

Nordic Journal of Surveying and Real Estate Research 10:2 (2014) 61–81

submitted on 10 July, 2014

revised on 2 October, 2014

accepted on 5 October, 2014

Classification and Co-ordination of Conflicting Rights for Sustainable Land Use

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Abstract. *The aim of this article is to investigate the possibilities to detect the conflicts between national interests and rights for sustainable land use. The analysis is based on a newly developed standardized terminological framework for classification of interests in land, the Legal Cadastral Domain Model. The model is used to classify conflicting rights in two Swedish mining areas, Kiruna and Bunge, in Kiruna the relocation of the city due to mining interests and in Bunge the ongoing conflict between mining interests and national nature preservation interests.*

The study shows that it is relevant to use a standardized approach for getting an overview of and thus comparing the multi-faceted nature of private and public interests in land. For example, land use regulations, such as a zoning plan, often contain prohibitions and obligations for the property owner embedded in the same document and a mining concession may contain instructions for environmental protection activities. They are in the model classified as separate interests beneficial or limiting for the right holder. A detailed classification therefore provides an overview and can assist officials and decision makers in identifying and co-ordinating conflicting interests.

Keywords. *Sustainable land use, land use rights, property rights, conflicting rights, Legal Cadastral Domain Model*

1 Introduction

1.1 Background

Today, conflicts around land use are current and urgent issues, arising around mining, environmental and cultural values, etc., often leading to debates and

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controversial decisions. Competing interests and goals of sustainable development call for advanced judgement and deliberation in planning and permission processes (Healey, 1997). Decisions on land use include hereby exploitation/development, production as well as conservation (Larsson, 2010). How land is used is of great importance and involves all sectors of society – the state, municipalities, the business sector and civil society. Land-use planning is the process of allocating resources, especially rights to use land in particular ways, in order to achieve maximum efficiency while respecting the nature of the environment and the welfare of the community (UN, 2005, pp. 51–52).

Examples of changes in land use in this article are the reallocation of the city Kiruna in the Northern part of Sweden due to mine extensions and the ongoing conflict between national preservation and private mining interests in Bunge, on the Swedish island of Gotland in the Baltic Sea. Several interests of national value (deposits of substances and materials, energy, reindeer husbandry, fishing, water supply, nature, culture, recreation, mountainous areas, etc.) are overlapping and also to some extent competing with each other in the surroundings of Kiruna. The conflicts between national interests are also evident in Bunge, where two national interests stand against one other; mineral extraction (limestone) against nature protection.

It is becoming increasingly urgent to find ways to deal with competing interests in land. Two decades ago Van den Bergh and Nijkamp (1991, p. 1409) stated, in their approach to develop an economic-ecological model for sustainable development, the need for an economic-ecological system and general characteristics of its dynamic behaviour. This is correct, however, in order to achieve a complete understanding of sustainable development other models and approaches are also needed. This article focuses on a method to classify the multi-facetted web of conflicting interests in land use and thus creating an overview in order to efficiently deal with these interests.

Many situations in society show shortage of land for different kinds of development due to different types of land use restrictions, preservations and use rights to land. Stockholm Chamber of Commerce states in a recent report that there is shortage of land for development in the Stockholm area (Stockholm Chamber of Commerce, 2014). Insufficient co-ordination between different pieces of land use legislation is often mentioned as a problem. Several Swedish governmental investigations suggested that the different regulatory frameworks for land use in many cases are difficult to reconcile, and in some cases directly contradictory (Government Inquiry, 2007).

Documentation related to permits on land use may show rights and obligations in a specific land area for different right holders. In order to achieve sustainable land use, policies (and land use legislation), management (planning and permits) and information on land must be integrated (Williamson et al., 2010, pp. 192–193). However, information on land use and different kinds of nature protection is kept by several state authorities and the municipalities.

Land information systems are used by different agencies and thus focusing on different aspects of land: e.g. juridical cadastre, i.e. a register of ownership of

parcels of land; fiscal cadastre, i.e. a register of properties and their value; and land use cadastre, being a register of land use (UN, 2004, p. 56). An information system may not be limited to one type of information, but contain many attributes of land use, thus being a multi-purpose cadastre (UN, 2004, p. 56).

The concept of multi-purpose cadastrals has been known for several years, see e.g. Dale and McLaughlin (1999). The purpose of integrating juridical, fiscal, planning and other information systems is to facilitate land use planning and land management and the enforcement of regulations affecting the use and value of land.

The complexity and diversity of land use rights and nature protection regulations makes it important that information is to be structured in order to be retrieved and analysed by different land management and environmental information systems.

Interests in land are of diverse nature and may seem as a complex legal structure difficult to overview without a conceptual framework of classification. One way of doing so is to classify them according to specific characteristics, such as their spatial expansion, the value or type of the land they cover, etc. However, underneath all these spatial, economic and other attributes these relations are the result of social processes such as agreements and instructions (contracts, public decisions, etc.) and are thus informal or formal legal instruments, regulating the use of real property. One system to provide a classification system is the newly developed Legal Cadastral Domain Model, LCDM (Paasch, 2012a; 2012b), which is used in this article.

1.2 Aim and Method

This article aims at investigating the possibilities to detect the conflicts between national interests and different types of land use rights (real property rights) for sustainable land use. The study focuses on situations with incompatible land use, restrictions on land use and in what way different areas of national interest are in conflict with each other and the legislation regulating special land use rights.

