Preparing Kadaster for the Future and Contribute to Sustainable Economic Development

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Key words: Data collection, Information services, Cadastre, Land registry, Sustainable economic development, Future.

SUMMARY

Intelligent and effective land administration systems are a solid condition for a sustainable and healthy economy. If such a system does not exist in a country, development chances are far from optimal. For instance, regarding legal security (a basic requirement for investors), access to credit (mortgage), spatial planning (in support of economic and environmental development) and effective and efficient land taxation. As a result, there may be many disputes, frustrating efficient land use. Therefore, protection of ownership through property registers is an important condition for sustainable economic development.

The national and international context in which this must be done is dynamic, and asks for permanent adjustment and improvement of products, services and business models. This also counts for land administration and cadastre in the Netherlands. As a result the products, services, the area of application and business models of Dutch Kadaster change, whether we like it or not.

There is a clear movement in the requirements of our users, from data deliverance activities towards (integrated) information and knowledge supply. To meet up to these requirements and to be prepared for our future role, Kadaster restructured it's organisation from a registration and a mapping division, to two new divisions: Data collection and Information services. This paper gives examples of the concrete recent activities at Kadaster, that contribute to these developments.

With respect to data collection the use of unmanned aerial vehicles (UAV) and a web based customer application for the identification of preliminary borders (SPLITS) are good examples. Groundbreaking is the new approach for automatic generalisation of (topographic) maps. But also giving room to small innovations by employees, is part of the used approach.

In the domain of information services our contributions to a national system of key registers is important, as new services like public web map services (PDOK), in which many national organisations work together. The provision of information to excavators on cables and pipelines (KLIC) has become a success, and land consolidation processes in the Netherlands are supported with new information products, such as 'the agricultural report'.

New business models like governmental open data policy influences our way of work and the area of application changes both in theme and in geography. In Europe, cross border developments become more important. Also the role of the user is changing (both professionals and the general public), resulting in self service and crowd sourcing initiatives. Meanwhile, the collaboration between governmental organisations, universities, NGO's and private companies is becoming more and more a prerequisite for keeping pace with developments and user demands. Finally, being part of an international context is considered very important to achieve all these objectives. Developments within Kadaster can no longer be seen without the context of international developments.

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1. INTRODUCTION

The eight Millennium Development Goals (MDG's) as defined by the UN – which range from halving extreme poverty to halting the spread of HIV/AIDS and providing universal primary education – have been a milestone in global and national development efforts. The framework has helped to galvanize development efforts and guide global and national development priorities (ECOSOC website, 2014). Although mainly focused on poverty relief in developing countries, the principles also apply to developed countries like the Netherlands. Equally, the four key dimensions of the post-2015 development agenda are relevant for the Netherlands. The four key dimensions are: inclusive economic and social development, environmental sustainability and peace and security.

An intelligent and effective land administration system is a essential for this development agenda. If such a system does not exist, development chances will not be optimal. The Dutch cadastre and land registry is a well performing system, managed by Kadaster, leading to a high level of legal security (a basic requirement for investors), access to credit (mortgage), spatial planning (in support of economic and environmental development) and effective and efficient land taxation. As a result, there are only few disputes in The Netherlands and land use is relatively efficient. The protection of ownership through property registers is an important condition for our sustainable economic development; this requires independent, professional and accessible information.

Nevertheless, the environment in which Kadaster operates is dynamic. The economic crises as started in 2008 has impact on Kadaster (Barnasconi *et al*., 2010). Also the fast evolving technological push and societal demand ask for constant and rapid adaptation to new developments and insights (de Zeeuw *et al.*, 2011).

In this paper a brief overview of the trends in Dutch society is given, impacting the cadastral system and land administration practices. As a result, Kadaster is changing its organisational setting and methods for the collection of data and the provision of services. Examples are given. Finally, our position in society is changing. This asks for an open mind with respect to better or enforced business models and the ability to operate in an international environment.

2. TRENDS IN DUTCH SOCIETY

In the Netherlands there is a shift from spatial and legal security as a cornerstone to a broader spectrum including the concept of trust. Furthermore users (including businesses and public sector bodies) work increasingly based on communities taking initiatives for the issues at

hand. The user is increasingly in the lead (Salzmann *et al.*, 2014). The Spatial Data Infrastructure (SDI) of the Netherlands has become as essential instrument to cope with these trends.

