracy of field activities and parcel mapping

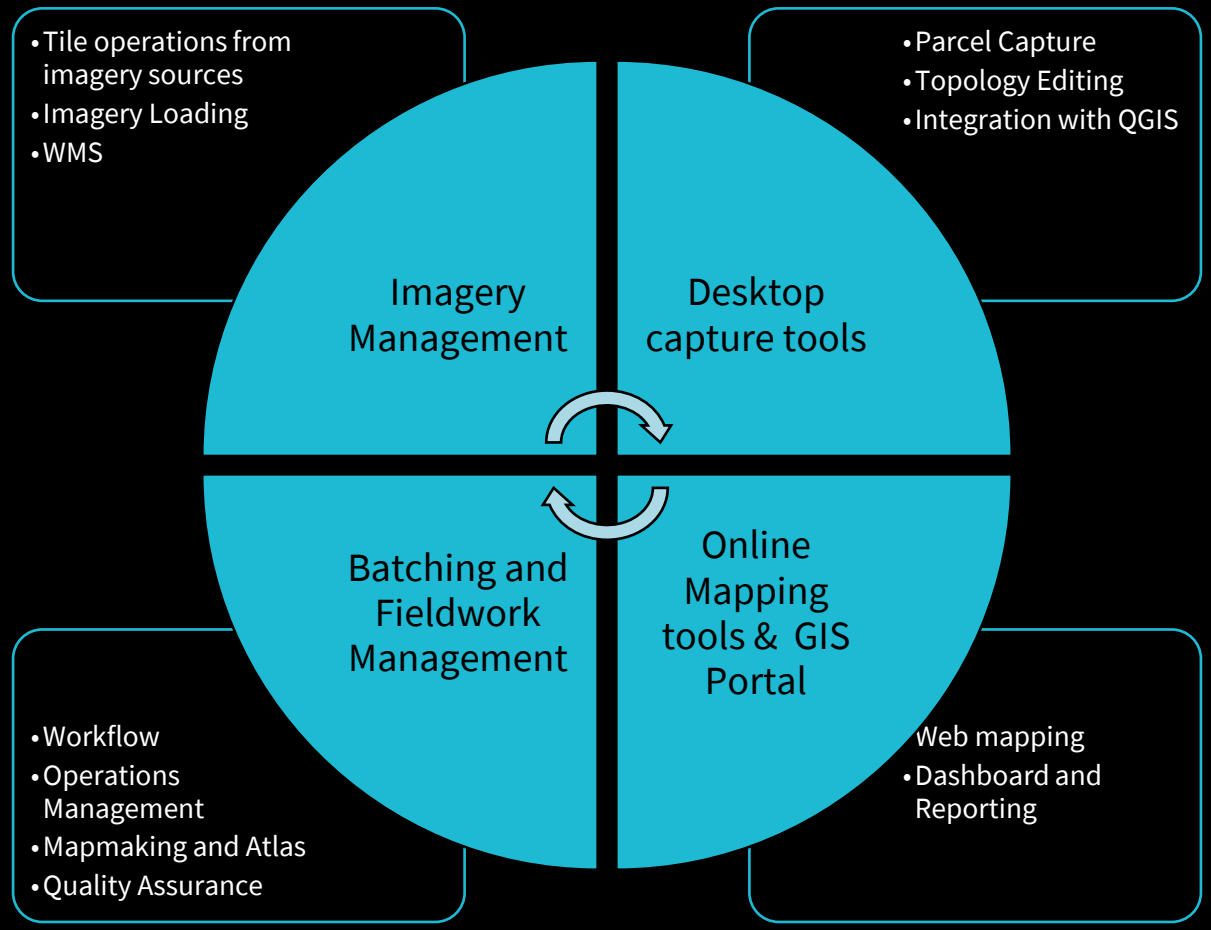
Geodetic Network

- CORS network from 11 to 22
- Add 200 geodetic marks (MOZNET)