A model for classifying conflicting rights and other interests in land is also presented. The LCDM is used as a standardized framework to classify the surveyed interests in land by grouping them into different types of land use in accordance with a number of characteristics described in the model. The purpose of using the model is to create a deeper insight in the nature of land use rights.

A theoretical survey is made of private and national interests in sustainable land use. Legislation regarding different rights is studied and the conflicts between them are analysed. Swedish case studies on the iron ore mining in Kiruna and limestone extraction in Bunge are used to exemplify land use rights and the conflicts between them. An analysis is made of existing problems and how the model can be used to classify the rights.

The article starts with theoretical aspects and definitions of land use rights and how such rights can be classified by using the Legal Cadastral Domain Model, LCDM. It continues by placing land use in a sustainable context and describes difficulties for authorities to interpret legislation and access information on

national interests. The article continues by giving two examples of conflicting land use rights followed by an analysis and classification of these interests using the LCDM model. Conclusions are made by bringing out the relevance of the LCDM model as a method for detecting, and as a framework for providing an overview and comparison of the multi-faceted nature of, private and public interests in land.

2 Interests in Land

2.1 Land Use Rights

Land is a limited resource and has to be administrated in order to regulate the various private and public interests of individuals, companies or the State. The way land is administrated includes decisions on access to land, land rights, land use and land development. Even though we rarely think about it, our activities (housing, farming, husbandry, forestry, recreation etc.) presuppose that we have certain rights. These rights are defined according to law or custom. Real property¹ legislation and in a broader context land use legislation, is concerned with regulating what may be done with land. Real property rights, which are considered as equal to land use rights in this article, are a link between the legal owner and the right and the areas of land in question. “Real” in real property usually is associated with something solid, fixed and permanent, which has to do with land.

Rights to land have at least three dimensions: what is included in a right, who is the holder of this right and what physical extension this right has (Larsson, 1997, p. 12; Larsson, 2010). It means that the concept of real property is more than a two-dimensional area (surface) or for certain rights a three-dimensional volume. Different types of legislation besides land law may limit the content and physical extension of a certain right (Ekbäck, 2000).

Ownership is often referred to as a bundle of rights that are defined by law (Larsson, 1997). Different holders can thus use the rights simultaneously. Ownership of property is to a large extent decided by what rights the owner of the property has received (Bergström, 1956). Ownership carries with it all the powers over the property that are not limited by legislation. Ownership to land can also be described as the owner being entitled to ongoing land use, e.g. agriculture.

Land ownership may theoretically assume absolute title, i.e. the right of the owner to do with the land as he/she pleases or sees fit, including excluding others from its use. In practice, absolute ownership rarely exists due to restrictions of various kinds (Mattsson, 2004). Access to land is in reality limited and different restrictions may be imposed on the landowner’s ownership right. The influences of public and private regulations on ownership rights are illustrated in Figure 1.

The grey, filled area in the figure illustrates the owner’s right to utilize his/her rights. To the far left in the figure the owner has control of all rights, i.e. being

¹ The concept of real property used in this article is not limited to any specific legislation or legal tradition such as civil law or common law, but is used as a general term for the strongest right available in a jurisdiction, called e.g. ownership, freehold or property.

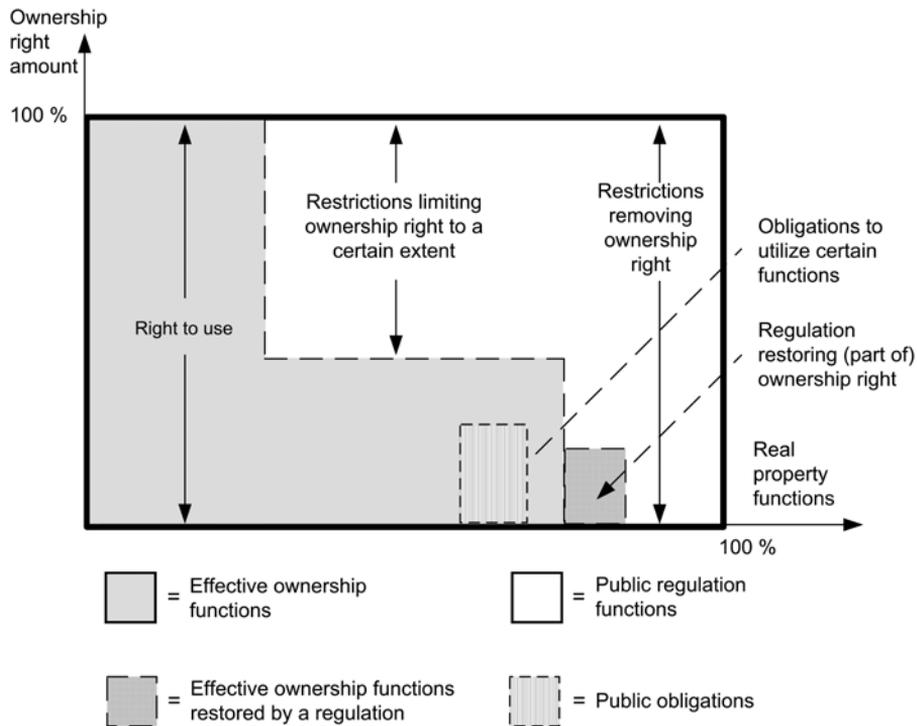


Figure 1. Public and private regulations influencing property right ownership (Paasch, 2012b, based on Ekbäck, 2000, p. 32).

able to do what he/she wants on the property without any restrictions, whereas in the middle of the figure the rights are reduced by privately or publicly imposed restrictions or obligations. Examples are a general prohibition to store chemical waste on the real properties and obligations for the land owners to comply with, such as instructions to preserve and maintain historically important buildings. This is illustrated by the striped area in the figure.

