

# THE IMPORTANCE OF RRR IN CADASTRAL SYSTEM

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## KEYWORDS

RRR, Cadastral System, LADM

## ABSTRACT

*Cadastral System is the base platform to abstracting land rights; maintain its records and registration. It normally makes agreements with dispersed right interests as tenure security, continuum of land rights, registration system, adjudication process and de-facto, local and central government policy aspects within land administration party. As, RRR- Rights, Restrictions and Responsibilities are related to spatial unit and its owner, normally right contains ownership and tenure aspect whereas restrictions is related to control use and different activities on land. Responsibilities relate more to a social, environmental, communal, ethical obligation or defiance to environmental sustainability. Most cadastral system of developing countries are still absence in identifying and assigning clear RRR in certain spatial unit i.e. buffered on Highways, banks of Rivers and Streams and special cases of shade of High-tension-transmission lines etc. This paper aims to provide an overall understanding of such RRR cases with the concept of cadastral system. This paper aims to show AS-IS situation cadastral system with comparing TO-BE condition with gap analysis based on LADM conception of some related cases. This paper concludes that cadastral system will be good when there is clearly defined RRR. So, better identification and assignment of RRR between spatial unit and land administration party can support better cadastral system which supports to better land administration of country.*

## 1 INTRODUCTION

### 1.1 Background

Land is the vital source, without it life on earth cannot be persistent. Good management of the land is important for present and future generations(UNECE, 1996) .Land tenure security supports transferability of land, greater investment incentive, more sustainable management of land resources (Ghimire, 2011).

A cadastral system can be suitably defined as a parcel-based and up-to-date land information system containing a record of interests in land e.g. RRRs(Williamson, Enemark, Wallace, & Rajabifard, 2010). Interests in relation to land can be characterized as identifying things that you can do (rights), things that you can't do (restrictions), and things that you have to do (responsibilities) (Grant, 2014). These three

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(rights, restrictions and responsibilities) can be abbreviated as ‘RRR’. A property rights system will define what, who, when and (through the cadastral system) where as land parcel object with relation of person. These components can be described as follows: What the RRR is in law? Who (or which organization) holds the RRR or is subject to it? When the RRR came into effect? Or when it ceased to apply? where the land or real property is that it applies to, including its extent(Gogolou, 2013) Cadastre at the core of land administration systems traditionally documented the land ownership rights. With the increasing pressure on land and land use, there is a trend that public authorities impose more and more restrictions and responsibilities. There is an international style that these restrictions and responsibilities are being combined into the cadastre as well, as landowners and other land market participants want and need to know about all factors affecting their land property.

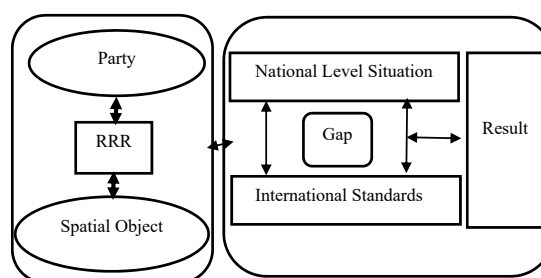
According to Ingram and Hong (2009) the five rights have been defined as Access—a right to enter a defined physical property, Withdrawal—a right to harvest the products of a resource such as timber, water, and food for pastoral animals, Management—a right to regulate the use patterns of other cutters and to transform a resource system by building improvements, Exclusion—a right to determine who will have the right of access to a resource and whether that right can be transferred and Alienation—a right to sell or lease any of the above rights.

The class Right or Restriction allows for the introduction of ‘shares of rights’ in case where a group of Persons holds a total part of a ‘complete’ right; this has to be included: a share in a Right is possible in Version A, but should be openly included as an attribute. Rights, Restrictions and Responsibilities should be specializations of the RRR class; this allows for the introduction of separate aspects in subclasses(Lemmen, 2012). Recent developments in land property- such as the evolution of governmental land-use planning controls- suggest that the previous theories of property as an unrestricted set of rights are now insufficient. Restrictions and responsibilities are now inseparably linked to our theories of property rights and ownership. Sustainable land

management demands that these similar concepts be dealt with in a complete manner(Žróbek, 2008).