Fit for Purpose Survey

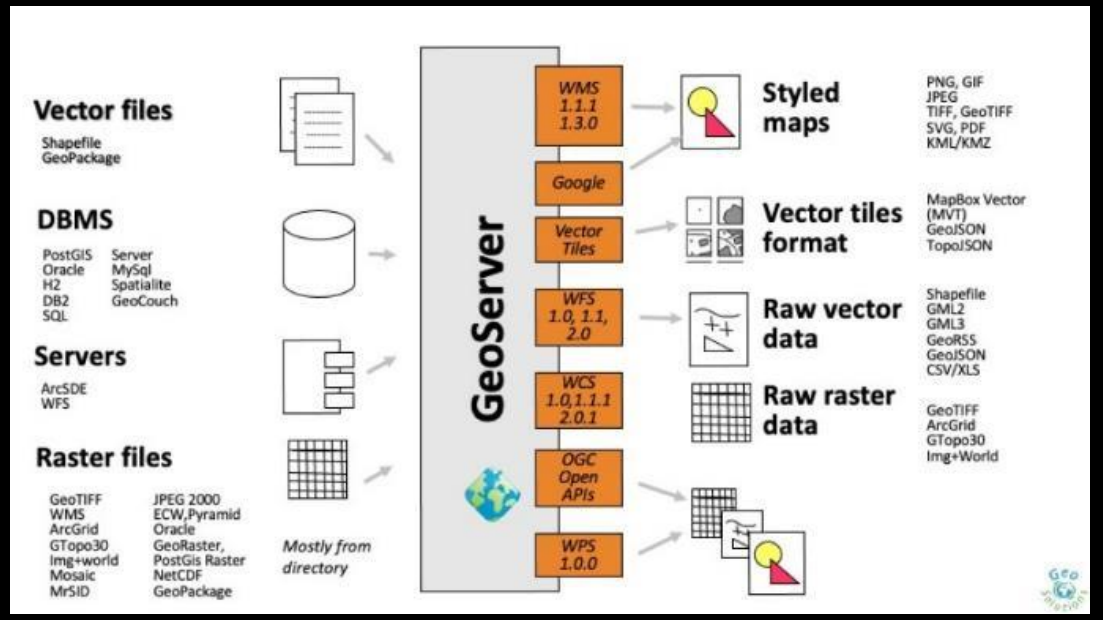
- Delimitation of Communities
- Demarcation for Land Titles
- GPS Enabled Mobile Mapping
- Land Use Planning