If the land owner receives a permission to do something which is otherwise restricted on the property, he/she is being restored parts of the original, i.e. absolute, ownership rights. Albeit absolute ownership is a (theoretical) concept it illustrates the influence of regulations reducing the actual activities to be performed on the property. The (partly) restored ownership is illustrated with the crosshatched area in the figure.

To the far right of the figure all ownership functions have been removed by regulations. This would in practice mean that the owner could not do anything without seeking permission. It is doubtful that this situation exists in the real world.

The possibility of exercising land use rights depends today on a whole range of legislation. Rules about environmental protection are for instance under rapid development with the consequence that policies and laws must be flexible and capable of rapid alteration (Kiss and Shelton, 1997), which also affects special

legislation connected to land use. The way the public and legally interested parties look upon different types of land use activities is probably affected by the absence of a clarifying view on how rights actually can be exercised due to restrictions, etc.

Land use rights are often sector-specific and can be in conflict with national interests and environmentally oriented target areas. Such rights can be e.g. mineral rights, utility easements for power lines, user rights, leasehold, public road right and 3D property rights for different purposes. Competition on land use reflects problems with the way property rights to land are specified. For example, mineral rights are more limited than ownership to land since the holder is entitled to use them for the purposes for which they are granted, namely to explore and extract minerals (Liedholm Johnson, 2010).

2.2 Classification of Interests in Land

The LCDM classifies interests in regard to how they influence the right of ownership to land. Ownership is in the model seen as *the* central relation between property owner and land. The model has been under development since 2005 and the latest version was published in 2012 (Paasch, 2012a; 2012b). It allows a classification of interests in land independent of their origin in different administrative or legal traditions. The model is not in conflict with the international standard for land administration, ISO 19152, the Land Administration Domain Model, LADM (ISO, 2012), but supplements it by providing a more detailed classification of interests in land than in the standard. The LCDM is part of current research to use its principles in conjunction with the ISO standard to achieve a more detailed classification of interests in land (Paasch et al., 2013).

The LCDM consists of two parts classifying two principle types of relations in land use; (private) real property rights and publicly imposed regulations.

2.2.1 Classification of Private Real Property Rights

The LCDM classifies real property rights based on what type of relation they execute in regard to being either limiting or beneficial to real property ownership. These relations are divided into five groups depending on how they influence the ownership right, whether the right is executed or latent and/or is a financial relation (such as a mortgage); *Common*, *Property to property right*, *Person to property right*, *Latent right* and *Monetary liability*, see Figure 2. The classes are briefly described in Figure 2.²

The *Common group* is a real property to land relation executed in land legally attached to two or more real properties. Owners of the participating real properties execute co-ownership rights in the land at issue (Paasch, 2012a). I.e. the real property is owned by other properties, not persons. The rights can be either beneficial or limiting to real property ownership. An example is the Swedish joint property unit, which is land or water owned in union by two or more properties.

The *Property to property right* group contains rights executed by the owner of a real property in another real property, due to his/her ownership (Paasch,

² See Paasch (2012a) for detailed descriptions and additional examples.

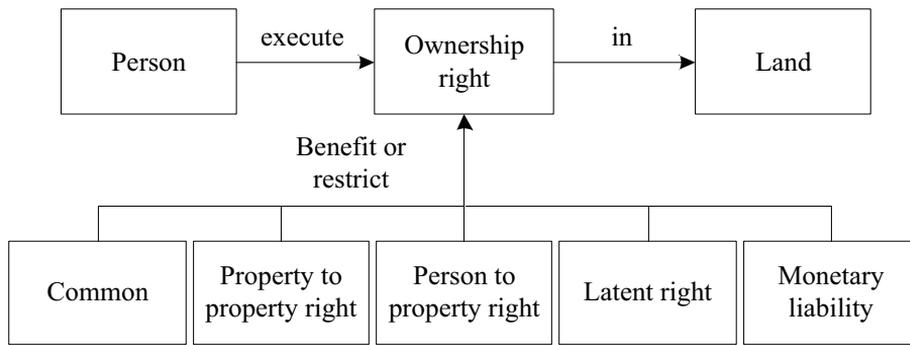


Figure 2. Classification of real property rights in the Legal Cadastral Domain Model (Based on Paasch, 2012a).

2012a). An example is an easement (also called servitude), where the owners of a real property has the right to use another property for specified purposes, e.g. right-of-way.

The *Person to property right* group contains rights executed by a person (i.e. a natural or legal person) to use, harvest the fruits/material of, rent or lease the real property in whole or in part (Paasch, 2012a). An example is the right for an energy company to construct and maintain electrical power conduits on someone's property. Another example is reindeer husbandry, which is of importance for land use in Sweden, as it affects roughly one-third of Sweden's land area, known as the Reindeer Husbandry Region. The right of reindeer husbandry enables the indigenous Sami population to use land and water for reindeer grazing, hunting and fishing.

The *Latent right* group contains rights not yet executed on a real property (Paasch, 2012a). An example is a mining concession which is latent until it is executed.

The *Monetary liability* group contains latent, financial securities for payment. The right executes a monetary relation in terms of security for e.g. a loan between the real property owner and the right holder. An example is mortgage, where a lender has a claim in the property as security for a loan.

