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1. Introduction

Oromia, with a total area of about 35.4 million hectares, represents about 32% of the country. With a human and livestock population of about 25.8 and 25 million, respectively, it stands to be the most populous regional state in the country. It has 14 zones and 200 districts with diversified agro-climatic conditions. About 48% of the area was once covered by dense natural forest.

The pressure on land has been increasing from time to time by the ever growing need of the human and livestock population. An extensive area of land has been brought to agriculture without considering proper land management practices. Cultivation of steep slopes and marginal land is prevalent. Deforestation is increasing at an alarming rate, creating a big gap between demand and supply. Streams are getting dry, causing shortage of water for human and animal use. Consequently, productivity of the sector is decreasing. Conflict over land use is another big problem that needs urgent solution.

To reverse these conditions, proper planning of the land management is essential. This requires recording land-related data to maintain sustainable management of land. In other words, sustainable development is dependent on the state having overall responsibility for managing ownership, value, and use of land.

The above mentioned problems and other related issues such as: guaranteeing security of tenure to support environmental management and conservation of natural resources, protection of state lands, resolution of land disputes, improvement of land planning, facilitation of rural land reform and new allocation, has led to the adoption of the land administration policies in general and parcel identification in particular. Here, it has to be noted that parcel identification is one of the important land administration activities to be undertaken.

Considering these problems and other issues, land use and land administration study was conducted three years ago. Based on the study, Oromia Rural Land Use and Administration Policy and Implementation Proclamation has been passed at the 5th regular session (August 2002) of the Oromia Council.

2. Objective

The objective of this paper is to share the Oromia region's experiences of land administration and parcel identification system. The paper will discuss some key terms that can be used in land administration processes.

3. Definition

3.1 Parcel/Plot

Terms like “Parcel” and “Plot” are interchangeably used in the region to show a unit of land owned by an individual (owner) regardless of its size and land-use type. In this case, a farmer can have more than one parcel in different areas. Both terms *parcel* and *plot* have the same meaning in Oromia, i.e., "*oyiru* or *masii*" which are interchangeably used in different localities.

3.2 Holding

The term “Holding” shows the ownership and refers to the total number and area of parcels or plots owned by an individual. In other words, different parcels/plots of an individual added up to make the holding, showing the individual ownership. The term "*qabiyyee*" is used as the equivalent of “holding” in the local language.

3.3 Recording

The term refers to the collected spatial and non-spatial attributes of the parcel that exist as a unit of information for reference, use or evidence. The process concerns the entry in the textual or descriptive part and the mapping part of the cadastre. A unique parcel identifier allocated to each parcel is at the heart of the cadastre system.

3.4 Land Registration

Land registration is a process of official recording of rights in land through deeds or as title on properties. According to current practice in Oromia, the recorded data includes the spatial attributes such as the area and non-spatial attributes such as the ownership, land-use type, current situation of the parcel, the parcel identifier (the code), with the neighboring parcel identifiers to indicate the location.

3.5 Cadastre

A cadastre is a methodically arranged public inventory of data concerning properties within a certain locality, based on a survey of parcel boundary. Cadastre differs from land registration in such a way that it emphasizes spatial data. The data included are a large-scale map or the form of the parcel, the size and the coordinates in association with the parcel identifier and the legal right or the ownership. In other words, the land registration is connected with the descriptive part while cadastre is the cartographic part of the parcel. However, in our region, cadastre is not applied because the surveying is being conducted using ropes, which makes producing the map difficult.

3.6 Cadastral Surveying

Cadastral surveying is a process of surveying to define the area, land use, the owner, the form and location of a parcel of land. Cadastral surveying can be done by means of several surveying methods, namely, teodolite, Chain, Compass, GPS, etc., depending on the availability of skill, material, accuracy needed, and economic capacity.

4. Parcel Identification System

The parcel identifier is a unique number (code) which is given to the parcel. It is the core element of the parcel due to its use in identifying the parcel easily and connecting the legal part (non-spatial attribute) with the cartographic product or the map of the parcel. Furthermore, the identifier can be used as the only link when digital data processing is implemented in the future. Normally the parcel codes are given with the processing of cadastral surveying. Cadastral surveying is made to establish boundaries of the parcels and areas by setting corner markers or monuments to ascertain coordinates of the corners and to obtain boundary and area information required for record-deed descriptions and for plotting parcels of real property. This means, cadastral surveying involves the use of mapping that shows the quantity, quality (land use) and ownership of the parcel and the identifier. However, the existing condition in Oromia does not permit this. Therefore, simple, low-cost, and speedy traditional field survey techniques are used for the purpose of land certification program.

