

Seminar 1. The use of the Cadastre

The use of the Cadastre among the Members States

Property rights, land registration and Cadastre in the European Union

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Abstract

Free movement of people, goods and capital will on the long run induce the European Union to harmonise or—at least—to co-ordinate property regimes, land registration and cadastre in the member states. Rationale is the importance of property rights, registration and cadastre for the implementation of EU policy. To make a first step, the EU should consider the creation of an official EU Committee under EU leadership.

Introduction

The European Union (EU) encourages the free movement of people, goods and capital within the Union. One might reasonably wonder whether this would effect the regulations on property rights, land registration and cadastre of the distinguished member states. After all, persons and companies moving from one member state to another will certainly face different concepts of real rights («rights in rem»), mechanisms for transferring real rights, concepts of land registration and cadastre, mortgage regulations, services, and legal securities. The same occurs for land use planning and development, land taxation, and all kinds of land related public prescriptions. Financial institutions which are active on the cross border mortgage market, have to deal with different concepts of mortgage, different ways to establish mortgages, different systems of securing mortgages, so that the liberalisation of the EU-mortgage market has been hampered so far, by lack of transparent concepts and procedures.

The impact of the EU accession policy will aggravate this variety, how desirable that accession might be from a political and economical point of view (Westerbeek, 2000).

All (almost all) countries in the world have their own property regime, their own system of securing land rights, and specific systems of land registry and cadastre etc. This is caused by the fact that the relationship between men and land directly relates to the norms and values in a society as developed through the years. As such the EU has been showing wise policy to respect these differences, by stating—in article 222 of the European Treaty—that the Treaty will not affect the issue of property in the various member states: such matters fall under national jurisdictions.

The question arises to which extent this statement can be maintained, now that EU policies affect more and more the national jurisdiction of the member states. This is equally valid for the influence of the EU on the jurisdiction of potential member states regarding the accession requirements they have to fulfil.

This paper aims at providing some preliminary considerations concerning the subject, inspired by the action taken by the Spanish government to include in the Official Performance Program (of the Spanish Presidency of the EU Council) the celebration of the first Congress of Cadastre in the EU, submitting a proposal to create a Cadastre Permanent Committee that will contribute to the future co-ordination of the cadastre in the member states.

EU-property market

The systematic analysis of law and practice on property in (Hurndall 1998) show that every member state has its own definition of «ownership» of land, although the impact of those «ownership» rights might be reasonably similar. Many member states have some form of absolute ownership (civil code law families), while «freehold» in the common law family is considered as akin to absolute ownership, although the Crown remains owner of the land and is it the Crown to grant a title. More differences occur in other rights to land, like the rights concerning common and joint ownership, and apartment-rights and condominiums. Also the way how loans are secured by a mortgage occurs in a variety.

In the context of this paper it will go too far to deal with these differences extensively, however there is enough evidence that EU-citizens and companies—when moving through the EU—are faced with different (or at least different to a certain extent) concepts of property rights (see also Dale & Baldwin 2000).

The inventory of key aspects in land registration and cadastre legislation carried out by the Working Party on Land Administration (UN/ECE WPLA, 2000) shows that—concerning the issue of land registration and cadastre—the differences between member states (and potential member states) are reasonably bigger. The legal security provided by registration might differ substantially, the legal meaning of information delivered by land registers and cadastres is different, land registers and cadastres are in a different way more or less up to date. The different aim of cadastres (e.g. fiscal, legal security, land management) establishes different legal meaning of cadastral information, procedures and processes. The procedures for the creation, transfer and deletion of rights to land are different. Also the way the property market is organised and facilitated might differ, as shown in the inventory of land administration systems in Europe and North America by the Working Party on Land Administration (UN/ECE WPLA 2001b). Sometimes the involvement of a notary is compulsory; sometimes a transfer-agreement drawn up by private persons suffices. The same occurs with the involvement of land surveyors. By consequence also the legal meaning of the cadastral map, and the cadastral boundary survey differs from country to country. Depending on the security provided by the land register, the role of land registrars in investigating the legal effect of a transfer-document is different: either passive or active.

