Introduction to Geographic Information Systems (GIS):

- A **powerful tool** for collecting, managing, analyzing, and visualizing spatial and non-spatial data, Integrating location-based information with descriptive attributes.
- It creates dynamic maps and performs spatial analyses, uncovering patterns, trends, and correlations not immediately apparent.
- It processes diverse datasets to provide deeper insights into spatial phenomena, supporting informed decision-making across various disciplines

Identify problems



Monitor change (change detection)



Set Priority ie Investment decision making



Manage & Respond to events



Understand Trends



Modeling data to perform future forecasting



Stakeholders & Project Management:

Stakeholders & Community Engagement:

- ❖ During the initial stages of project initiation
- ❖ Understanding the needs and expectations of project stakeholders
- ❖ Building trust and relationships with stakeholders
- ❖ Identifying project risks and opportunities



Project Management:

- ❖ Planning and Implementation of projects to full life cycle
- ❖ Risk Mitigation & Quality Management
- ❖ Stakeholder Coordination
- ❖ Resource and Budget Management
- ❖ Regular project monitoring, evaluation, and reporting



Flood risk Mapping, Catchment analysis & Drainage Masterplanning:

Flood-Prone Area Identification:

A general GIS-based analysis using Digital Elevation Models (DEMs) to identify areas susceptible to flooding. The results of this analysis are subsequently mapped and visualized for further assessment and decision-making.

Catchment Analysis:

A step-by-step analysis and calculation of runoff water volumes that will flow into a water-retaining structure, such as a dam or reservoir, once it is constructed.

Investment Prioritization Mapping for Drainage Master Planning:

This involves creating maps that highlight priority areas for drainage investments, considering budget constraints and phased implementation.

The maps support informed decision-making by aligning resources with project goals.







Post Flood Infrastructure Damage Assessment:

Cloud Computing Using Google Earth Engine and JavaScript:
Analyzing satellite imagery for flood detection by comparing pre- and post-flood images, identifying flooded areas, assessing impacts on land use land cover , and estimating affected populations.

Cloud-based platforms enable large-scale data processing, applying filters and thresholds to accurately map flood extents while integrating additional datasets to refine the results.

The results are then displayed in visual charts that are easy to interpret and make decisions.

Results

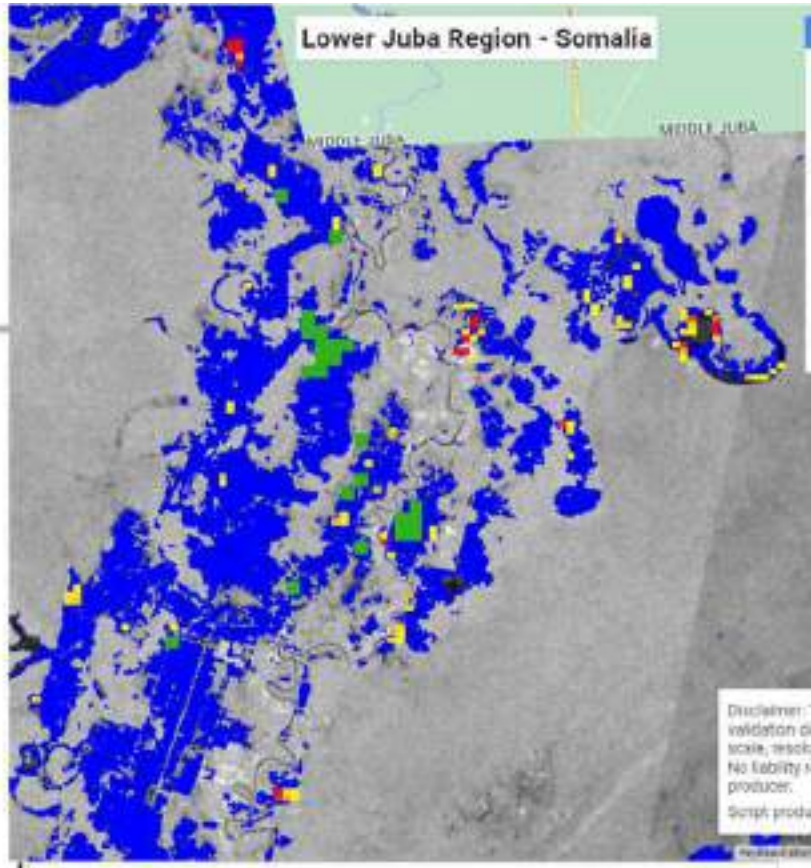
Flood status between:
2023-11-01 and 2023-11-30

