Procedures to be followed in the mapping of the Mombolo aldeia for a case study on land ownership, allocation and use

Introduction

The overall purpose of this work is to build a set of data which will be informative for purposes of describing, analyzing and understanding issues of land ownership and allocation in a rural community. This information should be useful for other purposes, including land use planning and the development of greater awareness of welfare issues.

While much of the work will concentrate on mapping the boundaries of all lands used for farming or owned as potential farm areas, contextual information will be assembled as well. This will include roads, paths, the homes of all residents, water points, and other important or prominent features.

It is reported that the Mombolo aldeia is home to some 180 families. We can expect most families to have about 4-6 separate fields, each of which will be mapped as a separate unit or polygon. The amount of work to cover all the fields will thus be substantial. To get this work done in a reasonable time and to ensure continuity of approach and method, the field team must work consistently, on as many days as possible and preferably camping at Mombolo for several days at a time. If this is done all the field work, data processing, checking and cleaning should be complete within 3 months.

Field work

1. The field staff should be divided into three teams, each equipped with a GPS and set of data sheets. There could be three different data sheets: one for farms, one for homes, and one for other geographical features.

2. Each data sheet should be pre-coded with each record having a unique code number, listed for example as M1, M2, M3, etc. This will help ensure that no record will be confused with another.

3. For mapping the farm areas, I recommend that each team go out with one farm owner and that all the farm areas belonging to that owner be mapped in one day or session. The farmer should also be requested to confirm at the end of the day or session that all his or her land has been mapped. An alternative approach would be for the mapping team to select an area of the aldeia and request that they be accompanied by all the farmers who have plots in that area. However, this approach will only work if all the farmers are present and available.

4. At the start of each day, the team should check that the GPS is set with the type of tracking set to "Distance" with a distance interval of 0.01 kilometres or 10 metres.

5. Before starting the mapping of a field, the team should record the name of the owner and type of field, entering this information as a new record in the data sheet for farms so that the record has one of the pre-numbered unique identification codes.

6. The GPS should be switched on, allowed time to acquire reception from satellites and report that it is 'ready for navigation'. The GPS should then be set to 'Tracking on".

7. Once all of this is done, the team will set off following the farmer as he or she walks around the edge of his or her whole piece of land. Note that this should include all his or her adjoining uncleared bush that is not being used for cultivation. The circuit around the land must end at the starting point, at which the team will set the GPS to "Tracking off". The team should then walk to the centre of the land area and mark a waypoint, entering into the GPS the unique identification code number for the record as the name of the waypoint. This waypoint will serve as a check to ensure accurate matching between the polygon that will describe the field and the information recorded on the data sheet.

8. This then completes the mapping of that area of land, and the team should then move to the next adjacent area of owned land, starting a new record, switching the GPS to "Tracking On", and following the procedure as before.

9. Any special circumstances, deviations of procedure should be noted carefully and clearly so that these can be taken into account when the data are processed.

10. On completion of the mapping work for the day, the GPS track log should be downloaded on to a computer as soon as possible.

Mapping of context features:
1. The location of each house should be mapped as a waypoint, entering into the GPS the unique identification code number for the record as the name of the waypoint. The name of the house owner and, if possible, the unique code for the family should also be recorded on this data sheet.

2. The same data sheet and method should be used to map important point features, such as the school, church, water points etc.

3. As opportunities arise, the team should use the tracking method in the GPS to record roads and important foot paths as they walk or drive through the aldeia. Each track for a road or path should be recorded on a data sheet, noting the time of the start and end of the tracking session and the type of feature being tracked. The same method should be used for mapping the boundaries of important geographical areas, for example grave yards, large rock outcrops, forest areas etc.

Things to do and check before going to the field
1. Ensure that spare batteries, data forms, pens and pencils and one back-up GPS are available and have been packed.

2. Clear the waypoints and tracks off each GPS after checking that all data have been downloaded and backed-up on computer.

3. Print out a map showing all the data collected so far. This can be printed using the satellite image as a backdrop. The map will be helpful in orienting the field team, showing areas and features that need to be mapped. Most importantly, the map can be discussed with residents of Mombolo to demonstrate the kinds of information that is being assembled by the project. This will help people to read and interpret maps, and it should foster interest and ownership in the whole process of mapping and recognizing land ownership.