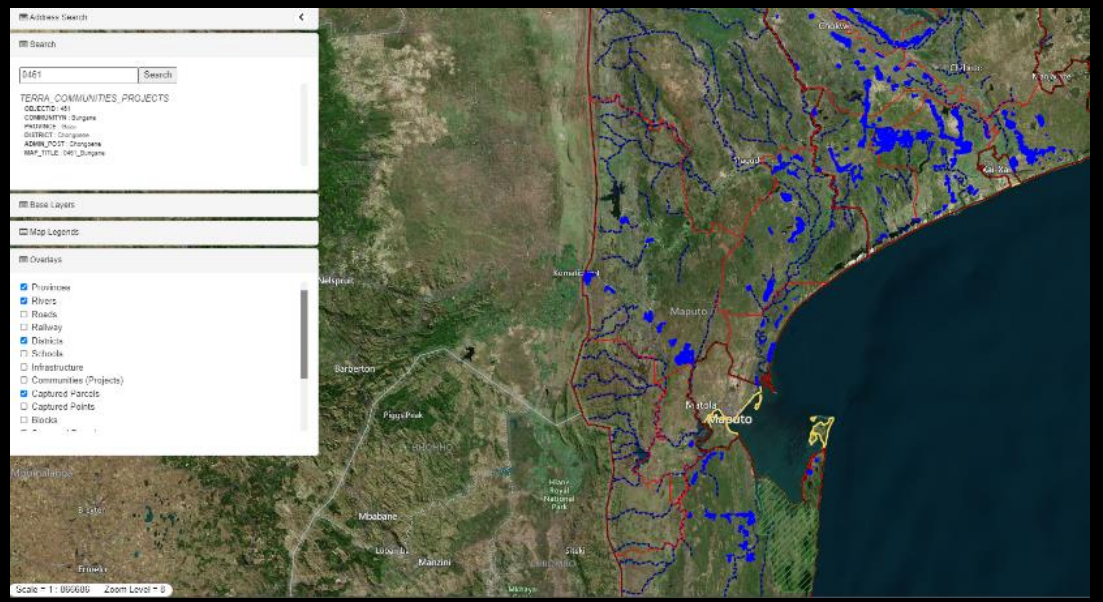
Mapping-based Utilities



Online GIS Portal

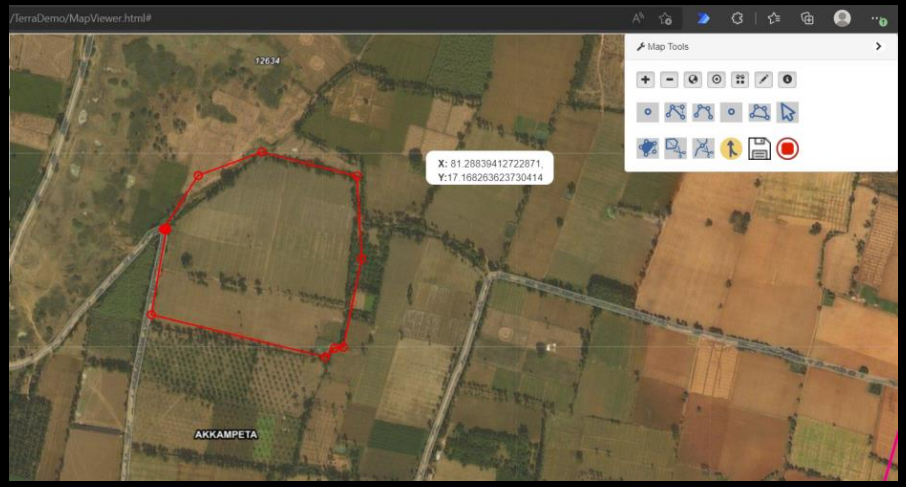
- Provides live GIS data available on any web browser device.
- Combines data from SQL Server, Geographic Information System (GeoServer,) and renders GIS datasets into tiles and sends it back to the requesting user.
- Uses Open Layers which is an open-source JavaScript library for displaying map data in web browsers. It provides an API for displaying rich web-based geographic applications.
- Easily accessible and quick navigation to desired area of interest.
- Various datasets can be overlayed to aid with decision making.



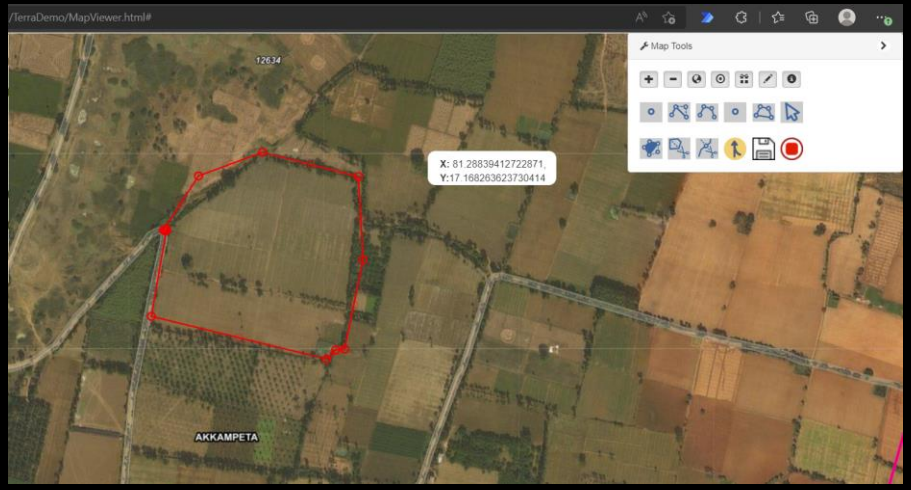


Online Mapping tools

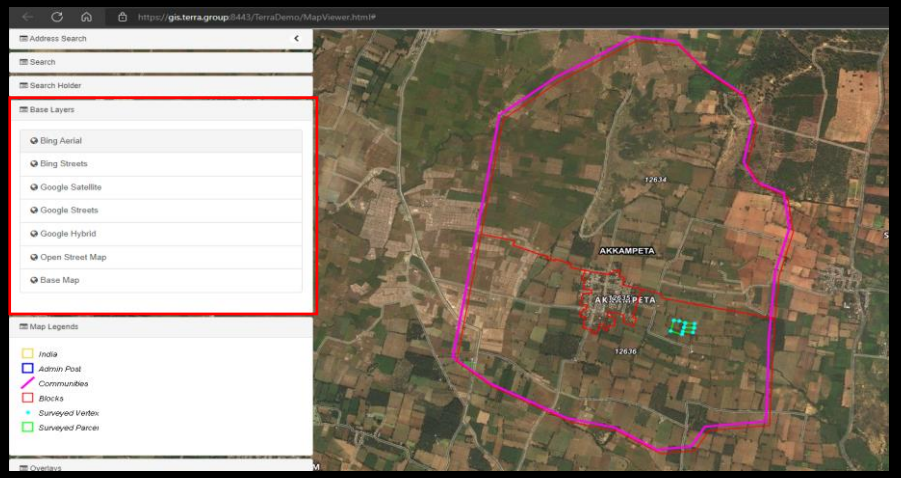
Capture Parcels



Editing Boundaries



Layer Management



Mobile GIS – Survey App

- GPS data capture
- Parcel Mapping and editing
- Beneficiary Recording
- Quality Assurance
- Data Synchronisation from Field when online

Android based for mobile/tablet devices

Render spatial data (GeoJSON)

Fully offline maps, Downloaded Imagery Map tiles

Integrated with offline topological editing tools

Integrated with GNSS antenna (eg Trimble DA1), including RTX services for Sub-meter measurement accuracy