## 1.2 Conceptual Framework

The conceptual framework for the paper is set out in terms of RRR with owner and spatial object. The existing practices and innovative actions will be important to perform Gap analysis to formulating strategy. This paper investigates the national country context of RRR situation



of (AS-IS) situation of cadastral system. The modern system and experience related to RRR in West Africa, Australia and Netherlands are reviewed as international standards (TO-BE) to gap analysis with national level situation, which conceptual framework is shown on Figure 1-1.

### 1.2.1 RRR -Right, Restriction and Responsibility

Land rights, records and registration normally do agreement with enumerations for tenure security, continuum of land rights, deeds or titles, socially appropriate adjudication, statutory and customary, co-management approaches, land record management for transact ability and family and group rights(Manandhar, 2015). Out of right upon land, restriction and responsibility on land are also important issue and interest in land administration.

The number of restrictions and responsibilities that control land use and development has rapidly increased over the last fifty years(R. Bennett, Wallace, & Williamson, 2005). The new Land Management Pattern demands that land and resources be managed holistically: a new model for the management of property rights, restrictions and responsibilities is required.

This paper aims to describe the major findings of ongoing research into the problematic management of property restrictions and responsibilities. The aim is to change the issue as one of land management, rather than one of information organization. Also discussed are a number of institutional, regulatory and policy issues that relate to restrictions and responsibilities. To date, these issues have received nominal attention: achieving sustainable land management will require that these issues be addressed (Bennett, 2007).

### 1.2.2 Cadastral System

The development or improvement of land registration and cadastral systems requires a broad view of system concepts if it is to ensure that these systems operate efficiently for many purposes besides the basic tasks of providing legal security by titles or deeds and data for property taxation.

The broad view of such system concepts concerns the integrated management perspective of tenure security, economic development and environmental control (Tuladhar, 2004).

A successful land information system should provide the essential information to provide efficient and effective land administration services and are guided by the government policy. LIS can integrate different tasks in traditional cadastres and land registration system into one thus increasing the efficiency in land administration services (Dangol, 2012).

## 2 Material and Methods

This paper is based on case study and literature review. It uses cadastral map and rule/ standards of local government or municipal regulation and national standards as secondary data.

### 2.1 Case study area

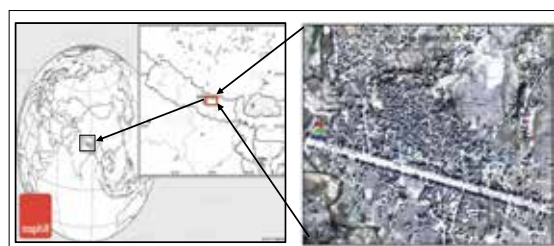


Figure 2-1 Case study site ( Banepa, Kavre, Nepal)

Araniko Highway, Punyamata River, Chandeshwori Stream and High-tension (power line), which belong to cadastral map sheet of 157-1324, located in Banepa Municipality, Kavre District in Nepal is taken as case study area which is shown in Figure 2-1 .

### 2.2 Case study issues

The case study issues are selected in Banepa Municipality, Kavrepalanchok district in Nepal. It is suitable for the study because there are different types of ongoing debate of Right of Way-ROW in Araniko highway, Punyamata River, Chandeshwori Stream and High-tension (power line) at Banepa, which is directly linked with different land right, restriction and responsibility issues.