In short, there is enough evidence that EU-citizens and companies—when moving through the EU—are faced

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with different impacts of land registry and cadastre (Van der Molen, 1999).

The review of land taxation systems in the EU by (Brown & Hepworth, 2000) show differences in fiscal treatment of ownership and use of land. Also the inventory on valuation systems by the Working Party on Land Administration (UN/ECE WPLA, 2001a) show differences in the estimation of the capital value of real estate as an asset.

Furthermore, the tax-deductibility of mortgage-rents differs substantially. All countries have some form of deductibility, however with different rates, and to different forms of ceilings.

In short, EU-citizens and companies —when moving through member states— are faced with different fiscal effects when acting on the land market.

Free movement of people and capital among the EU member states on the long run will create a European property market. «On the long run», because EU-investigations show that the movement of people between the member states actually does not expand enormously yet. However, the free movement of capital is increasing, also due to the mergers between financial banks. Economic theories (e.g. Douglas North's theory on institutions and transactions) stipulate that human interactions might flourish if transaction costs are as low as possible.

A conclusion might be that the development of a future European property market will induce the EU to take steps regarding harmonisation or co-ordination of:

- property right regimes,
- land registration and cadastre (level of security of real rights and parcel-boundaries, and transparent operational procedures),
- easy and transparent procedures for creation, transfer and deletion of property rights,
- clear mandates, tasks and liabilities of facilitating public bodies (land registrars, cadastral officials) and professionals (notary, solicitors, conveyancers, licensed land surveyors, real estate brokers, etc.).

EU-liberalisation of financial markets

The earlier mentioned differences between member states are equally applicable on the free movement of capital. In the context of this paper especially mortgages are relevant.

Land and buildings are often used as collateral, providing a possibility to secure a loan through a mortgage. Financial institutions (banks, mortgage banks) develop cross border activities in providing mortgages to customers, within the EU rules on free movement of capital.

The above mentioned inventories show that member states apply different legal concepts of «mortgage», apply different rules regarding the creation and deletion, and assign different legal meanings to registration. The extent to which registers are guaranteed by the State is not the same. There are substantial differences on the question if proof is required of the discharge of a seller's mortgage before registration of a new purchaser is made. Ranking of mortgages might differ, so that the priority of older mortgages over younger mortgages, and mortgages over personal claims (rights *in personam*), is a serious matter of attention. Rules for foreclosure are even more complex.

It is plausible that the free movement of capital, at least for the European financial market for mortgages, needs more streamlining. Attempts are made by the EU to develop

directives on mortgages, but so far these are not submitted to the Council. As mortgages contribute substantially to financing ownership of houses and financing business activities (see the position of long liabilities in balance sheets of companies) a better facilitation of the European mortgage market may induce the EU to take steps in the harmonisation or co-ordination of:

- concept of mortgage-rights as security for loans on land and buildings
- registration and cadastre
- procedures for creation and deletion of mortgages
- regulations for foreclosure

In the meantime some member states attempt to co-ordinate the dissemination of land information through a EU sponsored project called EULIS (European Land Information System), providing a prototype of an electronic front desk giving access to involved cadastres (OLL_n, 2002).

EU-regional planning and development

The EU-attempts to encourage cross border physical planning and development result more and more in common planning in —what is called— EU-regions. Although planning law differ from country to country, and the legal status of plans is not the same, one might say that a common approach to shared regional interests is a step forward.

The function of land registry and cadastre is quite modest at this stage: a government can develop plans without detailed knowledge about properties and property rights.

The need for appropriate information regarding ownership, value and use of land increases when (normally: *local*) governments enter the procedure of development of plans, and —after that— implement the procedures to sustain a given land use.