Mobile App – Workflow GIS

View Community

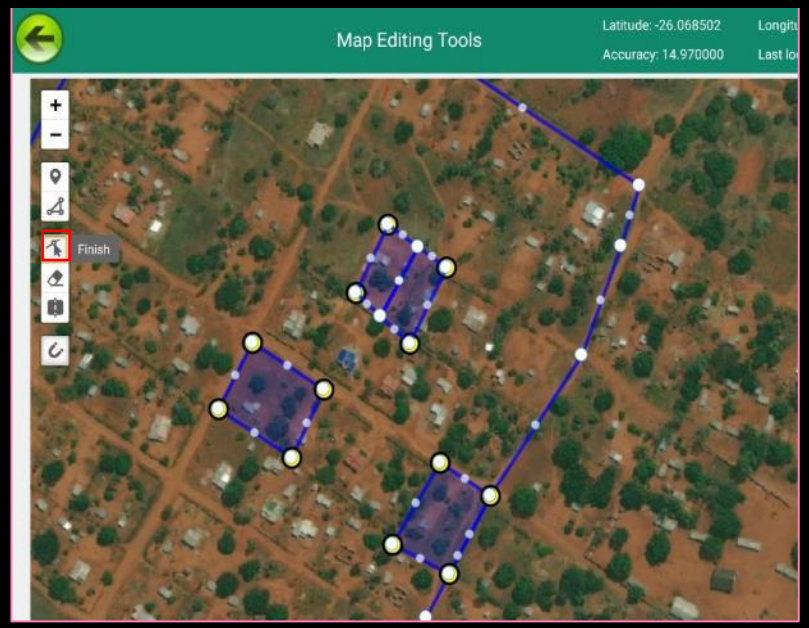
View assigned blocks

Capture/Survey Parcel

Mobile App - GIS Topology Functionality

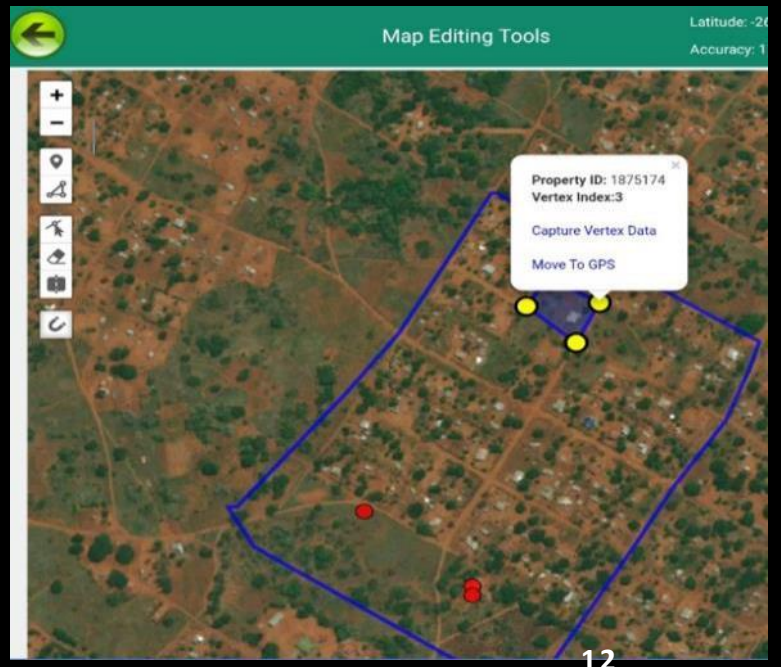
Enables users to drag/move vertex including common vertices on the map or using GPS from device

Activate the polygon vertexes.



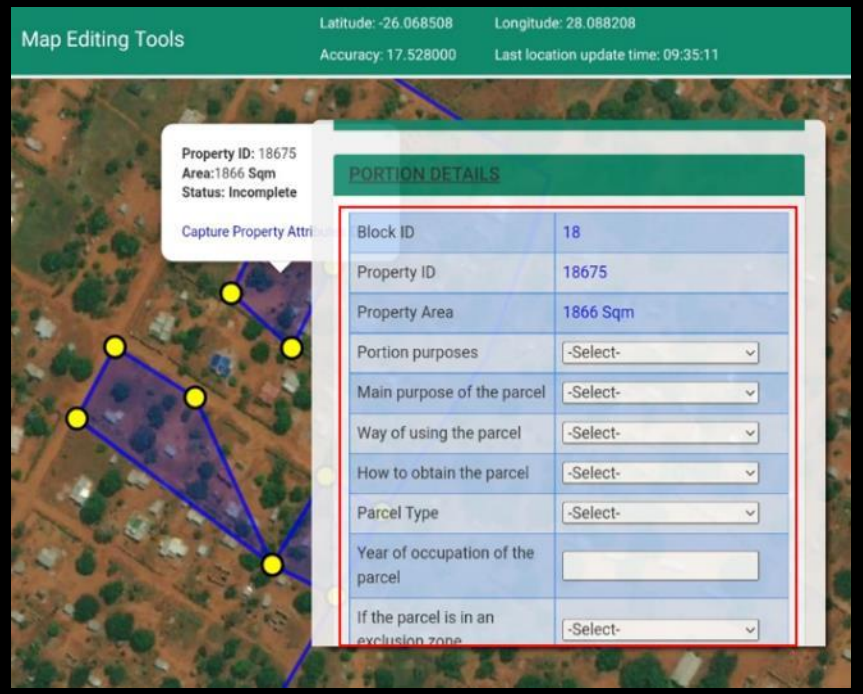
Adjusted polygon shape.