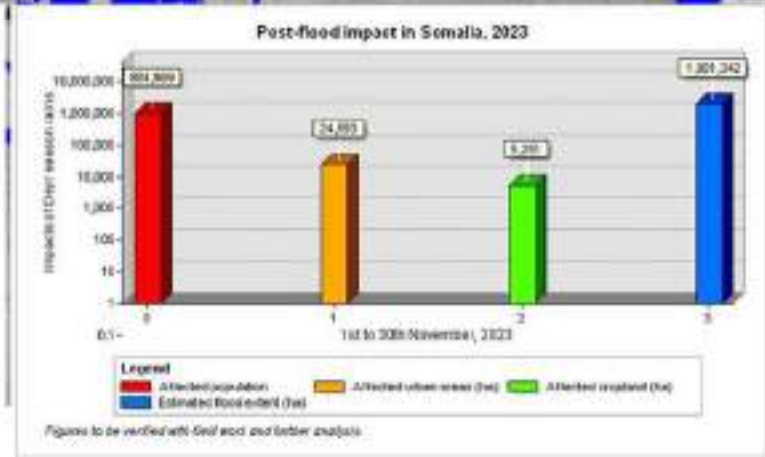
Estimated flood extent:
based on Sentinel-1 imagery from 2023-11-02 to 2023-11-26
33149 hectares

Estimated number of exposed people:
based on GHSL 2015 (250m)
45748

Estimated affected cropland:
based on MODIS Land Cover 2020 (500m)
498 hectares

Estimated affected urban areas:
based on MODIS Land Cover 2020 (500m)
2588 hectares





Capacity Building & Technical Assistance:

Target Groups:

Host Country & Stakeholders e.g

- Engineers
- Urban Planners
- Surveyors
- Cartographers etc

Gap Analysis:

- Overview work performance
- Identifying work obstacles causes
- Gap analysis
- Development of capacity building curriculum

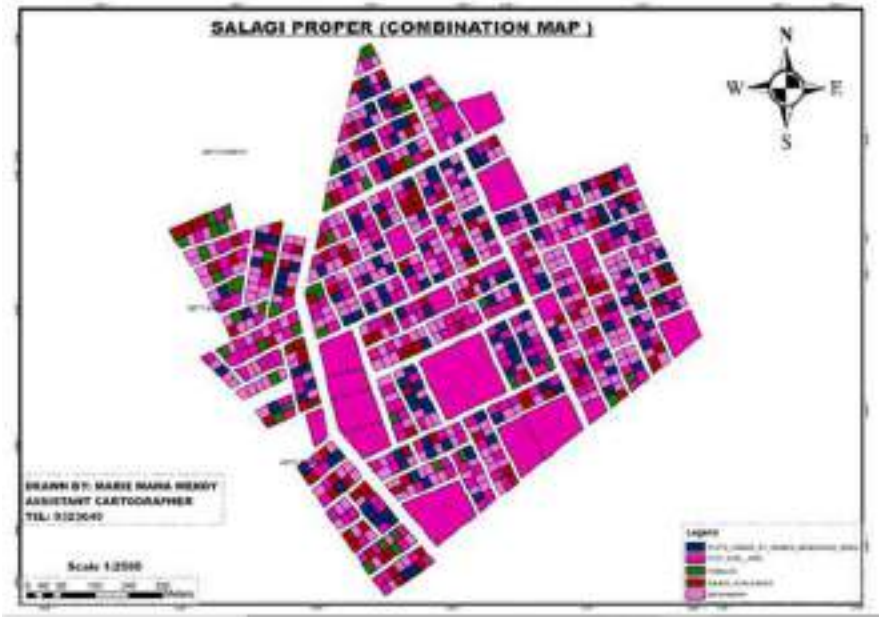
Delivery:

- Theoretical Training
- Practical Training
- On-job Training



Cadastre Mapping, Land Information Systems and Digitization of Land Records:

Digitization of land records by converting analogue copies into digital format to enable efficient data retrieval, support Land Information Systems development, enhance informed decision-making, and streamline land administration.



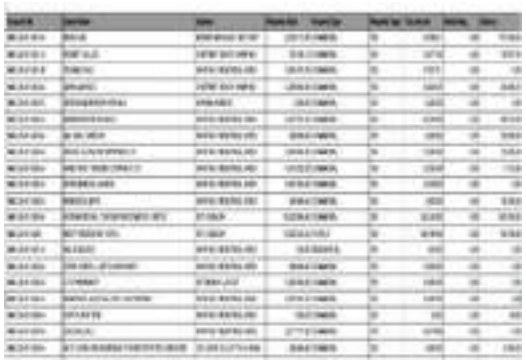


												LAND REGISTRATION FORMAT - MINISTRY OF LANDS AND REGIONAL DEVEL
1	LAWN 84	Male		SALABI LAYOUT	Governme	Residentia	500	615	14/11/20	30/01/2013	31/10/210	
2	MOOD U	Male		SALABI LAYOUT	Governme	Residentia	500	725	7/10/5	41162	31/7/2104	
3	WARIAMA	Female		SALABI LAYOUT	Governme	Residentia	500	390	7/10/5	39874	14/8/2104	SAL/378
4	FATOU NDI	Female		SALABI LAYOUT	Governme	Residentia	500	206	25/8/2007	27/08/13	31/7/2104	
5	SHERIFO	Male		SALABI LAYOUT	Purchase	Residentia	500	419	5/11/06	39691	31/10/2104	SAL/374
6	IBRIMA CE	Male		SALABI LAYOUT	Governme	Residentia	440	758	7/01/06	31/08/07	31/12/2104	SAL/397
7	AWA MBIE	Female		SALABI LAYOUT	Governme	Residentia	500	893	5/11/05	14/4/08	31/10/2104	SAL/294
8	FATOU BA	Female		SALABI LAYOUT	Governme	Residentia	500	235	27/10/20	30/12/07	31/08/2104	SL/169
9	MUSA BAD	Male		SALABI LAYOUT	Governme	Residentia	516.57	823	22/11/06	40094	31/10/2104	SAL/387
10	IBRIMA JA	Male	PO5/7842	SALABI LAYOUT	Purchase	Residentia	500	488	42973	39904	31/8/2104	SAL/215
11	JAWO SAI	Female		SALABI LAYOUT	Governme	Residentia	500	530	27/08/06	39181	14/08/2104	SAL/176
12	FODAY KIN	Male	616088	SALABI LAYOUT	Purchase	Residentia	467.8	710	22/11/06	31/08/07	31/10/2104	SAL/111
13	HADY BC	Female		SALABI LAYOUT	Inheritan	Residentia	500	594	17/3/2007	27/7/17	14/12/2118	SR. NO 41
14	MOMODO	Male		SALABI LAYOUT	Governme	Residentia	500	488	24/12/201	41258	31/12/2114	SAL/SCL/1
15	LAMIN SALL	Male		SALABI LAYOUT	Governme	Residentia	500	610	28/12/201	26/4/2011	31/7/2104	SL/343
16	ANDU FATT	Male		SALABI LAYOUT	Governme	Residentia	664	891	22/11/06	26-9-07	31/10/2105	SAL/563
17	MARIAMA	Male		SALABI LAYOUT	Governme	Residentia	500	510	28/8/06	31/27/08	31/8/2104	
18	JOSH M.	JOSCHUKW	A0618253	SALABI LAYOUT	Governme	Residentia	500	463	14/07/06	7/07/08	30/8/2104	43/84/2000
19	LAMIN LAT	Male		SALABI LAYOUT	Governme	Residentia	500	465	23/8/05	1/09/08	31/8/2104	SAL/215
20	SAMBA BAI	Male		SALABI LAYOUT	Governme	Residentia	500	511	16/8/09	23/08/12	10/02/2101	SAL/ KOL/
21	HARRY P.F	Male		SALABI LAYOUT	Governme	Residentia	500	805	9/11/05	5/8/08	31/10/2104	SAL/87
22	LAMIN LAT	Male		SALABI LAYOUT	Governme	Residentia	500	589	17/8/2009	14/12/11	31/8/2107	43/84/2000