2.2.2 Classification of Publicly Imposed Regulations

The public regulation part of LCDM is based on the concept that public interests in land can be divided into restrictions and advantages, see Figure 3. The classes are briefly described below.³

Public regulations can be classified into two groups according to the functions they execute: 1) Public regulations creating a prohibition for the real property owners and others to perform certain activities on his/her real property; 2) Public regulations creating an obligation for the real property owners and others to perform certain activities on his/her real property. However, citizens whose actions are limited by a restriction or obligation may apply for a permission or

³ See Paasch (2012b) for detailed descriptions and additional examples.

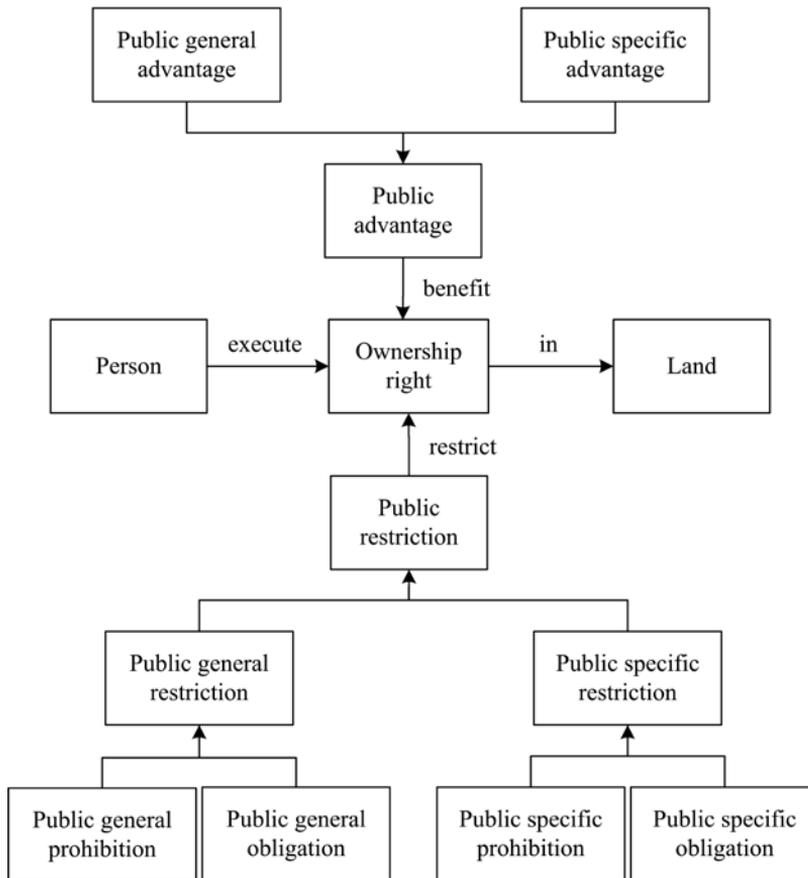


Figure 3. *Classification of public regulations in the Legal Cadastral Domain Model (Paasch, 2012b).*

dispensation in order to perform certain activities. Permissions and dispensation are in the LCDM described as advantages. They allow the real property owner(s) and others the advantage to conduct certain activities on his/her property, not possible for others not having obtained a permission or dispensation.

These prohibitions, obligations and advantages can be further divided into whether they are general (i.e. affecting e.g. all real property within an area) or specific (i.e. affecting specified real property within an area), see Figure 3.

An example of a public general prohibition is not being allowed to build within urban areas without a building permission. A public specific prohibition is e.g. a building regulation listed in a municipal detailed plan, prohibiting buildings of certain heights within a specified area. A public general obligation is e.g. the obligation to maintain waterworks and bridges in good working order. A public specific obligation is e.g. to keep vegetation under a certain height within a specified area. A public general advantage is e.g. the lessening of a general regulation by change in legislation, affecting “everyone”. A public specific advantage is e.g. the dispensation (i.e. permit) to build within a shore protection area.

2.3 Sustainable Land Use

Land use and planning regulations are normally expressed in negative terms as prohibitions or restrictions on any undesirable utilization of an area (Buitelaar, 2007). Planning may however encourage and promote economic land use that is considered beneficial or compatible with environmental objectives (Kiss and Shelton, 1997). If possible, planning should be done in such way that certain activities will not stand in the way of others. The importance of such a holistic view in governance of land use has been stressed in a recent Swedish Government Inquiry on developing a strategy for long-term sustainable land use with the aim of achieving the generational goal and environmental objectives (Government Inquiry, 2012).

There are different definitions of sustainable development and the focus has changed during the years. The 1992 Rio Conference presented the “three pillars approach”, which emphasized the social, ecological and economic dimensions of sustainable development. These dimensions and supporting legislation can sometimes be in conflict with each other. It is not completely clear how the different dimensions of sustainability should be interpreted and how the relation between them should be understood, since they mean different things to different people and organizations. Dempsey et al. (2011) claim that little attention has been given to the definition of social sustainability in built environment disciplines. The World Bank (2014) relates to sustainable development as meeting the needs of the future depends by balancing social, economic, and environmental objectives or needs in decision-making. It is claimed that many of the objectives may seem to conflict with each other in the short term, such as industrial growth conflicting with preserving natural resources.