Move To GPS

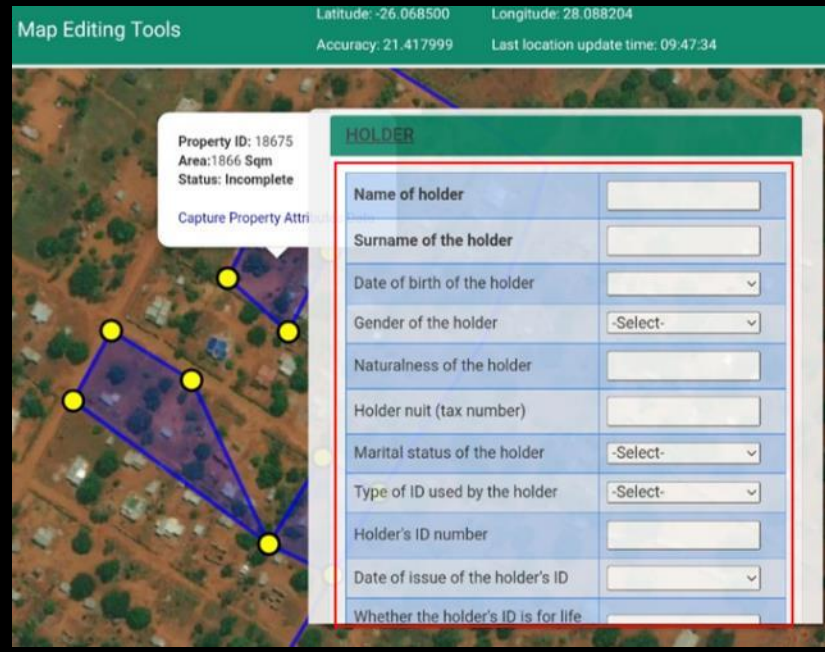


Mobile App – Beneficiary Listing

Complete the Portion details form

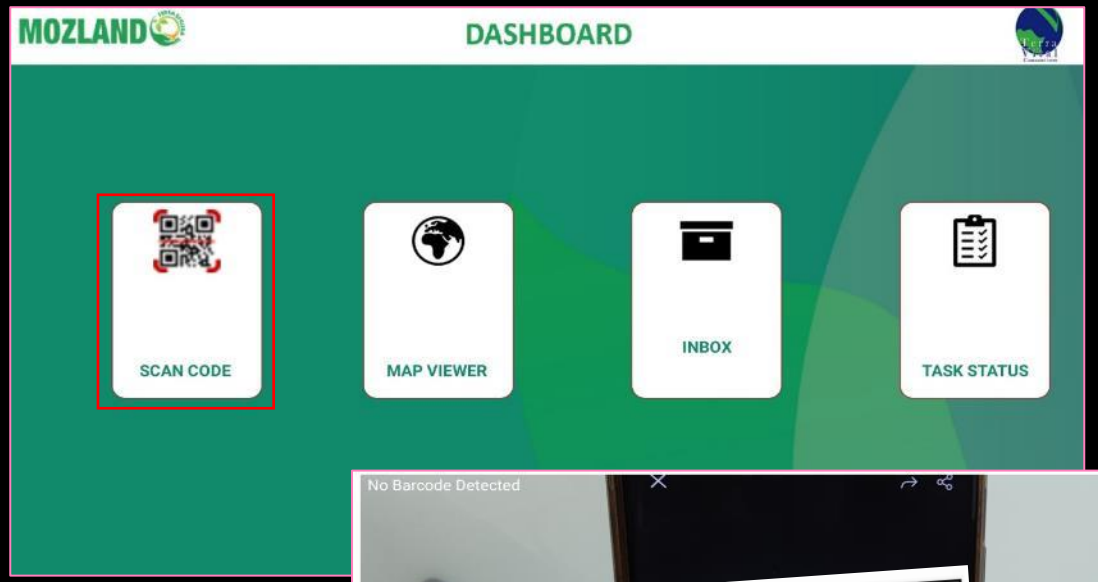


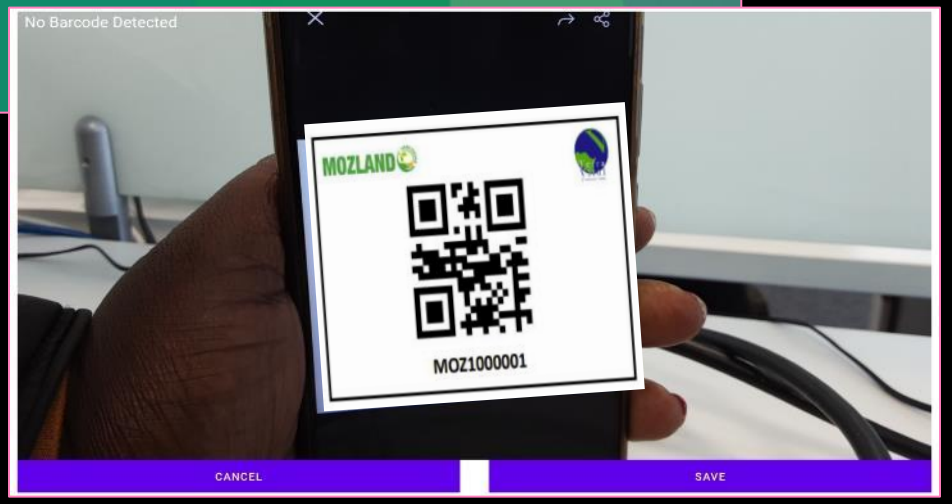
Complete the Holders details form



QR Code

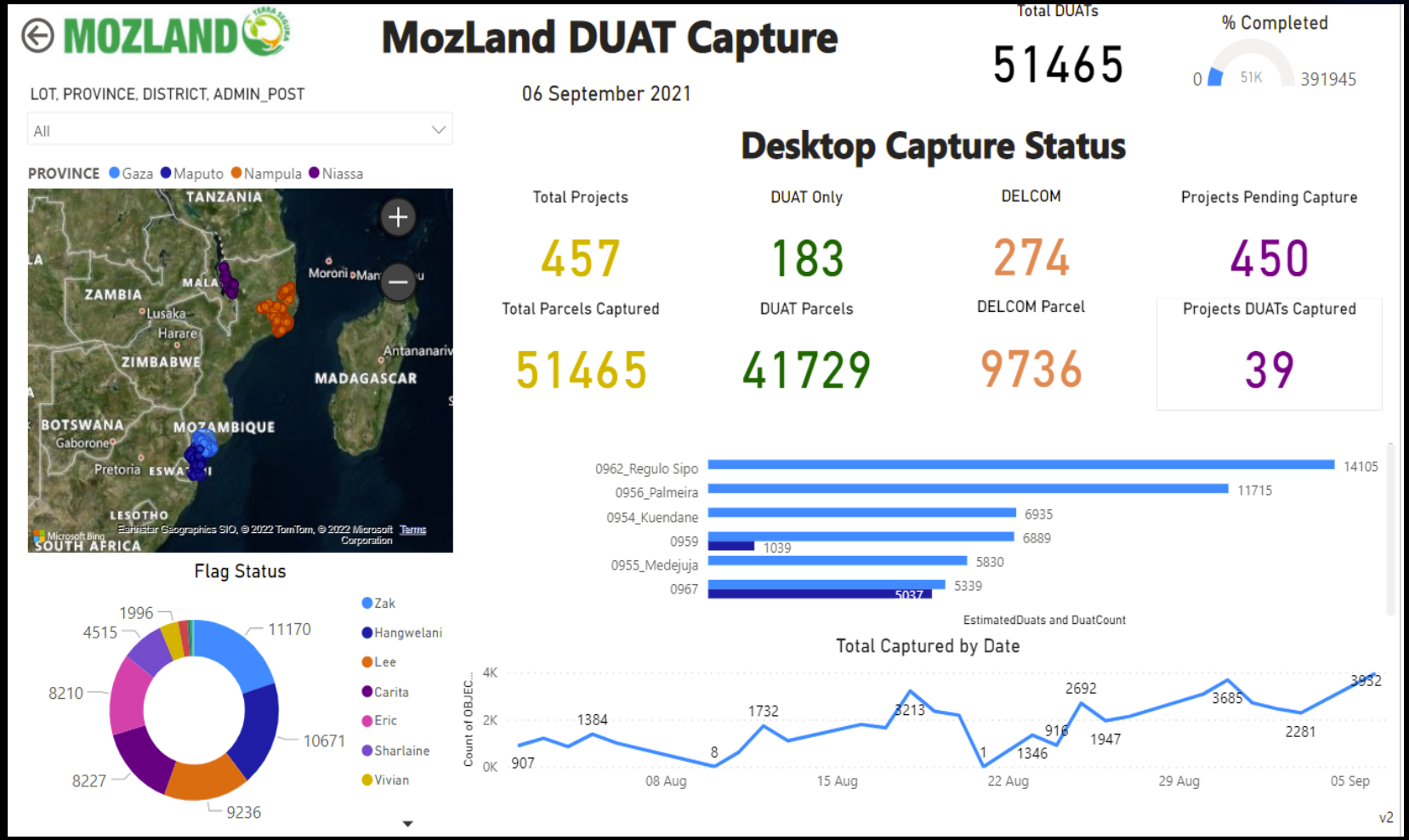
- The Scan code functionality read using the device camera and assign the QR code to the Surveyed Parcels
- The user scans the QR code, the application zooms to the parcel which is linked to the QR code.
- QR Code is also used for Community Data Editing, Title Handover and Customer Enquiries