At both stages the government needs to interfere in land owners' private rights to dispose. The right to dispose is after all the main substance of the ownership right. Without detailed knowledge on «who owns what and where», it is extremely difficult for a government to enforce her legal competencies. To create participation by landowners, it is needed to know who they are. If they don't wish to cooperate with the government to develop the area according to the spatial planning, the government might consider the exercise of pre-emptive rights or expropriation. The legal meaning and procedure for pre-emptive rights and expropriation is complex and differ among the member states, however everywhere detailed information from the land register and the cadastre is needed.

During the maintenance of the given land use after the development procedure, the government exercises normally a system of permits and allowances, like the building permits, construction permits, demolition permits etc. in order to control the land use of the area. These are also nation-specific, but everywhere supported by adequate land information.

Whatever the case, land registers and cadastre deliver in many stages of the process of planning, development and maintenance, information regarding ownership, value and use of land and buildings, which is essential for the appropriate enforcement of a governments' spatial planning policy.

If the EU in the future likely is to encourage co-operation between member states on their spatial planning,

it might be recommended not to look at planning procedures only, but to focus on the legal instruments a government has at its disposal to effectively implement and sustain the given land use. As mentioned, also the availability of appropriate information on ownership, value and use of land is conditional. Therefore —also for this reason— it might be needed to harmonise or co-ordinate the legal meaning, and operational aspects of land registers and cadastre.

EU-common agricultural policy

The EU introduced the Common Agricultural Policy (CAP) in 1992, and adopted the Integrated Administration and Control System for compensatory aid provided for under the reform of CAP Directive EEC/3508/92 introduced the Integrated System providing Community part-financing of expenditures incurred on its establishment.

The Integrated System provided for a single aid-application, to be submitted by the farmer each year. That is the key component of the administration and monitoring of area-related aid schemes. The Integrated System also entailed the setting up of computerised databases enabling cross checks to be conducted on holdings, as well as parcels and livestock. To conduct this type of check, provision was made for a system for identifying and registering agricultural parcels and livestock.

Part of the System therefore is (see article 2 of the Directive) an «alphanumeric identification system for agricultural parcels». Article 4 states that this alphanumerical system is to be created on the basis of cadastral maps and documents, or on other map references.

A review by Kragh (Kragh 1998) shows that the used data source for the Integrated System differs substantially among the member states. Basically the cadastral registers and maps could not serve as data source for the System, although in article 4 this seemed to be the first choice of the EU. A majority of member states maintain a system based on topographic maps or orthophotos, however with a certain reference to the cadastral register and maps. A minority used the existing cadastral registers and cadastral maps, and added to that relevant information from other data sources.

The main reason that cadastral registers and maps were not a priori suitable for use in the Integrated System, will be that these registers and maps primarily reflect ownership and owned parcels and not use-rights and agricultural parcels. Long leases might be registered, but normally short leases are not. How a farmer actually uses his land from year to year is up to him, and need not to be registered. Also —at that time— there were problems caused by lack of country covering, unsuitable map scales, backlogs in maintenance, lack of up to date-ness. In the meantime-many countries maintain two country covering parcel based systems.

The question is if maintaining two country covering databases is efficient. Although we face an already existing situation, it is likely a good idea to take into account also this function of land registry and cadastre when considering harmonisation or co-ordination.

EU policy on the environment

Protection of the environment is an important objective of EU policy. The amount of land related government measures increase, of which many of them are inspired or even imposed by EU Directives. Anyhow the number of rights and interests in land according to public law, create a situation where the legal status of land according to

public law is almost equally important as the status according to private law (Van der Molen & Österberg, 1999). This —at least— is valid when these public encumbrances have legal power against third parties, so that —for example— buyers of real estate need exact knowledge of the public restrictions, in order to avoid embarrassing restriction of their private right to dispose. By the way this regards not only environmental prescriptions but also regarding planning, historical monuments, public acquisition rules etc. Governments do not have much attention to an appropriate registration of these public restrictions so far. That is even worse because the number of government bodies that are mandated to impose such restrictions, is many. Even for professional parties, who are hired by a purchaser, it is a burden to guarantee that their investigation on the private and public legal status of land indeed delivers a complete picture. Whatever the case, land registers and cadastres play or —at least— should play an important role in determining public encumbrances and make them properly known to the public.