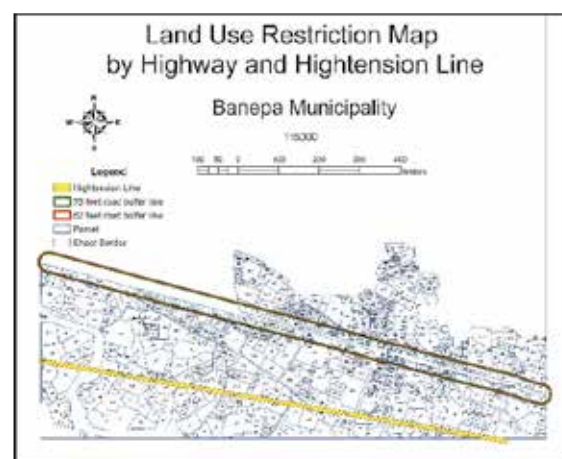


Figure 2-2: Land use restriction map by Highway and high-tension

The major controversial issue of case study area is ROW of Araniko Highway at Banepa Bazaar, because of dual conflicting provision of 75ft provisioned by local government or municipal regulation where 82ft standard is restricted by national highway standards from the center line of the Highway ROW (right of way). Figure 2-2 shows the ROW of Araniko highway with 75 feet and 82 feet from center line of highway and same as 30 feet land area occupied by High-tension (Power line). In figure Araniko highway with buffering zone is shown in upside of figure and the high-tension buffer zone is shown in down side. In case of Punyamata River and Chandeshori stream of Banepa region, the municipal rule is regulated as 15 meters

restriction for river and 7 m for stream from both banks. Lands which are located both at the bank of Punyamata river, are restricted by 15m to freely hold and 7m on Chandeshori stream is shown in Figure 2-3. Governing law for land restrictions in case of highway, rivers, stream and high-tension areas are shown in Table 2-1, which shows the comparatively municipal regulation and national standards of different cases.

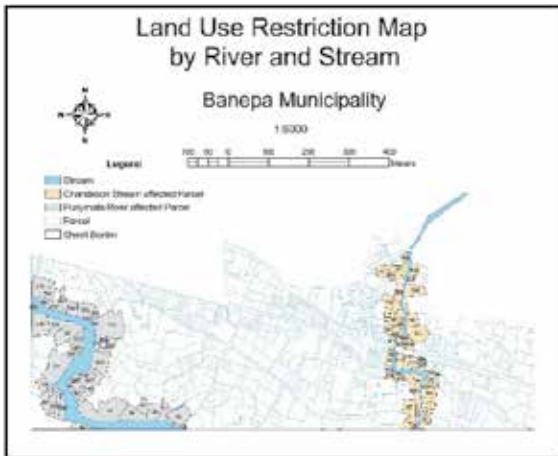


Figure 2-3: Land use restriction map by River and Stream.

There are several laws related to land administration. The rules have gaps and overlaps among the land acquisition techniques. Even, in the Land Acquisition Act of Nepal, the clear statement "When acquisition of land from public, government cannot get land without providing compensation". In the case of land acquisition history of Government of Nepal enforced to get land without compensation. If the right is clear in land administration system, such problems would be solved.

| S.N. | Case Issues     | Governing law/ Norms/ Rule / Standard |                     | Remarks                |
|------|-----------------|---------------------------------------|---------------------|------------------------|
|      |                 | Local Government                      | National Standard   |                        |
| 1    | Araniko Highway | 22.86 Meters/ 75 feet                 | 25 Meters / 82 feet | From center of highway |
| 2    | Punyamata River | 15 Meters                             | -                   | From Bank of River     |

|   |                                  |          |                   |                           |
|---|----------------------------------|----------|-------------------|---------------------------|
| 3 | Chandeshori Stream               | 7 Meters | -                 | From Bank of Stream       |
| 4 | High-tension (Power line) 64 kv. | -        | 9 Meters/ 30 feet | From Centre of power line |

Table 2-1: Case issues and governing law/ norms/ rule/ standards.

### 3 RESULTS

It is very important part of the study that shows the problems of RRR in land parcels located near and touched within highway, river, stream and high-tension lines. With consideration of literature review, different levels interview, house hold survey, review of international experiences and case map analysis, we can foster RRR issues as problem in parcel objects.

