

Field-testing of Various Cadastral Surveying Methodologies: A Summary

Ethiopian Mapping Agency (EMA)

Different surveying methodologies can be used for the purpose of cadastral surveying. These are broadly classified as field survey methods (steel tape, theodolite, total station, GPS, etc.) and air survey methods (aerial photographs and satellite imagery). Experiences in other parts of the world are neither concrete nor specific. For example, in Africa different countries use different cadastral surveying methodologies, often with varied approaches within a country. In the Ethiopian context, the Amhara, Oromia, SNNP and Tigray regional states deployed different cadastral surveying methodologies when implementing their regional land administration programmes. For the First Level Rural Land Certification programs, the Oromia and SNNP regional states deployed simple rope measurements without production of any geo-referenced parcel index maps. For the subsequent Second Level Certification, the Amhara regional state, with the support from the Swedish International Development Agency (SIDA), has been using total station and GPS surveying methodologies at pilot level. It was thus very urgent and important to choose an appropriate cadastral surveying method taking into account the prime purpose with due account of important evaluation criteria, including accuracy, cost, time, appropriateness and flexibility in field operations.

In order to choose the appropriate cadastral surveying methodology, EEELTAP contracted the Ethiopian Mapping Agency (EMA) in February 2006 to undertake a field-testing study on various cadastral surveying methodologies. The prime purpose of the field-testing was to provide a comparative analysis of the following five cadastral surveying methodologies:

- a) Rope/ tape method
- b) Compass and chain method
- c) Hand-held Global Positioning System (GPS)
- d) Total station, and
- e) IKONOS High Resolution Satellite Imagery (HRSI).

The field-testing was undertaken in “*Hordofi Got*” of *Bolle Kebele* Administration (KA), West Shoa Administrative Zone. The “*Hordofi Got*” covers an area of about 130 ha of land. Using a hand-held GPS, total station and IKONOS HRSI methodologies a total of about 154 parcels covering an area of about 83 ha of land were surveyed and geo-referenced Parcel Index Maps produced. For the Compass and Chain method, a total of 43 parcels covering an area of about 23 ha were surveyed and parcel sketch maps produced. For the Tape/ Rope measurement, existing data generated by the Alem Gena Wereda Land Administration and Use Team was used as a prime data input for comparative analysis.

Five evaluation criteria were used to compare the field-tested five cadastral surveying methodologies: accuracy, cost, time, appropriateness and flexibility in field operation. Summary of the result (cost and time only), based upon the preliminary analysis, are shown in table 1 below.

The analysis of the above study is still under preparation. The results will be published in two volumes and made available to the wider public.

Table 1. Preliminary summary of costs and survey time by methodology

Methodology/Criteria	Costs (in birr)		Survey time/speed (in work-hours)	
	Average cost/parcel	Average cost/ha	Average time/parcel	Average time /ha
Methodology 1 (HH GPS)	43.15	80.40	00:19	00:34
Methodology 2A (Rope only)	7.00	13.00	00:15	00:28
Methodology 2B (Rope and HH GPS)	8.40	15.70	00:17	00:30
Methodology 3A (tape & compass only)	157.60	291.80	01:34	02:53
Methodology 3B (HH GPS with tape & compass)	158.20	293.00	01:36	03:00
Methodology 4 (Total station)	63.01	117.41	00:23	00:44
Methodology 5 (IKONOS HRSI)	123.35	229.90	00:17	00:31