What the EU can do is making this an essential and standard part of their Directives so that in the national law-making processes the determination, processing and dissemination of relevant land-information to EU citizens and companies is safeguarded.

EU-consumer protection policy

The protection of the consumers within the EU is part of the EU policy. This is materialised through various standardisation activities (like CEN), anti-trust measures, and —important for the property market— the EU Directive on time sharing (EU 94/47) and the judgement of the European court on intellectual property (13th July 1995 C-350/92).

The earlier mentioned paragraphs make clear that the consumer (whether a natural person or a legal body) when operating on the market for real estate cannot feel very protected so far. Evidence for that might also be found in the fact that in order to protect himself, the consumer seeks professional help when operating in this market. When a consumer seeks help of a professional party for the sake of convenience, it is another matter than seeking help because of insecurity and even threat of fraud. So, on the long run, facing an EU encouraged cross border living style, the EU should take responsibility in enhancing consumers protection regarding the property market.

Need for eu coordination of land registry and Cadastre

Referring to the above mentioned paragraphs, a (I would suggest: preliminary) conclusion is that free movement of people, goods and capital on the long run ask for taking steps on harmonisation or —at least— co-ordination by the EU of property regimes, land registration law, cadastral regulations in order to meet the requirements of the EU policy on

- facilitating an European land market,
- liberalisation of the financial market for mortgages
- regional spatial planning, development and maintenance
- agricultural policy
- environmental policy
- consumer protection (both private persons and companies), so that also EU citizens and companies can

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benefit from good land registry and cadastre at European level (UN/ECE/WPLA, 1998).

Regarding the earlier mentioned Spanish initiative; one might say that—in my view—the initiative could be highly appreciated, but—to put it bluntly—it does not go far enough. The establishment of a Permanent Cadastral Committee aiming at

- the creation of a proper scenario where the cadastral activities of the EU and the members states can be known,
- the provision of complete interoperability among the EU cadastral systems through common strategies and initiatives

likely can not be successful without taking into account the harmonisation or—at least—the co-ordination of property regimes and land registration cadastre regulations.

Because of the relation with article 222 of the European Treaty such a comprehensive approach should be embedded in the EU-administration, and therefore leadership of the EU is needed. Forming a meeting place for cadastral officials might be useful for diffusion of visions, and for sharing ideas and developments, but is basically too informal, and might overlap with—for example—the Working Party on Land Administration WPLA of the United Nations Economic Commission of Europe, Commission 7 on Cadastre and Land Management of the International federation of Surveyors FIG, or the pan-European organisation of National Mapping Agencies Eurogeographics.

So—in my view—the key for the future of land registry and cadastre in the EU is a formal body under EU leadership, with the comprehensive mission to bring harmonisation or co-ordination of property regimes, registration and cadastre further within the EU policy-framework (see as a step forward the «Land Administration Guidelines» of the UN/ECE/WPLA, 1996).

Recommendation

First of all the Spanish government deserves a compliment for recognising the importance of property, registry and cadastre for the EU and for involving the issue in the Official Performance Program of the Spanish Presidency of the EU.

Secondly, the EU should be invited:

- to create an official EU committee or task force,
- consisting of officials responsible for property law, registration and cadastre,
- in order to study the impact of the free movement of people, goods and capital on property regimes, registration and cadastre,
- to take into account the support to EU policy that good land registers and cadastres can give,
- with the goal to identify appropriate EU measures to be taken,
- EU authorities definitely should chair such a committee.

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Customers of Cadastral Information in a service oriented society

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Customers of quite different profession are using Cadastral Information as a tool for their decision-making. The main categories of customers and their demands have changed dramatically over time. They are accessing components and services not only from Cadastre but from different sources in digital form. How can they manage it? Is it by a coordinated approach of the information providers or is it much more a demand driven initiative, not withstanding all the hindrances? In fact it seems that we should know more about the customers, their demands and the changes over time!

