

Issues and Improvements in the Parcel Identification System for the Land Administration System in Ethiopia

U. Lennart Frej¹

1. Background

On July 15, 2005 the Federal Government of Ethiopia issued Proclamation 456/2005 on Land Administration and Use.

The preamble of the Proclamation states², among other things:

Whereas, it has become necessary to establish an information database that enables to identify the size, direction and use rights of the different types of land holdings in the country such as individual and federal and regional states holdings;

Whereas, it is deemed necessary to put in place legal conditions which are conducive to enhance and strengthen the land use right of farmers to encourage them to take necessary conservation measures in areas where mixed farming of crop and animal production is prevalent and where there is threat of soil erosion and forest degradation;

In order to achieve these objectives the *land holdings* that the Proclamation speaks of have to be unambiguously defined and referenced in the interest of strengthening the farmer's rights as well as in the interest of environmental up-grading and protection.

Fig 1. illustrates the concept of object identification as a basic pre-requisite for sustainable economic, environmental and social development. However, a number of other components must also be in place and interact in order to satisfy a sustainable development process. Security of tenure is one of them.

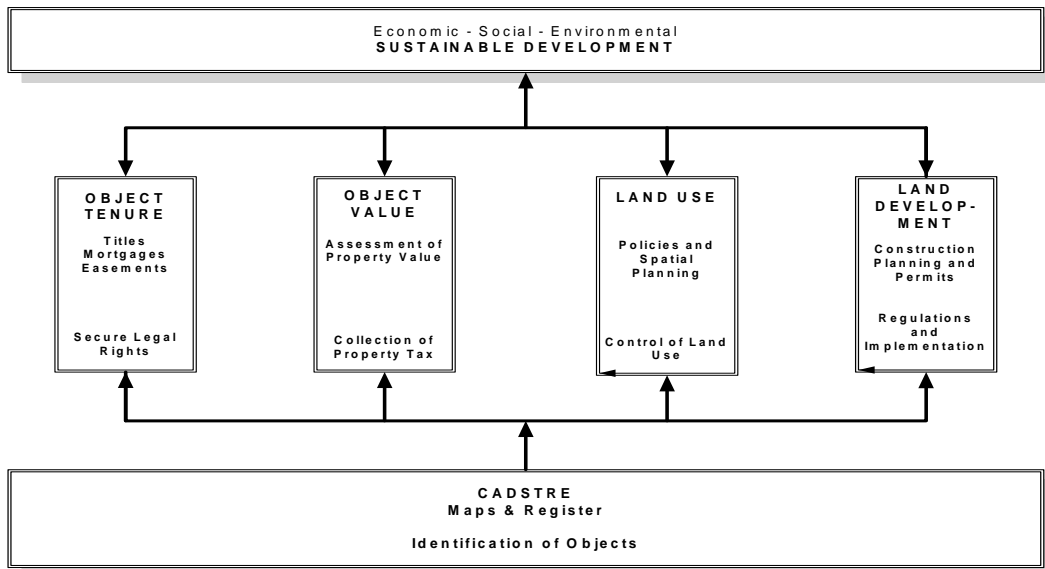
The identification and accurate description of real property units and their relation to neighbouring properties is essential if land markets are to operate smoothly and openly for the benefit of all. Real property identifiers provide a link between the various components of a land market. A clear definition of what is to be transacted and where it is located is central to the land development process. Failure to identify the ownership and rights surrounding real property units has had disastrous consequences in many development programmes, especially those designed to help low-income communities (UNECE 2004).

¹ Lennart Frey is the Land Titling and Cadastral Systems Specialist at ELTAP.

² Translation published in the Federal Negarit Gazeta.

The quote above refers to ownership, real property and land markets in a free market economy. It is nevertheless applicable to the current situation in Ethiopia. Ownership can easily be substituted for *user rights*, real property for *parcels/holdings*. Although it may not be correct from a political or juridical point of view to talk about a land market in Ethiopia, transactions concerning parcels and rights connected to these do occur. Also the objects for user rights must be identified and described in order to secure tenure for the benefit of the user in right as well as for society at large.

Fig. 1. Object identification and sustainable development.