The necessary accuracy depends on the purpose for which the survey is conducted, the time when the result is needed, and the capacity of the organization. Regarding the Oromia region, lower precision may be required in order to permit the use of more rapid surveying technique.

Parcel identification, boundary demarcation and area estimation are the important activities carried out to meet the objective. This includes detailed information at the individual parcel level that should serve the need of both the individual and of the community at large.

Though, records are time-consuming, expensive to compile and to keep up-to-date, the parcel identification system serves for asset management, environmental impact assessment, land and property use right. They reduce land disputes, provide security for credit facilitation, physical planning, and help site management and protection.

5. Number of Parcels to Be Identified

According to data available, the rural household size of Oromia is estimated to be 4,421,408 (4.4 mil) households having an average of four parcels/plots of land per household. From this data, it is possible to generalize that there are about 17,000,000 – 20,000,000 parcels of land that have to be identified, demarcated, measured, and registered in the region.

6. Steps for Parcel Identification System

It is obvious that the land administration system is a new activity for the region as well as for the country. Lack of experience is a problem reflected in land administration and parcel identification activities.

However, after organizing an experience-sharing tour in other regions, creating a forum with national and international experts, reviewing different materials on land administration and cadastral survey, its implementation has commenced.

In the region, the parcel survey is conducted by the kebele land administration committee composed of young and relatively educated members from among the kebele dwellers. These members of the committee have been trained so that they carry out the implementation. To carry out the process, the following steps were devised.

6.1 Kebele Boundary Delineation and Demarcation

Before identifying the parcel, the kebele administration, together with the kebele land administration task force (the committee), carry out the demarcation of the kebele boundary by putting pillars on the edges or corners of the boundary. This demarcation of the kebele boundary helps them to know well their territory so as not to either encroach on other kebeles or leave out their belongings. They are also responsible for carrying out the process of parcel identification and its survey. Furthermore, the rough total area of the *kebele* will be estimated to evaluate the accuracy of the work of the measured parcels by comparing with the total.

6.2 Identification and Demarcation of Communal Lands

The kebele administration, together with kebele land administration committee, is responsible for identifying and demarcating the communal lands. After delineating and demarcating the kebele territory they start to identify and demarcate communal lands such as forest lands, grazing, and others by putting pillars on the angles of the boundaries. This helps them to identify easily and pass the communal properties during the parcel surveying as most individuals make claims to get more land from the communal land.

The area of the communal land too will be estimated. A topographic map (1:50000) can be used for the purpose.

Furthermore, the kebele administration and kebele land administration committee are responsible for taking corrective measures on the lands encroached upon by illegal settlers (squatters).

6.3 Identification and Demarcation of Parcels

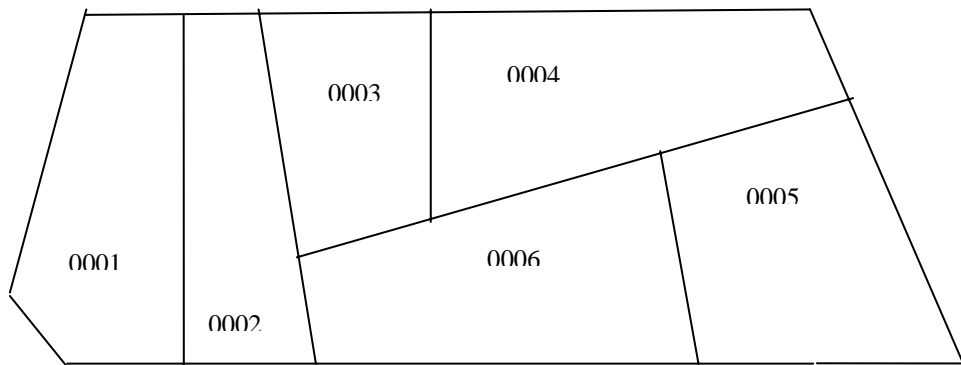
Hansen defined demarcation as the physical marking of boundaries. According to him, two types of boundaries exist, namely, the exact position of the boundaries is fixed (high

accuracy) or approximate, general boundaries. In the later case the exact line of the boundary is left undetermined; for instance, whether it includes a hedge, wall, or ditch, or runs along the middle of a wall or fence. In the case of the Oromia region, most dominant boundaries between parcels are farm strips while in some cases hedges, and live fences can be found. Based on the above in Oromia Region the practice of parcel boundary demarcation reflects the general boundary description. The Kebele land administration committee, in the presence of the owner and the neighbors of the parcel, will identify and demarcate by putting pillars at the corners of the boundary. The parcel owners and the neighbors are obliged to be present and work together with the committee.