What are the challenges for the customers? The customers get more and more involved in the unpleasant aspects of **merging, transforming, overlaying, filtering information**. A sound infrastructure however needs some harmonization for optimised common use of services and data provided.

All that is just a repeating story already known from the past. It was always a process of trial and error for developing sustainable infrastructure and business models, which are still under permanent improvement.

Cadastral changes over time

What have Cadastral systems archived in the past?
 In most European countries systems to collect, maintain and provide Cadastral Information has been developed during the last 200 years. We have to be aware about the changing demand on Cadastre developed for an agricultural society adapted to the demand of the Industrial Society and still shaping for the Information Society and now facing the challenges of the **Service Society**.

The focus of improvements within Cadastre was mainly on:
Procedural streamlining: Within Cadastral Agencies all over time the procedures and workflows were improved quite a lot.

Organizational improvements: First of all it was an organizational than a technical challenge to collect the information. Cadastre is handwork and not a science. In recent time however Cadastral systems with a sophisticated approach are introduced with the support of EC-subsidies. Such expensive approaches seem to be more in the interest of the profession instead of focusing on the customers demand. This results however in lower customer satisfaction and loss of social and economic relevance of a Cadastre in a society.

Improved access to information: Cadastral Information was adapted to the customers demand regarding structure, content and methods for easier access for the customers. At about 1975 the concept of public access to digital cadastral information developed at the University of Laval (CND) was introduced in some European countries (Sweden, Austria).

All these developments was fully in coincidence with the general changes in society.

Despite of the benefits of all these improvements of Cadastral Systems achieved the global picture however shows that we have to be aware about the incoming demand on Integrated Services.

Overall focus of an Society	Cadastre as a tool to support
Agricultural	Tax on rural properties
Industrial	Parcelling, Reallocation
Information	Land Market
Service	Integrated Services

Integrated services provided by different institutions as a joint approach: Integrating tools for a joint information infrastructure is a longer process similar to the political decisions in the fifties for a common currency, which needed 50 years for implementation or the strategy decision on telecom liberation, which showed good results within 10 years.

Institutional improvements within Land Administration: These improvements seem to be the biggest of all above mentioned challenges. Some countries seem to have solved institutional cooperation of the main partners within Land Administration by having a unified Agency on Cadastre and Land Registry (NL, CZ, SK, H, MD etc.). Even in those countries however cooperation is needed with professions like «General Planning, Urban Planning, Agriculture and Environment. In addition the Financial Sectors as well as Valuation are partners of a Cadastre.

Cooperation within the profession: Public private partnership for collecting, maintaining and providing Cadastral Information improved the system. Within this workflow the licensed surveyors in French, Germany, Denmark, Belgium Switzerland and Austria managing exclusively the fieldwork for the Cadastre. The components of such a system are the flexible contribution with an operational focus from the private side and ensured sustainability from the public side. On the other end private information providers offers access to public registers and developed value added products (web-access to Cadastral Information).

In Austria the former competition between private and public side was clarified by law in 1968 and is nowadays a smooth cooperation.

Cooperation between professions: In addition to the above mentioned improvements within the profession of surveyors a cooperation within all partners of Land Administration (Cadastre – Land Registry), Land Valuation and Real Estate related Financial Services is needed for a sound Land Market.

Cadastre as part of Spatial Information Infrastructure

Cadastral Information is considered as an essential part of Spatial Information Infrastructure in order to link any legal fact to a certain geographically defined object. We often consider property, parcel, building and apartment as such objects. From the customers point of view however the units might be quite different:

- Agricultural experts consider farm units (owned or leased) as an object to be focused on.
- Environmental experts consider larger areas like a lake or valley as an object to be linked with certain rights.
- Fiscal units are often quite different from Cadastral definition of a property.
- Urban infrastructure of highest value like metro, railways, bridges etc. are often not even maintained as cadastral objects. On the other hand fragments of