Dutch Kadaster contributes to the SDI, being aware of the fact that its information, products and services contribute to knowledge sharing for sustainable development. Good governance, development of e-government services and growing towards a spatially enabled society, are basic elements in the national strategy.

3. LAND ADMINSTRATION IN THE NETHERLANDS

As a result of the economic crisis, the Dutch property market continued to contract in 2012. This is a trend since 2009. During the year 2012 we registered 8% fewer deeds and 21% fewer mortgage documents than in 2011. There was also an 18% drop in the number of survey requests. We supplied 19.7 million information products via Kadaster-on-line, which is 6% less than in 2011. This trend continued in 2013.

The strategy of Kadaster in 2013 and onwards can be summarized in the phrase: "Going on in the new reality". In our strategy we do not count for a sharp revival in number of transactions (although early 2014 some positive indicators for slight economic growth are observed). This means we have to adapt to less income, less personnel and further cutting on costs. Therefore automation and innovation have high priority.

At the same time there is a clear movement in the requirements of our users, from data deliverance activities towards (integrated) information and knowledge supply. This can be translates in some clear developments effecting the business processes and position of the Dutch Kadaster directly. The following eight aspects can be mentioned:

- *From data to information to knowledge*. In our primary business processes we experience an increasing demand for more knowledge intensive services. We shift from data deliverance centre, towards information provision and knowledge centre. This means that advisory services on our information products (based on our data collection activities) become more and more important. Figure 1 is an example of information on sales volume and prices of houses in the Netherlands. This information (and much more) is provided through a so called 'information dash board', as available at the Kadaster website (in Dutch only).
- *People change.* Our society changes into an information based society where citizens, professionals and officials become more and more informed and connected. As a result Kadaster moves, unsolicited, from an single issue authority towards a widely available service provider. Also the next generation is better educated in the use of high tech interfaces and the interpretation of huge amounts of information. Social media and virtual environments become part of the real live environment of individuals and organisations.

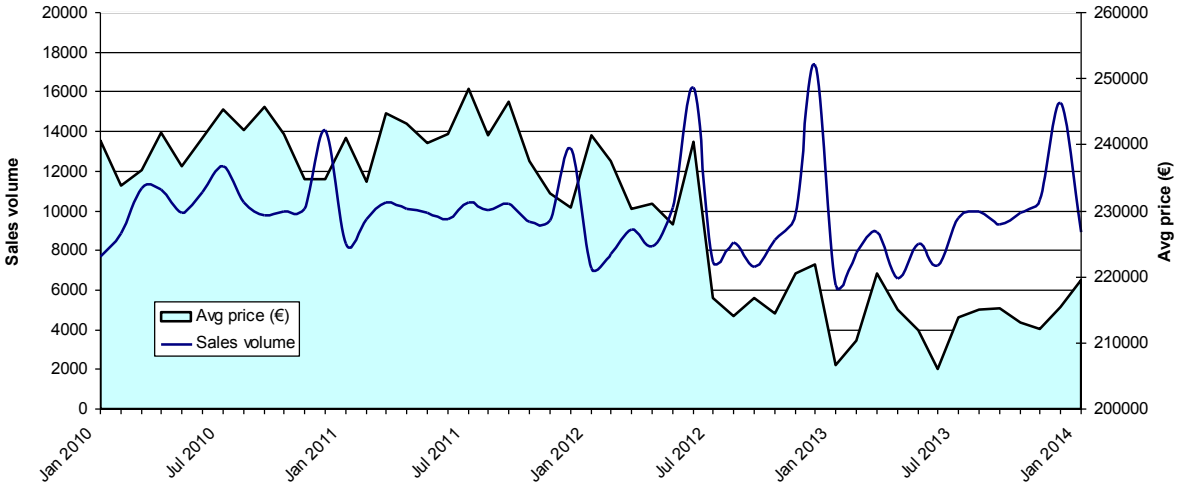


Figure 2. Number of houses sold in the Netherlands in relation to the average price at a monthly basis (January 2010 – January 2014).