Data entry
1. At the end of each day, download all the track and waypoint data from each GPS, saving each set of data as an ArcView theme with an appropriate name, for example. Tracks_GPS_Cesar_23_October_2007.shp. These files should be saved in a separate backup folder and will only be used to copy the locations of new features into the five permanent ArcView themes listed below.
2. Use the tracks to trace and add new polygons, making sure to add the correct unique code number for the polygon as well as the code and name for the owner.
3. Use the other tracks to trace new linear features such as roads, paths and river streams, and the margins of important geographical areas.
4. Use the waypoints to add new points for houses, making sure to record the code number and name for the family.
5. Likewise, use waypoints to add new point features for important landmarks etc.

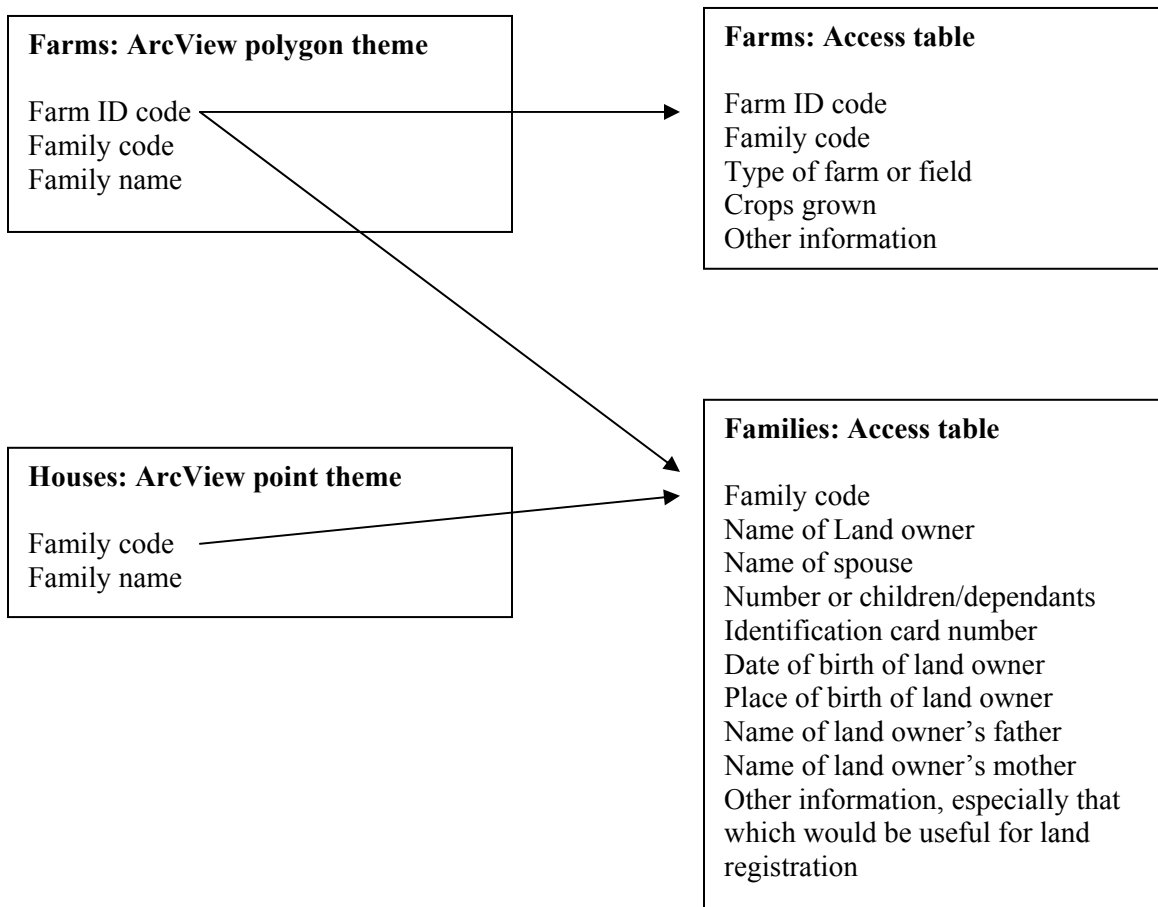**ArcView themes and Access databases**
All the ArcView data can be handled in the following themes:
1. Farm areas as polygons, with the following fields:
    -   Unique farm ID code for each polygon; this would be the code allocated on the data sheet for the field work
    -   Family code for the family owner of the farm – for linking to Access table of owners.
    -   Name of farm owner – as a check in case the Family code for the farmer is wrong.
    -   Area – as calculated from ArcView in square metres or hectares
2. Houses as points, with the following fields:
    -   Unique ID code for each house; this would be the code allocated on the data sheet for the field work
    -   Family code for the owner of the house – for linking to Access table of owners
    -   Name of house owner – as a check in case the Family code for the owner is wrong.
3. Other point objects, for example school, water points, important land marks, church etc. There will be three fields:
    -   the unique code allocated for the field work,
    -   the type of feature, and
    -   the name or description of the feature.
4. Linear features as polylines, for example roads, foot paths and rivers. There will be three fields:
    -   the unique code allocated for the field work,
    -   the type of feature, and
    -   the name or description of the feature.
5. Other area features as polygons, for example major rock outcrops, important patches of forest, graveyards etc. There will be three fields:
    -   the unique code allocated for the field work,
    -   the type of feature, and
    -   the name or description of the feature.