The overall goal for sustainable development that the Swedish government has provided (Swedish Government, 2006) is based on all three dimensions, which shall be balanced in a long term perspective. It is not always clear how to balance between the dimensions or whether one of the goals shall have priority over the others when they are in conflict with each other. According to the Swedish National Board of Housing, Building and Planning (2008) sustainable urban development in Sweden aims to ensure social, economic and environmental quality of life for people living in urban areas today and in the years to come.

Swedish planning legislation includes aspects on sustainability. However, conflicts between existing planning legislation and environment legislation have emerged and this was one of the reasons for developing a new Planning and Building Act in 2010 (Legislative Bill, 2009/10). The Swedish Environmental Code applies parallel to legislation that is connected to the development of land use (buildings, infrastructure and natural resources) and is like an umbrella for other legislation connected with development of land. Many restrictions and obligations concerned with how land use rights should be exercised are today linked to environmental protection of different kinds. Certain interests protected under the Environmental Code are of such stature as to be termed “national interests”. The characteristic of a national interest is that the area designated incorporates qualities of national concern pertaining e.g. to nature and heritage conservancy, outdoor recreation,

mineral extraction, water and energy supply. It is specified in the Code what particular considerations that have to be made for the use of land and water areas. Preference shall be given to such use of land and water which from a general point of view results in a good long-term management. Special consideration shall be given to large areas that are not, or only slightly, affected by development projects, areas that are particularly sensitive from an ecological point of view, agricultural and forestry land, reindeer herding and fishing, land with high natural and cultural values, areas with valuable minerals, areas appropriate for industrial use, as well as areas for military purposes. Various sectorial authorities are required to furnish the County Administrative Boards with particulars of areas judged to be of national interests.

The descriptions of national interests are sometimes not sufficient for the planning process in the municipalities, which the Swedish Association of Local Authorities and Regions has stated (SALAR, 2011). Legislation and government sector agencies place different demands on land use. The State authorities indicate the vulnerable areas based on their own priorities, which may result in conflicting governmental interests in these areas. The state is, however, not making any overall priorities in a conflict between its own different interests. One public interest, such as infrastructure or energy, might be in conflict with other public interests, such as preservation, nature and recreation, meaning that the State is often in conflict with itself.

A recent Government Inquiry (2013) points out that many decisions on national interests are 40 years old, and since then conditions have changed and the decisions have not been updated. It is claimed that today there is uncertainty about how many of the national interests should be interpreted and applied in relation to changing circumstances and new claims to land and water. Information that is out of date then often leads to uncertainty about planning and development among municipalities and developers. The County Administrative Board is responsible for compiling a current summary of the governmental and inter-municipal interests to guide the municipalities in their decisions. In order for this to be useful, current decisions and descriptions of national interests are needed. The general opinion seems to be that the deficiencies in the application of the system of national interests too often lead to that planning and implementation of urgent housing and infrastructure projects are delayed or impeded.

The Government Inquiry (2013) suggests that national interest issues should be investigated and examined as early as possible in order to prevent delays in the subsequent planning process. The conditions for the examination need to be clarified so that it is clear to the relevant authorities what values and criteria within the respective national interest should be guiding for this examination. The Inquiry also proposes that housing should be stated in the Planning and Building Act as a general interest, which is currently not the case.

3 Examples of Conflicting Rights

3.1 Kiruna

In Kiruna several national interests have an influence on the land use. Within the same area many different interests often overlap each other. The current expansion of the mine causes new needs for housing, infrastructure and working places. Even if the municipality of Kiruna is the largest municipality in Sweden in relation to land area, shortage of land seems to be a problem due to different types of land use restrictions, preservations and user rights to land (Cars et al., 2013). However, it is a difficult task to identify new areas for the city development due to existing different national interests. For reindeer husbandry areas or routes for summer and winter pasturage as well as halting places cannot be blocked. The mountain areas should be left unexplored, areas should be left for nature protection and recreation and areas with valuable natural resources, such as minerals, should be protected for activities preventing accessing them. Besides this, several areas are included in the European nature network, Natura 2000.⁴ These areas enjoy special protection.

The city of Kiruna was established in the beginning of the 20th century as a consequence of the huge investment for opening an iron ore mine in the area. In May 2013 the first stage of the new main level below surface was opened, which is estimated to be mined within 20 years from today. The main factor causing problems with extraction is that the ore-body is sloping 60 degrees towards the city which means that its bottom is closer to the buildings in the city. (Municipality of Kiruna, 2013; 2014). The mining causes deformation (cracks etc.) of the land surroundings. The deformation area has had an effect on the railway being a national interest for communication. In 2012 a new railway passing behind the mine (still being a national interest) replaced the old railway and a new location for road E10 has been planned, also being a national interest of communication. Several different alternatives on how to transform and locate the new city establishment have been discussed. (Municipality of Kiruna, 2013; 2014).

Only if two or several national interests are incompatible it can be accepted that one of the national interests is harmed. In the comprehensive plan and specifically in the area of city Kiruna the following national interests are affected: Natura 2000, cultural values, reindeer, valuable minerals, road, railway, aviation and national defence. In the surroundings for Kiruna city area further more interests are apparent such as nature protection areas, national rivers, Natura 2000, recreation, reindeer, railway and outdoor recreation. Several of these interests overlap. The whole city is affected by a national cultural interest and a national interest for valuable substances. These two interests are in conflict with each other. The interest of mining has been judged so huge from a national economy point of view that preference should be given to this interest. However, the changes of the built environment must be designed as to minimize negative effects on the

⁴ Network of sites designed to safeguard Europe's rarest and most endangered species and habitat types.