2. Objectives

This paper will highlight the requirements on parcel identifiers and describe different identifiers and their usefulness for land registration and information sharing. It will also give some examples from the newly independent states of Central and Eastern Europe and from some African states presently engaged in modernizing old systems or introducing new systems due to new technical demands.

3. Introduction

3.1 What Is a PIS

The title of this paper reads "Issues and Improvements in the Parcel Identification System for the Land Administration System in Ethiopia". The parcel identifier serves to uniquely determine and define the entity of land to be demarcated on the ground, registered and to which legal rights can be attached. The parcel is also the object to be described on the cadastral index map and for which a certificate is issued.

The relationship between the identifier and the object to be referenced is either a *one to one* relation or a *one to many* relation as shown in Fig.3 below. What has been chosen in different countries is based on tradition and what was practical at the time the decision was made.

To be able to continue we need to clarify and define some basic terms. The attempt at definitions that follows is based on the Proclamation and the UNECE Guidelines on Real Property Units and Identifiers (RPUI). They are primarily valid for *land registration*.

Definitions

First of all it should be noted that the new federal Proclamation 465/2005 offers few definitions that are relevant to land registration and when it does, they are mostly imprecise. The Proclamation uses, e.g., the term *land holding*, but does not define it.

In the Ethiopian context the term *land holding* seems to be used both to indicate a single *parcel* and the *total number of parcels* included in the certificate, as a right holder usually has more than one parcel in the rural areas. The parcel is the smallest land entity to be demarcated, registered in the Registry Books and recorded in the certificate. So, from this point of view the term *land holding* is not unambiguous.

A parcel can be divided into *plots*. The Proclamation, e.g., Article 11.1 talks of “a farm plot”, this seems to correspond to *parcel* rather than plot according to the RPUI definition.

According to the Guidelines, a *plot* is defined by the crop that grows on it. Registration of plots is not a task for *land registration*.

Land registration is defined as the process of recording rights in land either in the form of registration of deeds or else through the registration of title to land³. The Proclamation has a similar definition. Article 2.15 states “*land registration*”[is] *the process whereby information on the expression of rural land use right and holding is gathered and analyzed*”.

It should be emphasized that no commonly accepted international terminology or definitions exist. Neither is there any standard basic register unit. There are some recommendations from various UN agencies on terminology for specific purposes. For the purpose of this paper the following terms and definitions will be used (table 1). They are as far as possible adapted to the terminology suggested in the RPUI.

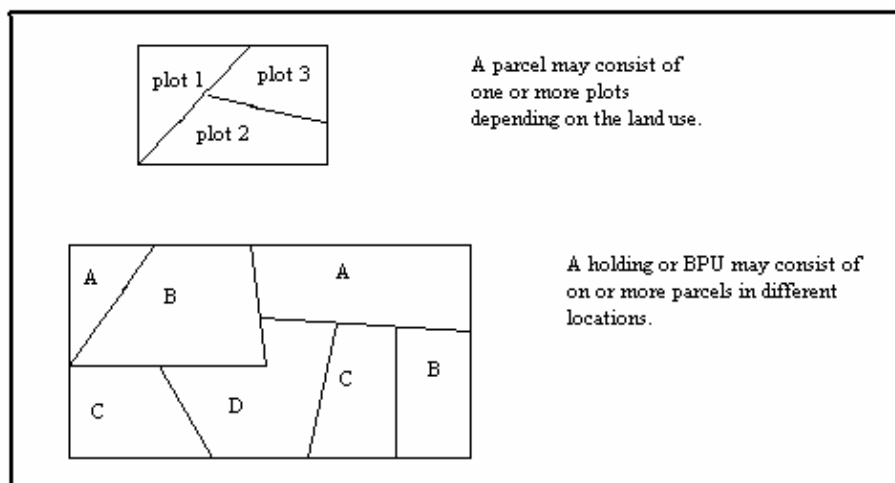
³ Definitions extracted from the Glossary of Terms in the UNECE Guidelines on Real Property Units and Identifiers and Land Administration Guidelines.