All the Access data should be in two tables:
1. Families, with one record for each family and having the following fields:
    - Unique Family code for each family
    - Name of husband
    - Name of wife
    - Number or children/dependants
2. Farms, with one record for each farm and the following fields:
    - Unique farm ID code for each farm area, this being the same code allocated for the field work and used in the ArcView polygon theme for farms
    - Family code
    - Type of farm or field
    - Crops grown
    - Other information which may be added later, for example soil types, fertility, age of farm etc

Linkages between these tables and themes would be as follows:

Farms: ArcView polygon theme

Farm ID code
Family code
Family name

Farms: Access table

Farm ID code
Family code
Type of farm or field
Crops grown
Other information

Houses: ArcView point theme

Family code
Family name

Families: Access table

Family code
Name of Land owner
Name of spouse
Number or children/dependants
Identification card number
Date of birth of land owner
Place of birth of land owner
Name of land owner's father
Name of land owner's mother
Other information, especially that which would be useful for land registration

Other suggestions and observations:
1. The Mombolo aldeia is evidently an old fazenda. This means that someone could possibly gain the title deeds to the area and the present residents of the aldeia could then be asked to leave and move elsewhere. Against that background, this mapping project should aim to confirm the rights of residents to their farm areas. One way of doing this will be to issue each resident with a 'certificate of title'. This could be an official looking document produced by the Development Workshop and signed and stamped by the local comuna administration in Chiumbo. The document would give the name of the land owner, the number of sizes (in hectares) of his or her fields, and also contain a map showing their location.
2. Once all the farm areas of all the residents have been mapped, the outer boundaries of the farms furthest from the village should amount to the border of the whole aldeia. This will need to be checked with the soba of Mombolo.
3. Similarly, areas within the whole aldeia that are not included in individual farms will amount to, and can be defined as commonage or common-property areas. It will be of interest to confirm the existence and status of these commonages with the residents of Mombolo once the mapping is complete.
4. A high-resolution satellite image has been made available for about half of the aldeia, and this will serve as a useful backdrop for various applications. However, the image should be used with caution. This is because the geo-referencing is not very accurate and many features might have changed since the image was taken some time ago. These cautionary comments are valid for all satellite images, and are especially important because the images are often so detailed and spectacular that they are treated as being definitive and accurate.
5. All the GPS and ArcView data must be recorded in degrees of latitude and longitude using the WGS84 datum, and *nothing else*. Ensure the GPS are set to these units and datum.
6. Much of the interest in land regularization in Angola has concentrated on efforts to **supply** activities that promote land regularization. However, I would recommend that much more be done to foster **demands** and interests in land regularization. Viewed from the perspective of government officials, there can be little real incentive for them to pursue the regularization of rural land: the amount of work to be done is massive; the legal framework for the process is unclear, and it would represent a substantial departure from customary practice and thinking.

   Likewise, rural farmers and other residents are unlikely to recognize or know the value of regularization, and will thus have little reason to press for its implementation. Indeed, many of these people might perceive the process of regularization as a sharp departure from traditional practice.

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