FIG WORKING WEEK 2023

28 May - 1 June 2023 Orlando Florida USA

Protecting Our World, Conquering New Frontiers

Hybrid pre-vectorization approaches to produce accurate, precise maps to scale up boundary demarcation for property rights delivery:

Case study in Zambia's Systematic Land Titling Project

Ali El Husseini, Ph.D., CEO, Medici Land Governance









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Integrated & Integrative Outcomes

★ Overcome resistance, inertia in planning & development

- ★ Eliminate constraints to doing business, accessing financing, facilitating trade
- ★ Improve efficiency of labor, product markets, by demonstrating technological readiness
- ★ Mapping land rights address need for sensitive, innovative approaches (e.g., customary lands)







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Zambia

- One of Africa's least densely populated countries, Zambia is "land abundant"
- Only 14% of land available for agriculture has been used
- Mining: critical "fulcrum" for growing economy
 - 13% of GDP, 70% of Zambia's foreign earnings
 - North-Western province: epicenter of copper industry
 - Two mines (Kalumbila and Solwezi) produce nearly 2/3 of Zambia's annual production of 720,000 tons



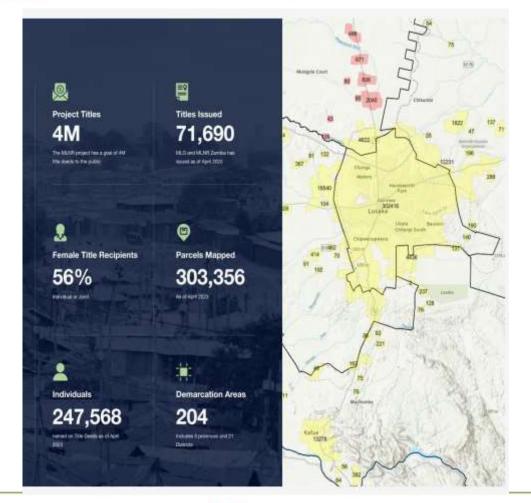




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□ MLG replicates Fit for Purpose Land Administration guidelines (World Bank & International Federation of Surveyors (FIG)) □ Zambia's Land Survey Act: land verified and secured for CTs must be "mapped using orthorectified imagery captured using drones or aircrafts"





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Hybrid Approach

- Spatial resolution precision down to 5-10 centimeters
- Uses machine learning for analyzing, detecting boundaries where fences, walls make automated boundary detection possible
- Hybrid process with boots on the ground, survey-grade global navigation satellite system (GNSS) in Zambia, simultaneous use of drones to capture spatial data







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Value of Hybrid Approach

- GIS technology magnifies objectives for accuracy, verified and secured certificate access, cost-efficiency
- Generate essential cadastral layers identifying land boundaries, building footprints elevations, etc.
- Plans for zoning, commercial areas, services areas, valuation algorithms
- Dispute resolution: processes leading to land titling bring latent disputes to surface







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- Easements, construction permits management, validate topographical rules for planning new settlements
- Mining, agricultural sectors: land use categorization, soil identification, measure of deforestation
- Sustainable agricultural industrialization, supporting food security without compromising ecosystem







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Copperbelt Province

> 6% of global copper reserves: geological surveys in Zambia: significant opportunity to find viable deposits of copper \succ Mapping produces data so investors don't need to resort to speculation, given uncertainty is typically reflected in price they are willing to negotiate for securing exploration licenses \succ GIS & mapping: data foundations for economic transformation, scales of efficiency" enhanced infrastructure, macroeconomic stimulus and stability are improved







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Direct Benefits

- →Transparent access to data to increase the public participation rate and eliminate redundancies
- → Streamlined property registrations and transfers
- → Documented land valuations and enhanced land wealth
- → Secured land inheritance
- → Empowerment for communities & citizens







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Indirect Benefits

- →Mapping, digitization of processes unlock capital for personal investment, access to credit, tenure security,
- → Open channels of revenue to build wealth
- → Encourage FDI opportunities
- → Use data roadmaps to plan for economic stimulus
- → Encourage real estate investment
- → Explore, develop natural, mineral resources industries