Table 1. Terms and definitions with corresponding equivalents

Term	RPUI ⁴	FP 456/2005 LAU
<i>Basic property unit</i>	A land parcel (<i>see below</i>) or group of land parcels in one ownership.	Holding, i.e., the parcel/s that are described in a holder's certificate. <i>Article 6.1</i>
<i>Land parcel</i>	A single area of land, or more particularly a volume of space, under homogeneous real property rights and unique ownership.	Seems to correspond to <i>parcel</i> but the translator uses the term <i>plot</i> , <i>Article 11.1</i>
<i>Parcel</i>	A land parcel	
<i>Plot</i>	A component of a land parcel (<i>see above</i>) normally defined by the way in which the land is used and capable of being plotted on a map.	

Fig. 2 illustrates the relationship between a basic property unit / land holding, a parcel and the plot according to the terminology of RPUI.

Fig.2. Relationship between a parcel and the plot.



In the following PIS is proposed to mean (basic) property identification⁵ system, i.e., the identification of the total *land holding*.

⁴ Definitions extracted from the Glossary of Terms in the UNECE Guidelines on Real Property Units and Identifiers.

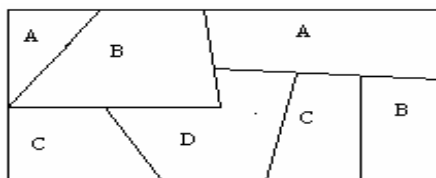
⁵ Identification system and referencing system/code are used as synonyms in this paper.

3.2 Permutations

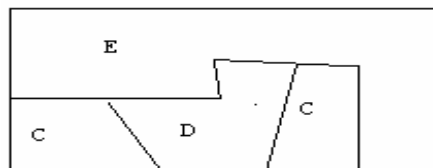
Not only the user of a land holding may change. The land holding itself may change due to consolidation, inheritance, gift etc. There are some common measures that may be undertaken in most systems. These are amalgamation, subdivision and re-allotment. The issue of whether the land holding consists of one or more parcels is not important in this case.

Amalgamation: Amalgamation is the process whereby two or more land holdings are merged to form a new land holding. A new land holding is created and is given a new unique identifier. See Fig 3 below.

Fig. 3. Amalgamation.



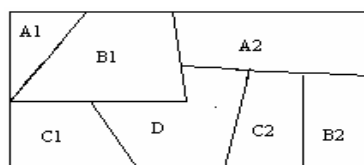
Land holdings A and B are merged into a new holding.



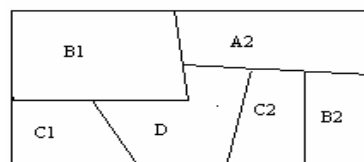
The new holding receives a new identifier E and the old identifiers A and B are transferred to the historical file.

Re-allotment: Re-allotment is a process where an area is transferred from one existing land holding to another already existing land holding. There are no changes of identifiers, only the area of the holdings change.

Fig.4. Re-allotment.



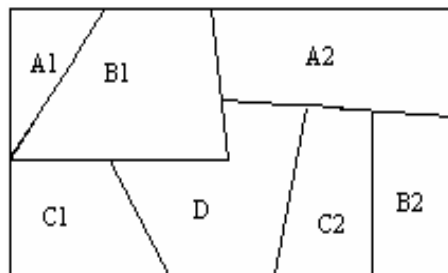
Parcel A1 is transferred from Holding A to holding B.



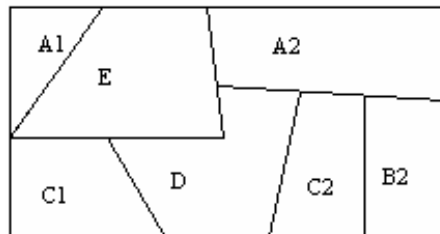
In this case as parcel A1 is bordering with B1 only the area of B1 changes. If A1 had not been bordering with B1 it would have become B3.

Subdivision: Subdivision is the process by which an area of a land holding or an entire parcel is alienated to form a new land holding with its own unique identifier. The parent holding can either be given a new identifier or keep its old identifier.

Fig. 5. Subdivision.



Parcel B1 is subdivided from land holding B to form a new land holding



B1 is given a new identity and becomes land holding E consisting of one parcel.

3.3 Basic Requirements on PIS

There are some basic requirements that a PIS should meet:

The reference chosen should be easy to understand and easy to remember; easy to use for the public and by computers; permanent so that it does not change with the sale of a property, but capable of being updated when there is for example a subdivision of the land; unique; accurate; and economic to introduce (FAO 1995).