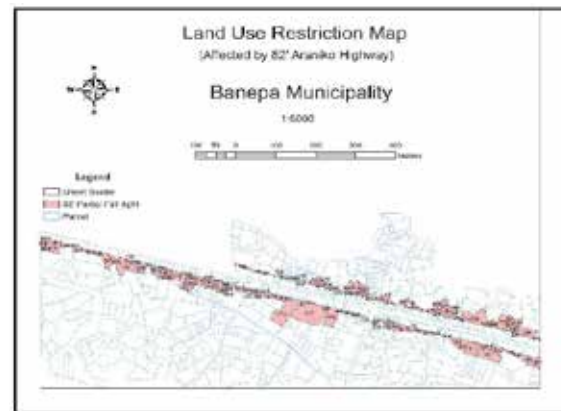


Figure 3-2: Land use Restriction map affected by 82 feet Araniko highway

The related parcel owners of affected case area are holding full right of parcel with their parcel certificate. They own full authorized certificate and map documents. But actually the certificate and parcel map may differ or wrong with actual situation in case of RRR. The provisions offered by land certificate of these areas surely meet low area and value. This creates land disputes, controversy and confusion in land administration. It directly affects in land value, land use, land ownership, land taxation and even in land development process. That variation on certificate and ground situation badly governs to right, restriction and responsibility issues.

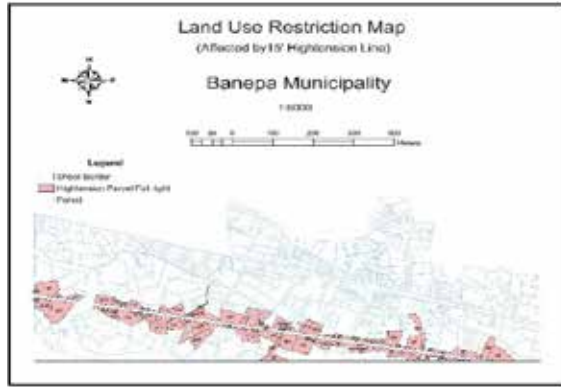


Figure 3-1: Land use Restriction map affected by 30 feet high- tension line.

We can see the parcel variation in shape and area in Figure 3-2, which shows the actual shape and remaining area of parcel after deducting restricted 82 feet ROW of Araniko Highway. Same as in Figure 3-1, we can see the affected parcel by cause of high-tension line. There are serious issues and problems in river bank and sides of stream. The land extended on bank side of river and stream is only for use, but the owner can not enjoy right on these land with law and rule of municipal regulations. But lack of notification of these restrictions on land certificate, owner usually using these illegal rights and overwhelm ignorant by their responsibilities.

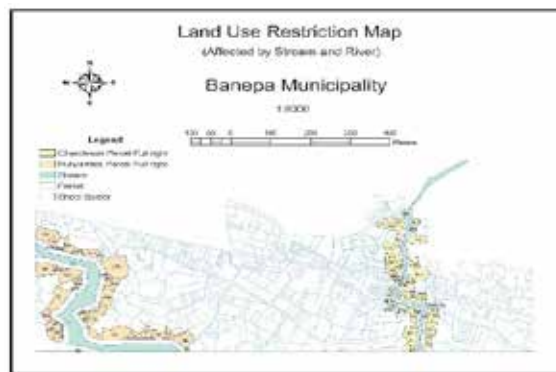


Figure 3-4: Land use Restriction map affected by Stream and River.

Figure 3-4 shows the remained parcel area and shape on the bank of Punyamata River. Same as Figure 3-3 aims to clear parcel visual with the area which deducts in highway and actual remaining parcel along Araniko highway.