Mobile Field Data Collection:

Adding spatial component to existing databases with attribute data.

Enhancing databases with a spatial component enables geographic visualization and analysis by integrating property locations, land use, and tax records, improving efficiency in tax assessment and service delivery.



Revenue collection database from the Finance Office



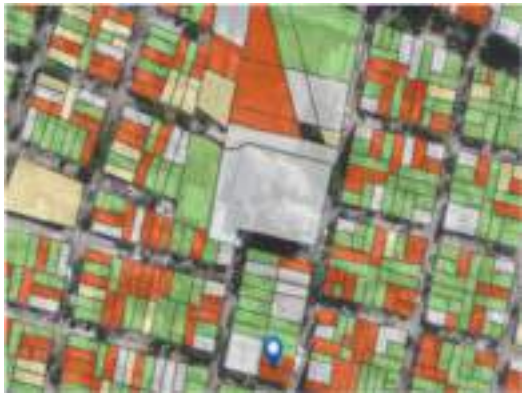
Locate Properties on Google Earth using local knowledge from the debt collectors



Conduct Field work using a mobile data collection app to identify more properties



Link all information on revenue collection in a GIS System



Use Structured Query Language (SQL) for Database Manipulation, Prepare Thematic Maps ras required.

Topographic Surveys & Sustainable Site Planning:

Ground Surveys:

Conducting, coordinating and managing topographic and drone (aerial) surveys of Infrastructure ie roads, water systems, buildings etc to support engineering designs.





Selected Project Highlights:

1. Led GIS-based urban planning and developed digital revenue systems for Greater Banjul, The Gambia (AfDB), supporting land management across three municipal councils.
2. Deputized Project Manager and delivered drainage master plan and flood risk mapping in Mogadishu, Somalia (World Bank), informing climate-resilient infrastructure investments.
3. Coordinated hydrological, catchment, and topographic surveys for 10 dam rehabilitations in Zambia (World Bank), strengthening rural water resilience.
4. Mapped over 100 rural sites for solar mini-grids and built an ArcGIS platform in Sierra Leone to guide clean energy investment decisions.
5. Conducted infrastructure assessments (schools, health facilities, WASH) in Northern Cabo Delgado, Mozambique (World Bank & UN), supporting reconstruction efforts.
6. Mapped health facility access in Kenya to support maternal and child health improvements in collaboration with UNICEF and the Ministry of Health.
7. Managed GIS projects for infrastructure (roads, water, waste, mini-grids, oxygen plants) across South Sudan, Central African Republic, Tanzania, Uganda, and Malawi.

Excerpt from the principal Cartographer, Ministry of Lands, The Gambia

“Once again on behalf of the Director and the deputy Director and the entire department and specifically cartography unit, we are, and we shall always be thankful and grateful to UNOPS for their unflinching support to the Department of Lands and Surveys.

Our sincere thanks and regards to you and UNOPS for wonderful coordination and encouragement to actually see that, constraints are identified, targeted and the results are always success.”

Mr. Yankuba Cham

Ministry of Lands and Urban Planning
The Gambia