To this it could be added that the identifier should be the same for all land within a nation, rural and urban, and be independent of who owns the land. This will facilitate necessary changes of administrative boundaries, information exchange and compilation of national statistics. It should also contribute to uphold transparency to the benefit of the holder, as it makes it clear that a holding that, for example, is about to be expropriated or transferred from rural to municipal jurisdiction, is the same as it was before the expropriation claim and the rights of the holder are also intact until the expropriation has been finalized.

Dale and McLaughlin (1998)⁶ list 10 requirements for a PIS:

- a) easy to understand, making confusion and mistakes less likely;
- b) easy to remember so that landowners can recall their references;
- c) easy to use both by the general public and administrators;
- d) easy to process in computers;
- e) permanent so that, for instance, the parcel reference does not change with the sale of the property;
- f) capable of being up-dated when there is a subdivision or amalgamation of two adjoining properties;
- g) unique so that no two parcels have the same reference and there is a one to one correspondence between the property on the ground and the property referred to in the registers;
- h) accurate and unlikely to be transcribed in error;
- i) flexible so that it can be used for a variety of purposes from registration of title to all forms of land administration;
- j) economic to introduce and to maintain.

These requirements have been widely recognized and also been put forth and adopted by UNECE Land Administration Guidelines (LAG), the RPUI and individual writers, e.g., Larsson (1991).

3.4 What Are the Benefits of the PIS?

Which are then the benefits of a national PIS established, accepted and used by different sectors in society?

Apart from correctly and authoritatively identifying the object to which legally recognized and protected rights are connected, proper identification indirectly, through its use in the land registration process, serves a number of other areas of social and economic activities:

Benefits arise through its application to: asset management; conveyancing; credit security; demographic analysis; development control; emergency planning and management; environmental impact assessment; housing transactions and land market analysis; land and property ownership; land and property taxation; land reform; monitoring statistical data; physical planning; property portfolio management; public communication; site location; site management and protection (UNECE 1996).

⁶ The list is taken from the book *Land Information Management. In Land Administration*, points 3 and 4 have been amalgamated.

The PIS can serve as a link between data sources and facilitate data exchange, cross referencing and processing, thus avoiding duplication of information in various registers that does not communicate or are difficult and time consuming to retrieve information from.

3.5 Ways of Referencing Land

Once the object, in the case of Ethiopia the holding, has been defined it is necessary to decide on the object reference or identifier. Referencing the object of a land use right can be done in a number of ways depending on historical reasons and the purpose for which the referencing system was designed.

The following are some examples: the name of the buyer and seller, the title registration number, volume and folio number, subdivision / district name and parcel number, block and parcel number, object address, coordinates.

As Ethiopia is in the process of automating its land registration process only those referencing methods relevant and practical in a modern automated system will be presented:

- Block-and-plot numbering system,
- Coordinate or geocode system,
- Street addresses.

The choice of either system does not mean that information about the holding right can not be retrieved using other references, such as user's name, provided it is sufficiently unique, passport or social security number – however, the latter two are not applicable to Ethiopia since most Ethiopians have neither passports nor social security numbers – the address of the holding, etc. The street address is, at this moment, not useful since most streets in Ethiopian Cities have no names. A proposal for an addressing system for Africa has been put forth in a discussion paper from UNECA (UNECA 2005). Addis Ababa City has issued guidelines on street addresses for the city.

Block-and-plot numbering system: Block and plot numbering systems are similar to systems using sub-division or district name and parcel number. The difference is that block and plot-numbering systems are independent of the administrative boundaries that the sub-division systems are based on. This can be an advantage if the administrative authorities are prone to often make changes in the administrative division of the country. This referencing model fulfills most of the requirements advocated by Dale & McLaughlin (1998) and others.

Coordinate or geocode system: This can be based on latitude and longitude or more commonly on the national grid used for small-scale mapping. Technically they are very exact, but they miss most of the other requirements related to transparency, practicality and easiness of use. A boundary can be represented by a string of coordinates taken for each corner or twist of the boundary. A whole parcel can be given a reference by choosing a one point within it, usually the assumed centroid coordinate. The accuracy is dependant on how many digits are used.