6.4 Parcel (plot) Coding

Each parcel (plot) of land will be given a unique identification code to differentiate one from the other. Codes are given in a sequential order, following a linear way from one corner to the other corner in the kebele in such a way that it will be easy to understand, remember and implement. In this case, one can have different codes for each parcel of land he/she owned. (See figure 1)

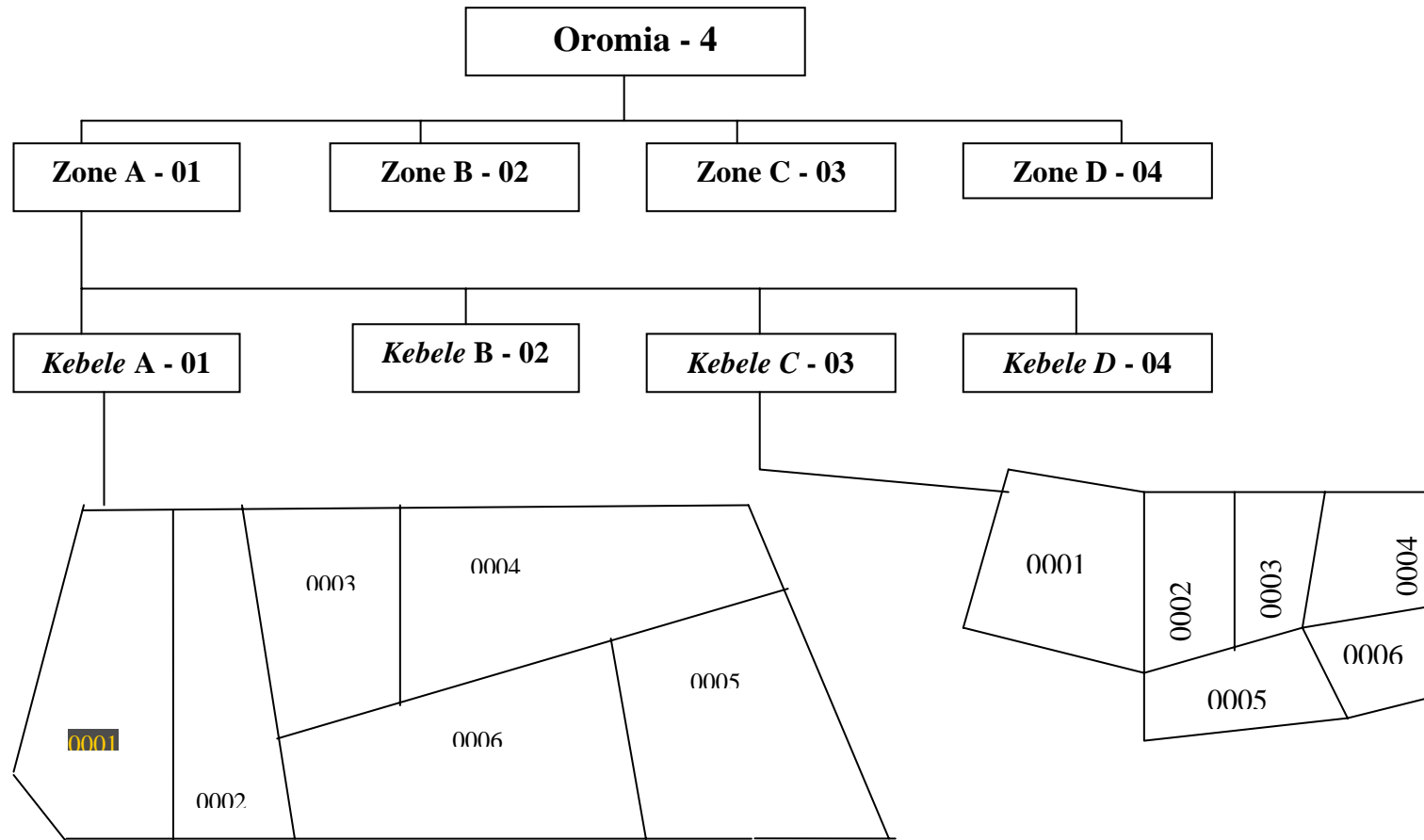
Fig. 1. Parcel coding.



