

Suitability of Unmanned Aerial Vehicle to support Communal Land registration

Todorovski Dimo, Chipofya Malumbo (Netherlands) and Blessing Munakamwe (Zimbabwe)

Key words: Access to land; Cadastre; GNSS/GPS; Land management; Legislation; Positioning; UAVs; GNSS; Surveying; Land Registration; Communal Land

SUMMARY

Poor land registration in some regions is linked to continued reliance on conventional cadastral tools such as Total Stations and GNSS, which are costly, complex, and time-consuming. Communal lands are most affected, often facing disputes, evictions, and uncompensated land acquisitions due to unclear land rights. Documenting and recognising communal land rights is vital to ensure tenure security and alleviate unnecessary and forced evictions. Unmanned Aerial Vehicles (UAVs), known for their cost-effectiveness and flexibility, are emerging as an alternative tool for cadastral surveying.

This study assessed UAV suitability for communal land surveying in Zimbabwe, comparing it to GNSS in legal recognition, accuracy, cost, and time. UAVs extracted coordinates from 20 Ground Control Points (GCPs), and 6 GCPs generated orthophoto compared satisfactorily to GNSS coordinates of the same points. Accuracy remained consistent with both GCP counts, and UAV-derived data met Class C error limits under Zimbabwe's Land Survey Regulations. Thus, UAV orthophotos are suitable for Communal land surveys under current legislation. UAVs proved faster and cheaper for data collection. Though effective, legal updates are needed to recognise UAVs formally. Further research is recommended to automate coordinate extraction from orthophotos for efficiency.

Suitability of Unmanned Aerial Vehicle to support Communal Land registration (13778)
Todorovski Dimo, Chipofya Malumbo (Netherlands) and Blessing Munakamwe (Zimbabwe)

FIG Congress 2026
The Future We Want - The SDGs and Beyond
Cape Town, South Africa, 24–29 May 2026