Dashboard

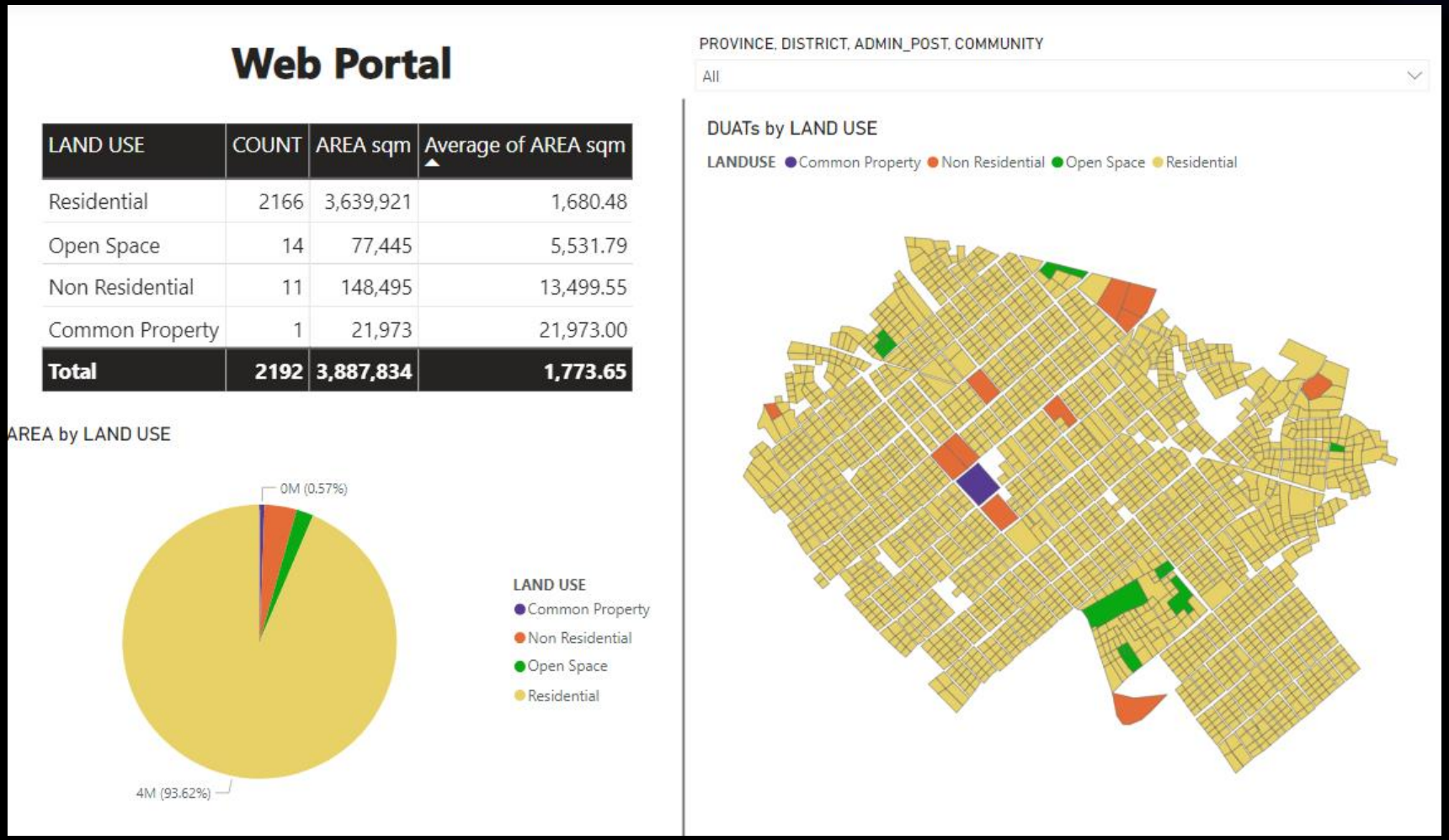
- GIS based analytical reporting tool
- User driven down capability
  - Display summary of desktop captured process
  - Number of Parcels captured per user
  - Total number of Projects/Communities captured