The sequential codes can be repeated in the other kebele but differentiated by adding kebele codes just before the parcel codes. The same can happen in different Weredas but can be differentiated from one another by adding Wereda codes just before the kebele codes. This method can be replicated in different zones but can be differentiated by adding zonal codes. This is also possible in different regions but they can be differentiated by their regional codes. The regional code 4 was simply taken from the previous numeric identifier of the region, i.e., Region 4.

The coding begins with the regional code (4) followed by zonal codes (01-14), Wereda codes (001- 999) and kebele codes (01 - 99), respectively, and finally by parcel codes (0001 - 9999) as illustrated in figure 2. Zonal, Wereda and kebele codes are given in their alphabetical order and have a constant digit based on the maximum number they can have (see Fig 2).

Fig. 2. Coding at the kebele, Wereda, zonal and regional levels.



The code of each parcel is illustrated as follows:

<u>Level</u>	<u>Coding system of the Region</u>
Region	4
Zone	01 – 14
Wereda (District)	001 – 200
Kebele (PA)	01 – 99
Parcel (Plot)	0001- 9999

1. Code of 1st parcel in Zone A, Wereda A and kebele A = 4-01-001-01-0001
2. Code of 1st parcel in Zone A, Wereda A and kebele C = 4-01-001-03-0001
3. Code of 3rd parcel in Zone A, Wereda A and kebele A = 4-01-001-01-0003
4. Code of 4th parcel in Zone A, Wereda C and kebele C = 4-01-001-03-0004

6.6 Parcel Area Measurement

A more precise area of a parcel can be obtained by using a sophisticated surveying technology. This requires trained manpower, modern equipment and sufficient budget. However, in Oromia, as the primary objective was to ensure the use-rights, and avoid land-related conflicts by issuing land certificate as quickly as possible, the quickest and cheapest method, the graduated rope or measuring tape, is utilized for area measurement.

A graduated rope is the method of surveying in which the area is divided into a network of triangles, the sides of the various triangles are measured directly in the field, with a chain or measuring tape, and no angular measurements are taken. It is the most suitable for fairly small and simple areas.

6.7 Parcel / plot Recording

In relation to the parcel, data such as parcel code, area in hectare, land value, land-use type, and names of the neighbors bordering the parcel will be gathered and recorded. It has to be noted that the community, before recording, will comment on all the information regarding the parcel.

The data of the parcel obtained in the field is recorded on the format prepared for the purpose. The data recorder starts to fill the data of a single parcel on one row. The entire format contains only the data of a single holding with a number of parcels at different locations. It is to be here noted that different adjacent land uses (forest land, farm land, grazing, etc.) of one household is identified per parcel, and provided with one identifier (code), while identical land uses in different parcels are given different codes. If different land uses are identified for a given parcel with a single code, on the land-use type column the recorder writes the dominant land-use type or records all if the space of the column is sufficient.

The area is to be calculated after measuring the perimeter of the parcel. The current condition of the parcel, i.e., whether it is degraded, overgrazed, encroached forest or in

good condition, will be noted. The location of neighboring parcels will be indicated to substitute the cadastral map, which is not available currently.

7. Achievements

According to the final report obtained from the department, implementation of the survey has been underway since 2003 in the region as soon as preparatory work was completed. So far:

- A landholding survey and registration started in 166 Weredas out of 200;
- Experts and technicians at the Wereda level were trained in land administration and land survey;
- 5000 *kebele* land administration and use committees were established;
- 25,000 committee members were trained on land survey and registration;
- Out of about 4.4 million rural households in Oromia, registration and survey have been conducted for about 2,484,693 households up to now;
- Corresponding to these households, about 6,277,000 hectares of individual and communal landholdings have been registered;
- A total of 2,535,060 landholding certificates was printed between 2004 and 2005 and distributed to 166 Weredas.

In general, most of the farmers of the region started to be aware of the land registration process and the number of demands for landholding certificates has increased. Besides a great deal of experience has been gained in the process, which has enhanced the capacity of the land administration workers and laid a firm foundation for cadastral system.

8. Problems Encountered in Parcel Identification

Land-use administration in general and parcel identification in particular is a new process in the region. Awareness creation for lower level administrative bodies and the community has been a major task of the department. Accordingly, different workshops were carried out at different levels of the administration, conference have been organized for the public to create full awareness. Though there is awareness at all level of the public, some problems were observed in the process of implementation as described below.