3.2 Bunge⁵

The limestone deposit in Bunge is located in an area of national interest for nature conservation or environment protection. The deposit is as such also identified as a national interest for valuable substances and is owned by the Finnish company Nordkalk. Limestone is a mineral not enumerated in the Minerals Act and comprises in this case “landowner minerals”. In order to access this mineral the land normally has to be purchased or leased from the landowner. Nordkalk has bought the property where the quarry deposit is situated. A landowner can thus prevent other parties from exploiting such deposits. Commercial exploitation of landowner minerals requires, however, an environmental permit for quarry and water operations. This permission can be seen as a public advantage allowing the real property owner to conduct certain activities if granted. As landowner the company has resolution of areas where water operations may be carried out if permit is given. Resolution is the first step of using water rights. The Bunge deposit is adjacent to two Natura 2000 protection areas, where e.g. protected species and groundwater may be negatively affected. There is no automatic exclusion of extractive activities in and around Natura 2000 sites, but it must be ensured that the activities do not adversely affect the integrity of the sites (European Commission, 2010). The Natura 2000 protection areas are public regulations creating a prohibition affecting the real property and obligations for the owner to perform activities adversely affecting integrity of the sites. The limestone deposit has status as a national interest (valuable minerals) and the quality of the stone is of importance for the Finnish steel industry. The area is densely populated and the closest permanent house is situated 500 metres from the planned quarry (Nordkalk, no date).

The Bunge quarry aims to replace another quarry owned by the company. Since 1998 work has been carried out in order to open a new quarry in Bunge. In 2009 the quarry as a land use was permitted, however, detailed conditions for operating the quarry were not stipulated until 2012. In 2013 the Swedish Supreme Court decided to cancel the previous permit and referred the case for a more comprehensive judgement to the lower court.⁶ Nordkalk has prepared and carried out extensive work in order to put the quarry in operation, which includes purchase of land, prospecting activities, extracting minerals for sampling etc. Several stakeholders have engaged in the permitting process. State sector authorities represent different interests such as mineral extraction, water supply (Swedish Geological Survey) and environmental protection and biological values (Swedish Environmental Protection Agency). Besides this, the County Administrative Board has dealt with the permission of felling trees. The intention is that the quarry should be managed as an open pit, e.g. extraction is planned from the surface and down to the permitted depth. Infrastructure needs to be built

⁵ Main sources used in this section derive from different court cases and information provided by the Swedish Environmental Protection Agency. Available on <http://www.naturvardsverket.se/Stod-i-miljoarbetet/Rattsinformation/Rattsfall/Takter/> retrieved 2014-07-04.

⁶ The Swedish Supreme Court case number T 3158-12.