	Industrial society	Information society	Service society
Requirements	Energy	Information	Integration of services
Infrastructure	Factories, Railroads	E-networking, data, info as property	Tools for inter-inst. Cooperation, P-P-P
Investment	Machinery, buildings	Info/com-tools, training	Tools for service on demand
Management	Patriarchal approach	Teamwork within comp/project	Meta-institutional networking
Information flow	Few, hierarchical information flow	Intensive exchange of information	Inter-institutional sharing Integration
Focus on	Assembly lines, production of goods, Taylorism	Integrated workflow	Opt. cooperation in a competitive world

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agricultural parcels with minimal value are maintained because of long tradition.

All these cases express the contradicting and changing demands over time on Cadastral Systems.

Online-user behaviour in other countries shows that the main user groups are focusing on descriptive data instead of maps.

Cooperation for GI-data and services

A regional diversity is in contradiction to a standardized demand. Similar to that GI-data products have to be developed on standardized base. And we see from the cooperation of Adv in Germany the strong development towards: «once face to the customer» (see also <http://www.adv-online.de/>).

Unified data products and services: The development of GI-data products as part of a spatial data infrastructure has to be forced on national as well as European level. A demand on unified data products comes from European wide acting users like EU, Investment banks, European infrastructure providers and the real estate market. Examples for that are:

— The INSPIRE-project: Infrastructure for Spatial Information in Europe (www.ec-gis.org/e-esdi) aims at making available relevant, harmonised and quality geographic information for the purpose of implementation, monitoring and evaluation of environmental policy-making and for the citizen.

— The EULIS-project under the eContent Programme of the European Union: An important part of such a development is the creation of international access to land and property registers. The EULIS project will create a demonstrator that will provide improved access to information on-line from eight national land registries.

Institutional Cooperation: Examples for good institutional cooperation in Europe are:

— **EuroGeographics** facilitates the cooperation of European national mapping agencies and provides guidance on geographic information incl. Cadastral Systems which they maintain.

— **UN-ECE-WPLA:** The Working Party facilitates the cooperation of European Cadastre and Land Registry agencies and aims at improving and promoting land administration among all countries of the ECE region.

— **The European Council of Geodetic Surveyors (CLGE)**, www.clge.org represents the interests of the geodetic surveying profession in Europe to the Institutions of the EU. The «Géomètres experts fonciers Européens (GE)» www.bdvi.de/BDVI/geometer/maingeo.htm have a quite similar approach with more focus on private surveyors.

The cadastre and the users demand

All the above mentioned organizations care about better cooperation among the sister institutions and about the profession of the surveyors. A good service for the main customer groups would in fact improve the position of Cadastre in Europe in a sustainable way. The real demand can only be covered in closer cooperation with the main customers as partners like the legal and financial business as well as urban and regional development.

The diversity of traditions and legislation on Land Administration in Europe has to be highly appreciated. Nevertheless this still allows a coordinated approach within

all further developments for the benefit of the customers. A satisfied customer's demand supports the interest of Cadastre Agencies and Land Registries as providers of spatial information and services. ■

The use of the Cadastre in Sweden

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Background

All land in Sweden is divided into property units. Changes to the division into property units are a continuous process-lots are amalgamated or sub-divided and other cadastral procedures are carried out. Lantmäteriet is responsible for guaranteeing legal security for individual property owners and also participates in measures to improve and formulate legislation in this field. Lantmäteriet is also responsible for register and system for land registration which shows ownership, mortgages, encumbrances etc, the custodian for that system is the National Court Administration. These two registers are the basis in the Swedish Land Data Bank System (SLDBS).

Development of the SLDBS started in beginning of the 1970s as a common system for the textual part of property and land. It started as an internal system, developed in-house and with internal demands but it has during the year grown to an open system used in the area of land administration and in the financial sector throughout Sweden with more than 25.000 users connected.

