

Cadastral Surveys: addressing territorial disputes in Somaliland

John Drysdale describes how Natural Area Codes and a Geographic Information System (GIS) database are enabling farmers in Somaliland to gain legal title to their land.

Abdi Hassan, a farmer in the Gabiley district of Somaliland, proudly holds out a laminated ID card to a visiting extension worker. The card is a land ownership certificate issued by the Ministry of Agriculture, and includes a headshot of Hassan, his name and a 10-digit code. 'This code represents the exact location of my farm', Hassan explains. 'Every farmer in the area now has one. For generations, our farm land had not been formally surveyed, so there were no officially recognized boundaries. The authorities would not issue any land title deeds. The situation has been worse since the end of the civil war. When the farmers returned there were many disputes over land, which sometimes became violent. No more – our land boundaries are now indisputable'.

This transformation has been achieved through a major UNDP-supported initiative, implemented by a local NGO, Cadastral Surveys, in collaboration with a Canadian company, NAC Geographic Products Inc. (NACGEO). Together they

have helped to bring peace to this troubled region by surveying, delineating and registering land boundaries on the basis of the Natural Area Coding System.

Natural area codes (NACs) are basically a simpler, more compact form of geographical coordinates than those used by other mapping methods such as the global positioning system (GPS). NACGEO has developed a computer algorithm that shortens the long strings of longitude-latitude coordinates and replaces them with NACs, or digital addresses, that are as easy to remember as telephone numbers. A NAC consists of a string of up to ten alphanumeric characters – the longer the string, the smaller the area, and thus the greater the detail. Thus, a two-character NAC specifies an area of about 1000 square kilometres, six characters 1 square kilometre, and ten characters one square metre. In Somaliland, it was decided to use ten-character NACs, providing unique identifiers for every farm plot, building or even tree.

The NAC system

NACGEO has so far assigned NACs for 17 countries, of which Somaliland is the only one in the developing world. There were no existing map databases that could be easily converted to the NAC system – Cadastral Surveys therefore had to start the mapping process from scratch.

The NAC mapping process is a rather complex undertaking. Cadastral Surveys sends a team into the field equipped with a theodolite to survey, record and map the exact locations of fixed objects such as houses or physical landmarks, and farm boundaries. Since neighbouring farmers must agree on the location of their shared boundaries before the surveying work can begin, they tend to resolve their disputes relatively quickly. Later, concrete blocks are embedded in the ground at various points to mark the agreed boundaries.

The surveyors' measurements are recorded, and copies are sent to the Cadastral Surveys head office in Gabiley. There, the raw data are examined to correct any obvious errors and are entered into ArcView, a geographic information system (GIS) software package, to create a

preliminary schematic map showing the location and area of each parcel of land. This basic map, or 'ground layer', is then emailed to NACGEO in Toronto, where cartographers superimpose onto it a rectangular grid of NAC coordinates. Any point on the map can now be identified with a unique NAC.

The new two-layer map is emailed back to Cadastral Surveys, where it is fed into the GIS database. Further layers can then be added to indicate other relevant details such as the location of wells and rain gauges. The finished product is a wall map of the area showing all the surveyed property boundaries and their coordinates, which is displayed in government and UN agency offices for all to see.


The surveyors then return to the field and paint the NACs onto the concrete 'boundary blocks' embedded in the ground. The NACs are stored in a 'master' database maintained by Cadastral Surveys, and at the Ministry of Agriculture. The Ministry uses the database to update land sale and inheritance records and, crucially, to issue laminated land registration certificates and freehold title deeds to individual farmers. The Ministry may also decide to use the database to manage the tax records for each farm.

Cadastral Surveys has so far surveyed and assigned Natural Area Codes to 3500 farms in Somaliland. Although Cadastral Surveys has been using GIS and the NAC system for less than a year, it has already seen a massive increase in its mapping productivity as the skills of local staff have improved. In the near future a new Institute of Land, Soil and Water Surveying will be established at the University of Hargeisa, where Somalis will be able to further develop their surveying and mapping skills. The current GIS maps will also be enhanced with additional topographical data and soil and water information, which will undoubtedly be of value in the future development of the region.


The NAC system has benefited the farmers of Somaliland in many ways, not least in resolving conflicts over land and helping rebuild communities. With the boundaries clearly indicated on a map, on ID cards and in concrete in the ground, their land is now a valuable legal asset that they can use as collateral for loans and may pass on to their children.

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REPUBLIC OF SOMALILAND
JAMHUURIYADDA SOMALILAND
Gabiley District Database
Maraga Diwaan Galinta Beeraha
Qaybta Yaad Sharciiga 82aad
Cadaayta Waxa Ku Iira Maahka & Dhatabayaha



Qodaal ma?
Cagaqagaf?: Haas
Dibi?: Haas
Gacan?: Maya
Xoolaha?: Haas
Nooca B: Beer Roob
Tumlo: Iinta Wayn
Aadka: Maxamed Makamed Bilal



Magaca 1: Maxamuud 2: Sugaal 3: Cumar
Owner's name

Wakiilka: Majiro
Photo: name of representative if not owner's

Degmada: Gabiley **Cobolka:** Hargeysa **Dhaxal:** Maya
District Region Inheritance

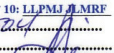
Yaa lahaa?: Maxamuud Sugaal
Previous owner?

Tirsiga beerta: G3056 **N A C:** LLPN JLMK **Hegtarka?:** 7.72
Farm No? Natural Area Code? Hectares?

Jihooyinka?: 343/759 **Waxa u badane laga beero?:** Hedhadi & Arabikhi
Map Ref? Landmark?

NATURAL AREA CODE **Control Point?:** CP890=334400 1075999

North	East	North	East	North	East
1: LLPR9 JLMMLC	6: LLPKD JLMMLI	11: LLPQ4 JLMMP6	16: _____		
2: LLPSQ JLM9Q	7: LLPJH JLMNJ	12: _____	17: _____		
3: LLPNT JLMSS	8: LLPKD JLMRB	13: _____	18: _____		
4: LLPMJ JLM98	9: LLPMB JLMR2	14: _____	19: _____		
5: LLPNV JLMQ2	10: LLPMJ JLMRF	15: _____	20: _____		

Date: 2004/05/17
Sign:  **Registrar Of Documents (Farms)**
Somaliland Cadastral Surveys Thematic mapping and data-based land registration

Somaliland's NAC mapping process begins with land surveys (top) and culminates in land ownership certificates (below). Photos: Cadastral Surveys