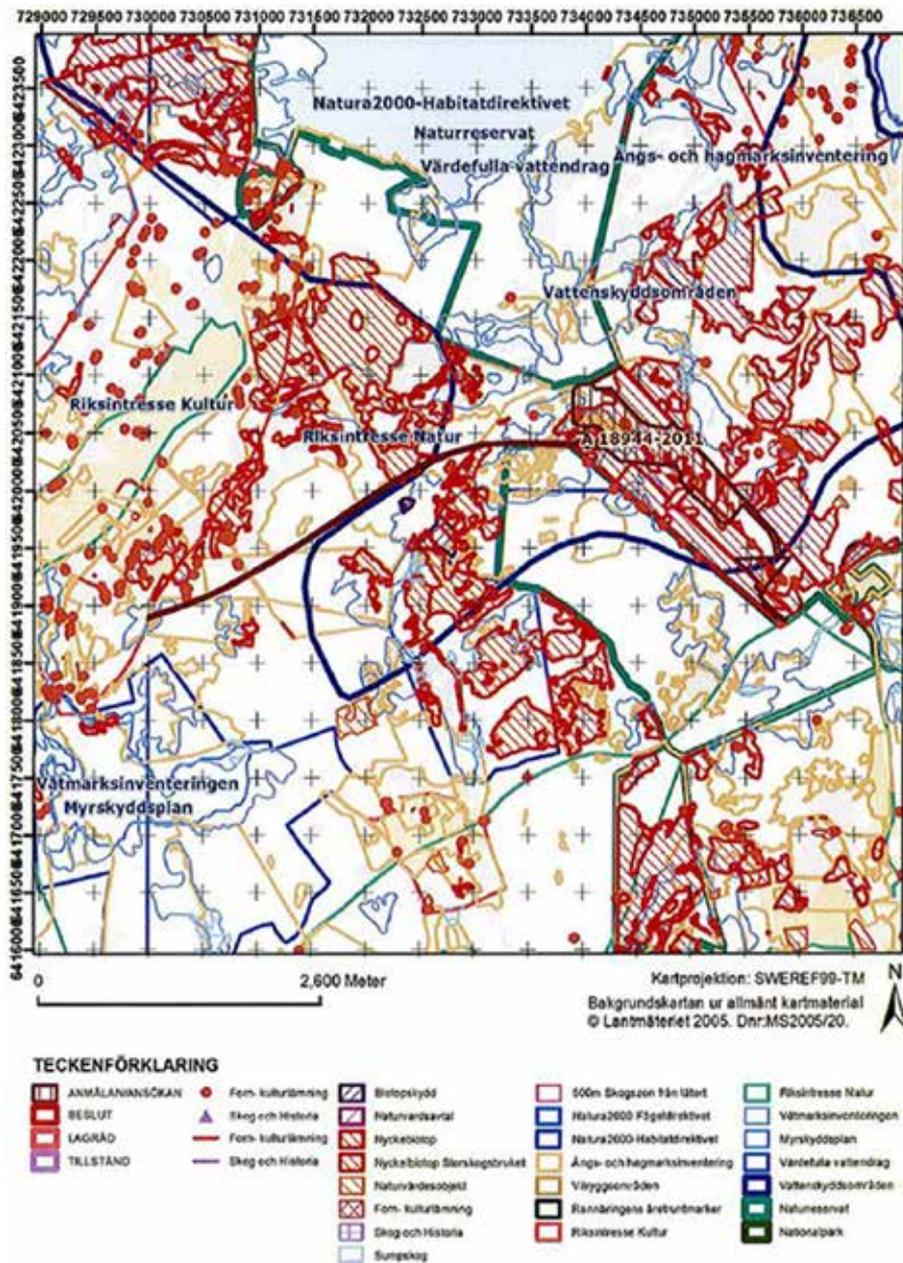


Figure 5. An overview illustrating the complexity of national interests in and around Bunge Ducker (in Swedish). (Swedish Environmental Protection Agency, 2011, annex 1). Background map © Lantmäteriet Permission i2014/00591

with a transportation system and a water cleaning system. To relocate the quarry to an alternative, less sensitive location on Gotland is not an option. The Swedish Geological Survey has stated that there are no other alternatives for location of the quarry due to the quantity and quality of stone.⁷

Nordkalk has not applied for using space within the Natura 2000 areas, but buffer zones adjacent to the quarry can be affected. The Swedish Environmental Protection Agency has found that there is a huge risk that the adjacent Natura 2000 areas might be damaged (Swedish Environmental Protection Agency, 2014). The water level balance in the nearby lake might be negatively affected, which makes it impossible for the municipality to use it as a reserve reservoir for water. The Swedish Environmental Protection Agency means that different kinds of land use activities such as limestone extraction, nature protection, recreation and other interests of society can co-exist on Gotland (Swedish Environmental Protection Agency, 2014). The crucial thing is the location of quarries, e.g. finding areas for extraction where the influence on the environment is minor.

In 2014 Nordkalk received a permit allowing them to start operating the quarry. However, the permission has been appealed to higher court, which means that Nordkalk still has no right to operate the quarry. The circumstances in Bunge show the difficulty for extractive industry in obtaining new permits to replace exhausted sites or to explore and exploit new sources. This is one of the most frequently cited concerns of the industry (European Commission, 2010). Several issues have been dealt with in court, such as localization alternatives and whether or not the national interest of valuable substances (limestone) should be given priority in favour of the national interest of nature conservation. Further issues are the influence on Natura 2000, environmental permission for quarry activities and activities in water, permission for infrastructure as to conveyor belt and roads within the extraction area.⁸ An overview of national interests in and around Bunge Ducker is shown in Figure 5, where the coloured areas show different interests in land.

4 Analysis

Describing conflicting rights in a standardized way facilitates a comparison of these rights. From the case studies it is evident that there are problems connected with conflicting rights and they increase when there is more competition for space from different, non-compatible activities, as in the examples of Kiruna and Bunge. The problems may e.g. lead to delayed or impeded urgent housing and infrastructure projects. In Bunge the economic costs for society, and for the company Nordkalk in particular, have been huge, not yet resulting in a final decision on permitted land use (extraction or preservation).

Table 1a and Table 1b below list the types of national interests in sustainable land use planning which have been identified in the case studies. The characteristics of the surveyed interests are listed in accordance with the LCDM classification

⁷ The Swedish Land and Environmental Court case number M 3666-13.

⁸ The Swedish Land and Environmental Court case number M 3666-13.

Table 1a. *Classification of interests in land in Kiruna.*

	Person to property right	Latent right	Public general prohibition	Public specific prohibition	Public general obligation	Public specific obligation	Public special advantage
Ownership rights (municipality of Kiruna)	×				(×)		
Ownership rights (State)	×				(×)		
Ownership rights (LKAB company)	×						
Exploration permit, exploitation concession, land designation-mining title (LKAB company)	×	×		×			×
Exploration permits (other companies)	×	×		×			×
Valuable substances (of national interest)				×			
Reindeer interest (of national interest)			×	×			
Reindeer husbandry right	×					(×)	×
Communication (of national interest, such as railway, road and aviation)			×	(×)			
Natura 2000				×		(×)	
Nature reserve areas				×		×	
Outdoor recreation			×	×			
Cultural interest			×	×	×		
National defence				×			

Table 1b. *Classification of interests in land in Bunge.*

	Person to property right	Latent right	Public general prohibition	Public specific prohibition	Public general obligation	Public specific obligation	Public special advantage
Natura 2000				×		(×)	
Valuable substances (of national interest)				×			
Nature protection or conservation areas (of national interest)				×		(×)	
Ownership rights (Nordkalk company)	×				(×)		
Permission for limestone quarry		× *)					×
Permission for water activities		×					×
Groundwater supply				×		×	

*) Depending on whether the permission, which currently is subject for a court decision, has gained force or not.

described in section 2.2. Please note that the tables are meant to illustrate the principles of a classification of the types of encountered interests in sustainable land use. A detailed analysis of the content of all interests is outside the scope of this survey. Interests which belong to the Common, Property to property right, Monetary liability and Public general advantage classes have not been identified as playing a major role in sustainable planning in the studied areas and have therefore been omitted. (×) indicates that the interest may/may not contain obligations. This has to be investigated for each registered right.