Map based Dashboard for Communities

- Display summary of captured Land Use parcels:
  - Category
  - Count
  - Size
  - Totals

- Spatially visualisation of Parcels by land use on the map



Quality Assurance

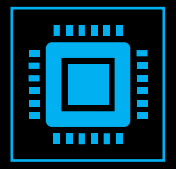
Completeness Checking (QA1)

Site Managers take responsibility for batch completeness checking, which is to ensure that all properties in the batch are surveyed.

Synced data automatically QC checked and made available day after sync on WFS service for Site Manager and Field QA Resource can review before signing off

WFS will have 4 status settings

Data corrected in the Survey App and re-synced to update the data,



QA2 (Desktop Check)

QC data passed per batch send to Terra team

Topology checks – Automated 100% sample based on Rules

Alphanumeric checks – Automated 100% sample based on Rules

Errors fixed by Desktop team (if possible) where possible

Failed fixes for field to be done after QA3

QA3 (Sample QA)

Geometry check – like shapes, access pathways etc – cursory check or sample

Alphanumeric – 10% sample against documents

If over 10% errors, then increase QA sample

Failed records sent to field team for corrections

Corrections to be made in App

QA4 (Community)

Maps and schedules sent to Community for checking

Fixes to made by field team

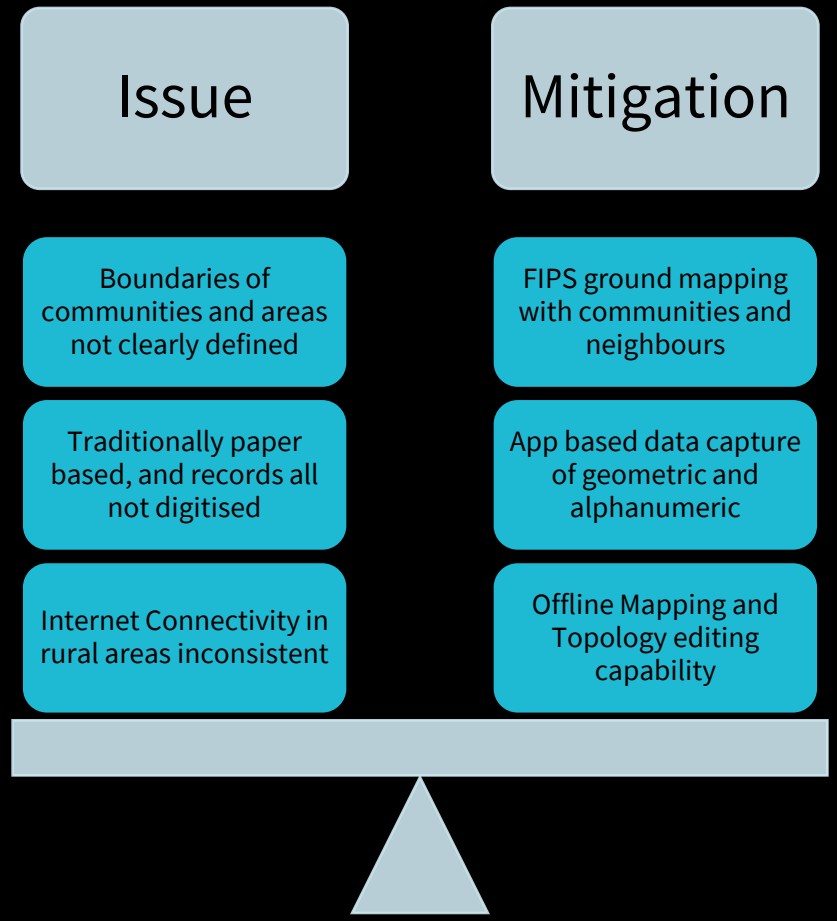
Corrections to be made in App

QA5 (Client)

Data uploaded to DNDT (backend/DPortal etc)

Data Corrections where necessary as identified

Overcoming Challenges



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THANK YOU

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