8.1 Resource Allocation

As a rule, a parcel-based land information system does not show immediate tangible and quantifiable results. It may take a long time to manifest itself as a very essential tool for development. So the attention provided by politicians at different levels was initially very minimal. The main problem encountered by the Oromia land administration system was this lack of awareness by local administration bodies. Parcel identification is a huge task requiring sufficient resource (budget for running cost, survey materials, transportation, etc.). However, in general the budget allocations made so far for parcel identification was very small, which indicates that the attention given by Wereda administrators is inadequate.

8.2 Reluctance of the Farmers

Though the majority of the farming community were very eager to get certification for their holding, some of them were suspicious of the new land survey. Some feared that the survey result is going to be used to increase tax. Some were suspicious that it might lead to deduction of their previous holding size for redistribution to others. A few are suspicious that it may lead to land reform leading to the status quo in the feudal era.

8.3 Lack of Skilled Human Resources

Parcel identification is a very technical activity requiring a well-trained manpower in relation to the size of land to be surveyed. Lack of skilled manpower has negatively affected the performance of the activity both in quality and quantity.

8.4 Unwillingness of the Land Administration Committee

The kebele land administration committee complained that measuring the parcels was time-consuming and started demanding payment for the time they spent in the committee work.

9. Current Situation

At present, the region has selected six focus Weredas out of the 200 Weredas of the region to implement the different activities of land administration, including parcel identification and registration, in a systematic way.

These focus Weredas were selected based on the selection criteria to include Weredas that have different problems and opportunities. Accordingly, the selected Weredas represented areas:

- i) with high land-use conflicts,
- ii) with pastoral farming system,
- iii) with food insecurity due to severe land degradation and shortage of land,
- iv) under intensive irrigation and land dispute in relation to land rent and other land tenure issues,
- v) adjacent to urban centers where land-use conflict is high and where there are private investment activities,
- vi) With high agricultural potential.

The field observation report revealed that parcel identification and registration activities were progressing in all the focus Weredas, where as for some households, the landholding registration has been completed (table 1).

Table 1. Progress of parcel identification and registration processes in selected six focus Weredas

No.	Name of focus Wereda	No. of HH completed registration	Individual plot area registered (ha)	Communal land registered (ha)
1.	Bule Hora	5612	6606	19496
2.	Chiro	30626	21573	488
3.	Dugda Bora	10601	44792	3525
4.	Mana	28817	28404	2255
5.	Welmera	0	34716	8729
6.	Tiyo	11701	33292	0
Total		87357	159395	34493

10. Conclusion and Recommendations

The implementation of land cadastre has individual, governmental and societal benefits. The individual benefits include the following:

- a) The documented evidence of land ownership, which a cadastre provides, provides security, reduces or eliminates the risk of eviction and thus enhances the incentive to invest in the land or real estate.
- b) The legal security affects the availability of resources for financial investment by increasing the possibility of mortgage-based loans.
- c) Dealing in land becomes easier, cheaper, faster, and safer. Consequently, access to land is improved.
- d) Increased legal security will result in a decrease of title and boundary disputes and related litigations, which save costs for both government and citizens and promote good relations between neighbors.

In addition, the parcel-oriented cadastre is a useful tool for the execution of a multitude of governmental tasks, for provision of agricultural data. It is a tool for activities concerned with the development of land in case of land reform, consolidation, or readjustment, and after all it is the basic input for other necessary large-scale maps, which will result in considerable saving of time and cost.

Therefore, taking the above into account, one can recommend that the system be implemented in the whole country. However, adequate and quality service can be gained when the full process of cadastre is applied.

It is almost impossible or very difficult to map the rope-surveyed parcel, which makes the system incomplete. The remedy to fill this gap is to apply a low-cost and faster modern technology. For efficient and effective implementation of the activity the following points need attention.

Training: Cadastral surveying is a completely new activity for the region and the country as a whole. The different approaches used for parcel identification and registration indicate the problem. So, a comprehensive and intensive training program needs to be designed to address the capacity problem. A large number of institutions, experts, Wereda and kebele administration, village land administration committee and other communities involved have to get training for its smooth implementation. International and national trainers and experts in parcel identification have to be mobilized for effective and efficient implementation of the activity.

National and International Cooperation: Cadastral surveying is an enormous task requiring capital, skill, time, etc. Thus, the need for national and international assistance in all spheres is crucial for the effectiveness and sustainability of the system.