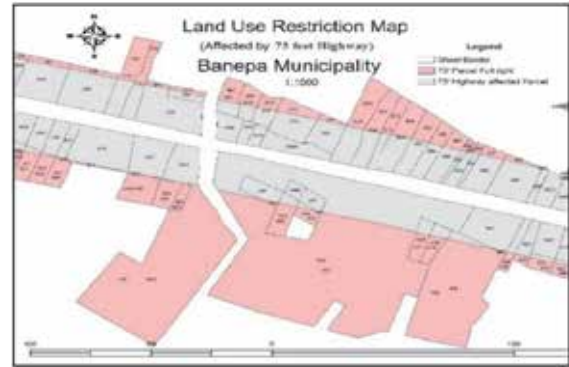


Figure 3-3: Parcel division with allocated to highway and actual remaining.

These figure shows clear visual of land extent problem with differentiation on land certificate and ground nature. Local government or municipal regulation and standards are only listed in official archive but not spark and annotates in land certificate. This issue is not only directly or indirectly increasing land related disputes and controversies day by day but also increasing in loss of land revenues, obstacle in urban development and land development.

#### 4. DISCUSSION

The core components of RRR with respect to cadastral system will be better when we can separate different interest on land. In the context of Nepal, RRR is not clearly mentioned in cadastral system. It will be better to study the gap between country context RRR and Standard form to define RRR, that method will suggest for its solution to maintain good cadastral system in country context.

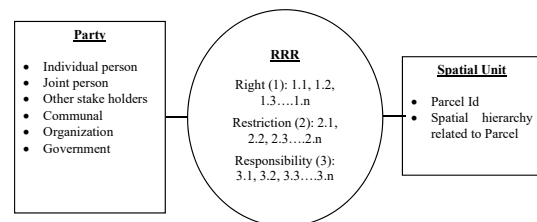


Figure 4-1: The abstract concept adapted by LADM

#### 4.1 ISO standard LADM

Land Administration Domain Model-LADM is the emerging concept in aspect of sustainable land administration system and related to object

to subject base cadastre and land administration system, showing the relationship between party and parcel. This is the ‘Object –Right – Subject’ model. It is generally recognized that a land recording system should be parcel based, not people based, with the parcel being uniquely described in some form of map supported by a land survey system(Lemmen, 2012). There are three categories with different theoretical connections between object and subject, a direct connection between object and subject, a connection through right and obligation and a connection through ownership.

The traditional concept of being relation of human kind to parcel only focuses limited RRR aspect. But LADM concept aims to define

descriptive relation of land parcel as spatial unit with respect to Party as different individual person, Joint person, other stake holders and communal aspect. So, in case of this study, this model is adapted by LADM by requirement of RRR relation with Party and Spatial Unit, which is shown in Figure 4-1.

Considering LADM as ISO standard of land administration, the exploration of figure of LADM having three essential components is shown in Figure 4-1. This concept mainly focuses on element based right, restriction and responsibility with respect to different party and spatial unit. This conception links party to spatial object with RRR. It debates on divers important of RRR to connecting party to spatial unit.

## 4.2 RRR Elements

| Person   | RRR   |   |   | Spatial Unit   |
|--|---|---|---|--|
|  | Right   | Restriction   | Responsibilities  |  |
| <ul style="list-style-type: none"> <li>• Individual person</li> <li>• Joint person</li> <li>• Other stake holders</li> <li>• Communal</li> <li>• Organization</li> <li>• Government</li> </ul> | R1.1 Occupy<br>R1.2 Use<br>R1.3 Sell<br>R1.4 Transfer<br>R1.5 Mortgage<br>R1.6 Compensation<br>R1.7 Easement<br>R1.8 Derive income<br>R1.9 Purchase<br>R1.10 Grant<br>R1.11 Inherit<br>R1.12 Develop<br>R1.n..... | R2.1 Exclude<br>R2.2 Land use type<br>R2.3 ROW<br>R2.4 Rule of NEA<br>R2.5 Local act<br>R2.6 Land use zone<br>R2.7 Subdivision regulations<br>R2.8 Minimum parcel size<br>R2.n..... | R3.1 Environmental requisition<br>R3.2 Pollution control<br>R3.3 Disturbance<br>R3.4 Structures for access<br>R3.5 Construction<br>R3.6 Setbacks<br>R3.n..... | <ul style="list-style-type: none"> <li>• Parcel ID</li> <li>• Area</li> <li>• Value</li> <li>• Use</li> <li>• Spatial hierarchy related to parcel</li> </ul> |