The LCDM offers the opportunity to study the land use rights from “the two sides of the coin”. Hereby, judgements on whether different types of land use can co-exist or not can be facilitated. For instance, a certain land use right may exclude other types of activities if the land is totally claimed. If this is not the case other rights may exist as well. Land use permits of different kinds may both include advantages for the holder and disadvantages with regard to restrictions.

The different functions of each type of interest are shown in the tables. An example is the LKAB company’s mining and exploration concessions in Kiruna, which is placed in the *Public specific advantage* class and the *Public specific prohibition* class. Even if the mining concession may not be administered as a prohibition, its content dictates the protection of LKAB’s right against others to use the property for mining purposes, which even stipulates environmental protection obligations. Furthermore, if a concession is obtained, but not executed yet, it will be classified as a latent right.

This illustrates that the concessions interact with other land use interests on four levels: 1) they are rights held and executed by a (natural or legal) person; 2) they are prohibitions for others not to use the land (for specified activities); 3) they are obligations for the owners to perform certain duties (e.g. for environmental protection) and 4) they are permissions to conduct mining activities granted by a public organisation. Without a detailed classification of its content the mining concession may only be regarded as a single entity in land use planning.

The examples of Kiruna and Bunge have shown conflicting interests within one area. What seems to be sustainable land use from environmental point of view might not be that from a social or economic point of view. Furthermore, it is not always easy to identify all these interests and understand what type of rights and interests that are present in an area and what they imply. The co-ordination between the rights has proven to be difficult as described in section 3.1 and 3.2 and the priorities are not self-evident, which has led to conflicts between different special legislation and between sectorial authorities, and appeals of the decisions have been made in the permit cases.

By identifying this as a problem area, there are questions to be considered and dealt with by authorities, policy- and decision-makers, both from a policy-making and a legal point of view, but also regarding developing more practical methods and technical solutions in registers, etc. In order to do that, there must be sufficient and standardized information available as a basis for the decisions.

A standardized approach could also increase and facilitate the cooperation and understanding between different sectors and representatives for special

interests, providing information on what land use rights are present in an area, where they are located and how they are correlated. Even if the results in Tables 1a and Table 1b are limited to two Swedish case studies, they can be analysed and used by the international community through a shared, standardized vocabulary.

If Nordkalk receives a permit that gains legal force, the permit can be seen as an advantage for ownership rights connected to real property owned by Nordkalk. At the same time conditions for the permit also means prohibition for the real property owner to perform certain activities on his/her real property due to Natura 2000 and also obligations such as compensation for tree felling.

The standardized model approach identifies the dualism in land use and creates an overview of and assists in untangling the complex “web of interests” by visualizing contradicting interests in sustainable land use. Improved methods of describing interests in land also reduce the difficulties related to where and how information can be obtained and understood by the citizens affected by long-term planning.

5 Conclusions

The conflicts of interest between different land use rights in attempting to achieve a sustainable land use are apparent. There can be different ecological, social and economic aspects to consider within the same area and it is not always obvious which of these interests to prioritize. The research presented in this article has shown that there are obvious and frequent conflicts between national interests, which are not solved properly in legislation or in practice. Examples from Sweden confirm this. Authorities and other involved parties have a difficult and important task in making such decisions. Ongoing governmental inquiries show that conditions have changed and that there today are uncertainties regarding the interpretation of national interests. There are obvious benefits to achieve from avoiding and dealing with such conflicts of interest. In doing so, there are certain issues that should be considered and there are needs for developing new methods for co-ordinating such rights. A possible tool for this could be the presented LCDM model, which offers a way of clarifying complex situations where several restrictions on land use apply, both for authorities and for the public.

The results would increase the knowledge of in what way different sustainability goals may sometimes be mutually exclusive and the social, economic and environmental consequences of this in a property right’s perspective. This is of benefit for many interested parties and stakeholders within planning and its implementation, and it might increase the possibility of social sustainability by the development of regions that are now being hampered by other activities.

It is thus becoming increasingly urgent to find good methods on how to deal with competing interests in land in all type of sectors affecting land development. For example, in 2013 Sweden launched a minerals strategy where land use items and sustainable utilisation of mineral resources are emphasized. A proposed outline of the strategy is a good dialogue and share of responsibilities between stakeholders and making mining towns more attractive natural and cultural environments (Ministry of Enterprise, Energy and Communications

Sweden, 2013). Since similar problems seem to exist internationally, the results from developing improved methods could also be of benefit for other countries experiencing similar problems with incompatible land use.

The results can also be used to further develop the conceptual framework and methodology for detecting and describing land use rights in relation to sustainable planning. If the rights have other characteristics not described in the model, they can be suitable for a more detailed method of classification, such as e.g. whether the classified rights are time limited during the year (e.g. giving access to land in specified periods) or limited in time (i.e. not valid “forever”). Such insight would provide an input to the further development of the LCDM. The principles of the LCDM could e.g. be used together with the newly developed international standard for land administration, the Land Administration Domain Model, LADM. Research in merging the two models is currently being conducted in e.g. Paasch et al. (2013). We believe that it is important to show that many rights are limited in time not least if they are connected to a permit. Also restrictions of different kinds might in time be outdated due to the development of the society. This means that information on rights and restrictions must be updated continuously in order to avoid unnecessary costs for involved stakeholders.

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