The coordinates can be combined in pairs as a single number. Of course, internally in a computer system, coordinates are very well suited for cross-referencing between the cadastral index map and the register even if the official identifier is hierarchical. However, they are not easy to remember, the longer the string the more open to errors when transcribing.

Coordinates fall short of most of the requirements generally accepted in the doctrine. They are not very well suited as primary keys. Their usefulness is also dependant on the accuracy of the measurement and the area of the object.

4. Current Situation

This section contains a brief survey of PIS adopted or under discussion in some countries in Europe and Africa. It is by no means comprehensive and it is based on a small survey for the purpose of this paper.

4.1 PIS in Some European Transition Economies

The development in the countries that were part of the Soviet block is of interest since they, after the fall of the Soviet Union and break-away from socialist plan economy, all have introduced either private ownership to land or long-term user rights. In some countries the State has retained ownership of the land (at least the agricultural land) and in some countries the market is restricted in similar ways as in Ethiopia. These countries have all gone through similar processes in determining their identification systems as that now begun in Ethiopia and they have come up with national solutions that are slightly different. There are, however, similarities. The RPUI contains some tables illustrating the models chosen by different countries.

To the question “Can a basic property unit (holding) consist of more than one parcel?” The following answers were given:

Hungary	Lithuania	Latvia	Poland	Russia	Slovakia	Slovenia	Ukraine
Y	N	Y	Y	Y	Y	Y	N

Out of the eight countries that responded to the enquiry six countries responded positively for basic property unit to consist more than one parcel.

In response to another question concerning the type of identifier that had been chosen countries gave the following answer:

Examples of basic property unit identifiers:

AUSTRIA (and similarly in **CROATIA**):
 Parcel ID: 20018-123/23
 (Cadastral unit identifier plus the number of the parcel. The Cadastral unit identifier

consists of five digits: provincial code (first digit); competent district court (second and third digits); and cadastral unit (last 2 digits). The codes remain unique keys in the sense of a database system even when mergers of administrative offices occur.)

DENMARK:

The Danish cadastral identifier is a compound of a number and small letters, like 2df. Each parcel has a unique number within a specific defined area. Prior to April 2001, the same number could be attached to several parcels within the same area, but now each parcel must have a unique number within a specific defined area. The numbering system does not apply to all parts of Denmark for historical reasons.

FINLAND :

BPU ID: 123-223-3-44

(Municipal code, location code, group code (block or house), unit code (lot or register unit).)

GREECE:

Parcel ID: 22-333-22-22-333

(Prefecture (2 digits)-municipality (3)-cadastral sector (2)-cadastral section (2)-parcel (3).)

LATVIA:

Parcel ID: 01000030002

(0100 = code of cadastral territory; 003 = code of cadastral group; 0002 = unique number in cadastral group (from 0001 - 9999).)

LITHUANIA:

Parcel ID: 4400-0004-4230 (the unique code)

(Each land parcel has a unique number consisting of 12 digits including 1 control number. The digits have no special significance.)

Cadastral address: 5203/0003:4

(5203 = code of cadastral unit; 0003 = code of block; 4 = parcel number in the block (unique within the block).)

RUSSIAN FEDERATION:

Parcel ID: 50:13:03:001 is the first parcel in cadastre block 3 in Chimki rayon (13 = the number of the cadastre rayon) in Moscow region (50 = number of cadastre okrug).

SWEDEN:

Parcel ID: Haninge Svartsö 3:49 where the municipality, township or village is named, followed by the block number and BPU number.

As can be seen from the above examples most of the NIS-countries have chosen to let a BPU/holding consist of more than one parcel and they have chosen some kind of hierarchical block-parcel numbering system.

4.2 Some African States

There is no comprehensive compilation on the situation in African states like the one mentioned in the previous section concerning the NIS countries.

For the purpose of this paper the writer has made a small survey of some African countries where it has been possible to get up-to-date and reliable information. It should be noted that discussions are going on in several African countries on how to reform their present identification systems that mostly date back to the colonial days. These discussions are mostly driven by automation requirements and the demand from the system design point of view for strictly logical and easy to handle referencing systems.

To the question “Can a basic property unit (holding) consist of more than one parcel?” The following answers were given:

Botswana	Ghana	Namibia		Uganda	Zambia
N	Y	N		N	N

Out of the countries that responded to the enquiry only **one country** responded in favour of basic property unit to consist more than one parcel.