Table 4-1: RRR elements

Cadastral system is backbone of land administration system. A cadastral system can not sustain without recordance of information of parcel and its owner. It is now clear that without clear identification of RRR component with relation of party or owner and spatial unit, recordance of cadastral system can not sustain. Proper issues identification about right, restriction and responsibility in policy, management and operational level is very crucial. It is emergence step to identify and allocate of RRR elements during cadastral survey and generating land certificate. The allocation and assigning RRR element(s) on individual parcel

will be better road mark for getting successful land administration destination. With respect to review of developed cadastral systems and case study the following RRR elements are identified, which are listed in Table 4-1.

In this RRR element table, certain codes are defined such as: R1.1 stands for ‘occupy’, R1.2 for ‘use’, R2.1 for ‘exclude’, R2.2 for ‘land use type’, R3.1 for ‘environmental requisition’, R3.2 for ‘pollution control’ etc. For better management of RRR system, these codes should be included in ‘Land ownership certificate’. Because of it, land administrators and land owners can clearly know about it, which will help in effective land

management system. It will, hence, solve the problems and miss-understandings from the local people to land administrators.

## 5. CONCLUSION

Cadastral system is the foundation of the land administration system of every country, which directly relates with important sectors i.e. development activities i.e. urban planning, town development, transportation and highway, hydropower and power supply construction project, financial sector, agriculture, and socio-cultural sector. So, the clear identification, allocation and assignation of RRR from process of cadastral system to generating land certificate can reduce conflict and rise positive aspect in cadastral system. Being LADM as ISO standard system model, this paper explores the idea of fitting LADM concept for the clear identification of RRR in cadastral system and assigning these elements in land certificate will support to better relation with party/owner to parcel (spatial object). It will be the base for sustainable land administration system of any country.

## REFERENCES

- Bennett. (2007). *Property rights, restrictions and responsibilities: their nature, design and management*. (Doctor of Philosophy), The University of Melbourne, Melbourne.
- Bennett, R., Wallace, J., & Williamson, P. I. (2005). *Achieving Sustainable Development Objective through better Right, Restriction and Responsibilities*.
- Dangol, S. (2012). *E-government based land information system architecture: A case study of Nepal*. ITC the Netherlands
- Ghimire, S. (2011). *Assessing the role of land tenure in hydropower development for social and environmental effects*.
- Gogolou, E. D. a. C. (2013). LADM as a Basis for the Hellenic Archaeological Cadastre. *Research paper*.
- Grant, D. (2014). *Cadastral 2034. A 10-20 Year Strategy for developing the cadastral system: Knowing the 'where' of land-related rights*.
- Ingram, G. K., & Hong, Y.-H. (2009). *Property Rights and Land Policies*. Paper presented at the The 2008 Land Policy Conference.
- Lemmen, C. (2012). *A Domain Model for Land Administration*. *PhD thesis*.
- Manandhar, S. (2015). *State and Public Land Management: Issues of Encroachment and Protection Technique*. *Master's Thesis*.
- Tuladhar, A. M. (2004). *Parcel-based Geo-Information System: Concepts and Guidelines*. Enschede: ITC Printing Department.
- UNECE. (1996). *Land Administration Guidelines*: United Nations Economic Commission for Europe
- Williamson, Enemark, Wallace, & Rajabifard. (2010). *Land Administration for Sustainable Development*.
- Žróbek, S. (2008). *The Influence of Local Real Estate Management Policy on Community Budgets*. Paper presented at the FIG/FAO/CNG International Seminar on State and Public Sector Land Management.



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