A number of additional registers have been added as time went on and today the comprehensive register is named The Real Property Register and includes:

- Address Register
- Building Register
- Co-ordinate Register
- Plan Register
- Property Assessment Register
- Sales Price Register
- Owner Associations Register
- Housing Credit Guaranties Register

Last but not least integration with:

- Geodata Bank System including digital maps of different scales and for different usage and
- Digital Archive including digitised instruments and dealings.

Lantmäteriet

The task of Lantmäteriet is to contribute to an efficient and sustainable use of Sweden's real estate, land and water. The organisation has three divisions:

1. The Division Land and Geographic Information is responsible for the generation, management, development and distribution of geographic and real property information.

Real property information comprises information from the Real Property Register, including the digital cadastral index map, the Land Register and the central registers for

buildings, apartments, addresses, mortgage certificates and real property prices. Geographic information comprises basic geographic data such as co-ordinates, terrain elevation data, aerial photographs, vegetation cover data and place names. The Division is also responsible for standardisation questions and for R&D in the fields of geodesy, cartography and geographic information systems.

The Division's main clients are credit institutions and banks, public administration, municipalities, estate agents and property management companies.

2. The Division Cadastral Services is responsible for Lantmäteriet's cadastral activities including decisions concerning the formation of new properties, changes to existing properties, joint-properties, easements, utilities and common facilities. Land ownership rights are determined and registered in the Real Property Register. Our clients include private property owners, forest companies and companies and organisations in the energy, telecommunications, road and railway sectors and the municipalities.

The main activities are carried out within 21 Cadastral Authorities, one in each county. At the headquarters there are units for development, marketing and management. The division has a total staff of approximately 850 of whom 800 are working at the Cadastral Authorities and 50 at the central level. In 38 of the municipalities there are also Cadastral Authorities within the local administration.

3. The Division Metria carries out a broad programme of repayment services in the land survey sector and also produces basic landscape information for the Division of Land and Geographic Information. Other services and products supplied by Metria include consultancy services in surveying and mapping and geographic information techniques. Through Kartcentrum Metria is responsible for the publication of the national map series and other map products, as well as a comprehensive cartographic work on a contract basis. Metria's clients are to be found in both the private sector, such as forestry and telecommunications companies, and in the public sector.

Metria has a total staff of approximately 760 and some 40 local offices.

As Lantmäteriet is one organisation all needs for co-operate functions are managed in one Department called Co-operate Functions. The biggest department within Co-operate Function is IT-Department, which comprise of 75 system developers and 60 staff responsible for Computer Services.

Major Commissions Last Year

Close co-operation with clients, an ability to listen and understand clients' needs and good planning are vital components in a well-functioning project. A good example of projects that Lantmäteriet has carried out is the National Road Database (NVDB), which has been built up by the National Road Administration and Lantmäteriet as a joint project together with local government authorities and the forestry industry. Another example is Lantmäteriet's co-operation with the National Environmental Protection Agency and the county administrative boards concerning nature protection and nature conservancy measures.

The success factor behind these examples is the idea of a common database for land administration, which is easy to access. Of course accesses to the database are only allowed for authorised user, security and data privacy is of utmost importance and is monitored carefully.

Good communication between clients and Lantmäteriet is also an absolute pre-requisite when developing customised Internet-based solutions for geographic information systems. System solutions in which the client's own specific data can be integrated with geographic data from Lantmäteriet have become of increasing interest. The advantage of distributing data via the Internet is that the user does not need to have a GIS system.

International Co-operation for Road Safety

A complete set of digital information about the Swedish road networks will result in significantly more efficient transportation and increased road safety. During 2001 the first stage of the development of the national road database was completed and data for approximately 500 000 km of road have been fed into the base. This basic information comprises the National Road Administration's road database and Lantmäteriet's database containing geographic data for Sweden. A great deal of work has been done to ensure that there is agreement between the data in the two bases.