In response to another enquiry concerning the type of identifier they had chosen, the countries gave the following answer.

Botswana and Namibia

Botswana and Namibia have identification systems derived from the old farm structure. The system is very complicated and not recommended.

Ghana

SG/AS/001/2006/numbers of the corner beacons. The Beacon numbers that demarcate the parcel are:

SG = Survey of Ghana
AS = Regional Code
001 = job number
2006 = the year the survey was carried out

Uganda

There is a proposal for a hierarchical identifier built from district/block/plot no.

Zambia

Surveyor General Allotment Area Code/Erf-Farm No/Portion No.

4.3 Ethiopia

Only the ELTAP focus regions will be discussed as these are presently the only regional states undertaking registration in the near future.

The project regions

Only the Amhara and Oromia regions have introduced identifiers that can be referred to as proper identification systems.

SNNP and Tigray use a system of identification based on recording the household number and names of the neighboring holders. This works well in the local context during the adjudication procedure and can even be preferable from the point of understandability and transparency in favor of the farmers. However, it is not suitable for an automated system as the identifier is neither stable nor unique. If the neighbors change, the identifier changes.

It could be noted that the Amhara computerized pilot project has found it a very useful tool during the adjudication process to have the names of the holders of the neighboring parcels available when the results of the adjudication process are presented to the Kebele inhabitants.

Other organizations

EMA has not been involved in cadastral survey and has therefore not introduced any PIS. It seems that there is no agency that has the responsibility for cadastral surveying. In many countries this is a task of the mapping agency.

CSA uses a hierarchical identifier that allows it to identify crops growing in a field (plot) within the parcel. The CSA identifier is based on recommendations from the FAO World Agricultural Census Programme (FAO 2000). This census programme focuses on economical statistics and not on land registration. It uses terms that are the same but the definitions are different.

Also the Addis Ababa Municipality uses a type of hierarchical identifier in its GIS that appears to be similar to that of CSA.

4.3.1 Amhara Regional State

This format is already in use in the Amhara Region in the manual system. It is a mixture of object identifier and the holder identifier. Some documents show also the use of a zonal code.

Parcel-id format:

Region code	Zone Code	Wereda code	Kebele code	No of each plot the land holder has in the kebele
AA	A	001	01	00001

Owner id format:

Region code	Zone Code	Wereda code	Kebele code	Registration No of land owner in kebele
AA	A	001	01	0001

If an owner moves to another Kebele, he is given a new registration number, hence this owner identifier can not be used as a personal identifier.

The automated pilot system uses this id for the holding:

Region code	Zonal code	Wereda code	Kebele code	Holding code
A	A	NNN	NN	NNNNN

Internally the system keeps track of all parcels that belong to a holding.

4.3.2 Oromia Regional State

Parcel-id format:

Region code	Zonal code	Wereda code	Parcel
AA	001	001	00001

This referencing system differs from the others in that it does not include the Kebele level. It is not clear how the holdings can be kept together in a computerized environment.

4.3.3 Addis Ababa City Administration

In its GIS, the Addis Ababa Administration uses a hierarchical identifier. The Title Registration Office uses a number of different identifiers for cross referencing files and folders.

Zone	Wereda	Kebele	Block	Parcel	Building/House #
1	001	01	10	1	00001/01/01

In a national system a code for Addis Ababa city has to be added to this identifier.

4.3.4 Central Statistics Office

CSA has a need to identify different crops at field level.

Region	Zone	Wereda	Kebele	Enumeration Area	Household	Holding	Parcel	Field
01	01	01	01	01	001	01	01	01

As can be seen from the above examples hierarchical sub-division/district or block-and-plot numbering systems are already in use in Ethiopia. The CSA identifier is stable over the years down to the enumeration area. Households, holdings, parcels and fields are sequentially numbered in a different order for each census. However, this does not imply that parcel data can not be exchanged between a rural land registration system and CSA in the future.

The incorporation of the zonal code in the identifier may not be a good idea as the boundaries of the zones are reported to be changed quite often. The effect of this would be that the holding will change identification and all systems using the code will have to be up-dated accordingly. If there are Weredas with the same name in a region the problem can be addressed in various ways:

- a) Re-naming Weredas that have the same name,
- b) Introduction of a system with cadastral blocks that are independent of the administrative boundaries,
- c) Using coordinates as identifiers.