The production centre for collecting the road data information is at Lantmäteriet in Gävle. This production centre will also be principally responsible for the continuous revision of the data in the base. The technical development work has been carried out by the National Road Administration. The working model for the development of this database has given rise to considerable international interest as an example of sound co-operation between authorities. Particular importance has been placed on the basic project planning. At the initial stages of the project deep analyses of user needs were carried out. This information was used in the formulation of technical specifications, working routines and of methods for quality assurance.

The next stage of the project will be for the local authorities and forestry companies to provide their information.

Support for Nature Protection Measures

The National Environmental Protection Agency has been given the task of increasing the protection of forest land during the next ten years an area of around 320 000 hectares may be transformed into nature reserves. The county administrative boards, together with The Environment Protection Agency, are responsible for taking decisions concerning the creation of reserves. The allocation of funds for paying compensation to affected landowners is done by the Environmental Protection Agency. During 2001 Lantmäteriet and the Agency have reached an agreement concerning support to the county administrative boards with both land ownership investigations and participation in setting out, surveying and demarcation of boundaries for reserves, and also with the development of technical solutions which would make it possible to store all relevant information in a safe and easily accessible way. During 2001 Lantmäteriet and the National Environmental Protection Agency have, together, also formulated a proposal for new legislation for cadastral procedures for nature protection. Implementation of the new legislation will mean that compensation to landowners affected by the creation of a nature reserve can be determined through a cadastral procedure.

Rational GIS Solutions

The National Environmental Protection Agency has decided to invest in an Internet-based GIS solution as the

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best way of managing information related to environmental protection. Lantmäteriet will be responsible for developing and running a geographic IT platform together with a tailored real property register for The National Environmental Protection Agency. The data in the register will include information about national parks, nature reserves, protection of biotopes and much more.

This co-operation with Lantmäteriet will result in significant rationalisation and improvement of the quality of the work that is carried out when protection measures are implemented.

Lantmäteriet has also developed a specially customised IT solution for the Swedish telecom company Telia. Via Internet, Telia has access, in open format, to a database at Lantmäteriet which means that Telia can use its own computer tools to compile specialised information, such as maps for utilities networks based on Lantmäteriet's base maps. Telia can also directly query Lantmäteriet's real property register.

Initially the system was intended to be used by about thirty users but because it functioned so well Telia has now signed an agreement for a system for 2 000 users.

Timber buyers in northern Sweden needed a geographic information system that would help increase the efficiency of their business activities. Together with Sägverken Norrland AB, Sägab and the National Board of Forestry, Lantmäteriet developed a Web service called Timmerwebb. Via Internet timber buyers now have access to maps, forestry data and satellite imagery. The information is stored in a common database and buyers can easily carry out analysis to locate interesting sources of timber and the owners of the forest properties. As there is no need for sawmills to install the database and GIS software in their computers, management, updating and installation of new program versions will be relatively inexpensive.

Conclusions

Lantmäteriet is a governmental authority responsible for a number of registers including all basic relevant information concerning land in Sweden: descriptive information, maps and archived instrument and dealings. The information in the registers is open for use and can easily be accessed if you are authorised. The use of the information is regulated in two laws, the Swedish Data Protection Act and a special law about the Swedish Real Property Register. It is up to Lantmäteriet to look after the customers and how they fulfil these laws.

The registers are structured as one common database, however there are a number of different technical solutions but that is transparent for the users. The users have one single interface for accessing the database. Comprehensive standardisation and data modelling exercises have accomplished the one database concept. The most important factor is the use of common identifiers and definitions in every register throughout the database, e.g. a building is described in the same way regardless if it is on a map or in a register for ownership.

The information in the database is updated and maintained by the organisation that is responsible for the data, which means that municipalities update e.g. property addresses, banks update mortgagors, the National Tax Board updates the assessment value etc.

The openness and accessibility of basic land information leaves the field for application open for competition, Lantmäteriet does not have a monopoly on applications for land information. However Lantmäteriet is responsible for the contents, the maintenance and the dissemination. As noticed by examples above, Lantmäteriet does have long and essential knowledge in the business so they are the natural partner for co-operation also for applications. ■