5. Constraints and Opportunities

5.1 Constraints

- Lack of common definitions and standards. As long as there is no national standard terminology, various organizations within the country are likely to define terms according to their own needs. This means that the same term can apply to different objects depending on the tasks and duties of the organization.
- There is no national information policy adopted or any national forum where standardization and coordination issues can be discussed. These issues go beyond land use and environmental protection. Other government agencies and the private sector have an interest in parcel-based information.
- There are various code tables in use by different organizations for Weredas, Zones and Kebeles.
- Requirements on basic parcel-related information need to be defined in terms of:
What:
 - information is needed and by whom?
 - intervals for updating and exchange?
 - accuracy demands for various data items?
- Systems already in use, however few, may be expensive or difficult to change.

5.2 Opportunities

- Automation of land-related information is only in an initial phase;

- Possible to set national standards for data and establish common administrative code tables;
- Common understanding of the present problem and future possibilities;
- There is international experience to draw on from a great number of countries in Eastern Europe (the NIS) and Central Asia that have recently gone through this process or are in the midst of doing so;
- The identifiers used by CSA and Addis Ababa Municipality are hierarchical and seem to correspond fully down to parcel/holding level; hence introducing a corresponding hierarchical structure for rural land should not be difficult;
- The second level certification⁷ effort has not yet started in Amhara and Tigray. It would be simple to introduce a common national identifier during this effort. In the other regions it can be introduced from the beginning.

6. Recommendations

It is recommended that the PIS chosen:

- uniquely identifies each land holding at the national level;
- a land holding is defined as consisting of one or more parcels;
- is the same for all land, rural as well as urban;
- have a logical, hierarchical structure that gives local reference;
- is independent of owner/user particulars;
- is stable over time but possible to up-date/change though only through a legal procedure in connection with physical changes of the parcel;
- is transparent and easy to use and remember by the common public; and
- a coordinate reference should be included for each parcel, however not as a *primary key* for common use as the everyday identifier.

7. The Way Forward

Which is the way forward to establish a national identifier?

- a) First of all key definitions have to be adopted by the focus regions. This issue should be addressed when revising the regional proclamations. Terms that need a definition are *land holding* and whether a land holding should consist of one or more parcels.

⁷ At present titling is carried out in two stages. The first stage does not include exact measurements of the parcels.

- b) The next step would be to agree on the structure of the identifier.
- c) The third step would be to decide on which administrative code tables to use.
- d) Finally a forum for inter-departmental discussion and information exchange should be established.

References

- Dale P., and J. McLaughlin. 1988. *Land information management*. United Kingdom: Oxford University Press.
- _____. 1999. *Land administration*. United Kingdom: Oxford University Press.
- United Nations Economic Commission for Europe (UNECE). 1996. *Land administration guidelines with special reference to countries in transition*. (ECE/HPB/96).
- _____. 2004. *Guidelines on Real Property Units and identifiers*. (ECE/HBP/135).
- Food and Agricultural Organization (FAO). 1995. *Land tenure studies 1: Cadastral surveys and records of rights in land*.
- _____. 2000. *Statistical Development Series No.5*.
- _____. 2003. *Multilingual thesaurus on land tenure*.
- Federal Democratic Republic of Ethiopia. *Rural Land Administration and Use Proclamation No. 456/2005*.
- International Federation of Surveyors (FIG). 1995. *The FIG statement on the cadastre*. Denmark: Frederiksberg. Publication No. 11/1995.
- _____. *The Bathurst declaration on land administration for sustainable development*. 1999. Denmark: Frederiksberg.
- _____. 2002. *The Nairobi statement on spatial information for sustainable development*. Frederiksberg. Publication No. 30.
- HM Land Registry. 2000. *Study on key aspects of land registration and cadastral legislation*. London: UNECE Working Party on Land Administration.
- _____. 2001. *Inventory of land administration systems in Europe and North America*. Third edition. London: UNECE Working Party on Land Administration.
- Larsson, G. 1991. *Land registration and cadastral systems, tools for land information and management*. England: Longman Scientific and Technical.