- *Offices become web services and location based services.* Our society gets more digitalized every day and improved communication technology opens up new applications and possibilities for both citizens as professionals. The demand from office based to internet based to location based information services is going very fast (over 95% of our services are provided through internet nowadays and social media start effecting our daily operations).
- *Environmental management becomes more and more a 'virtual world activity'.* In the demand for a more efficient and reliable government, essential information (which we define as 'key registries' in the Netherlands) is being stored digitally and connected systematically. As the concept of 'data at the source' is assumed to avoid duplication and to improve the efficiency and data quality, data management becomes a joint responsibility of different governmental organisations using all kind of commercial facilities like services, application platforms and infrastructures. The management of our national spatial data infrastructure (SDI) becomes more and more a virtual world activity. Hence, decision making and environmental monitoring become more dependent on the virtual environments that governmental organisations maintain. Our cadastral and land registry information sources play a crucial role in these processes, as it influences personal (People), economic (Profit) and environmental (Planet) issues in society.
- *Problems become to complex to handle on your own*. At the Dutch Kadaster we experience that the demand for plain raw data decreases while the demand for solving complex issues increases. These issues are very often not solvable with a single issue data analysis. The integration with information from other organisations or sources is unavoidable in that process. The other way around, our data becomes more and more part of analysis done by other organisations or individuals. For that reason we have to make our data and information available in such a way that our partners and others can solve their problems by integrating our data and information into their systems.

- *Optimum services*. Bottom line in these tasks is the permanent need for the optimum in quality, costs and time. Extensive automation of processes are a prerequisite to meet up with societal demands;
- *Less transactions.* The economic value of land and real estate declines, resulting in lower number of transactions;
- *Open data.* Society keeps on developing a demand for freely accessible data for both private and public use.

4. ORGANISATIONAL RESTRUCTURING

Cadastre, land registry and land consolidation in the Netherlands are integrated since the establishment of Kadaster. There is a development towards a positive legal status of the registration[1]. This has been extended with the national topographic mapping since the late nineties. Recently also services for addresses, building information and information on the location and ownership of (subsurface) utility networks (cable and pipelines) have been added to our organisation's responsibilities. The national information provision service for taxation on housing and the large scale base map of the Netherlands are added to Kadaster's task in 2013. It is clear: Kadaster as an organisation is moving towards a national centre for geo-information services, rather than a pure cadastral agency.

To comply with our rapid changing environment, Kadaster is evaluating its approach and policy on a yearly basis in relation to its long term policy which has a five years cycle (Lemmen *et al.*, 2011). The key targets for the policy period 2013 – 2017 are defined as:
- Offering services that suit our customers needs;
- Collaboration with partners (government, science and industry);
- Cost control;
- Flexibility;
- Quality and continuity.

Early 2014 these targets will be recalibrated, as done every year.

To meet these requirements and to be prepared for our future role, Kadaster restructured it's organisation in 2013 from a registration and a mapping division, to two new divisions: Data Collection and Information Services. The way Kadaster tries to meet the changing societal demands can be characterized by four pillars in which Kadaster is:
- An important infrastructural pillar;
- An enabler of lean public services;
- An organisation with lean processes;
- A customer oriented organisation.

[1] It should be noted that the legal system in the Netherlands is a negative system; there are no real practical implications because of this; the provided information to the land market is very reliable and cost effective.

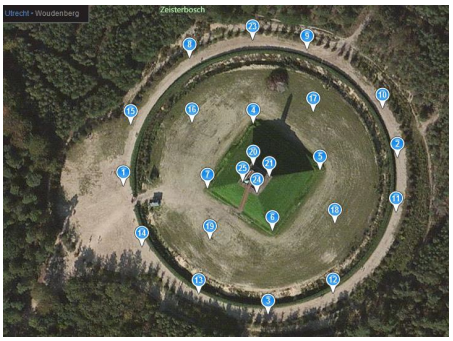
In the following two paragraphs examples of the recent activities at Kadaster are given, that contribute to and follow these developments.

4.1. Data collection

With respect to data collection the use of Unmanned Aerial Vehicles (UAV) and a web based customer application for the identification of preliminary borders (SPLITS) are good examples. Groundbreaking is the new approach for automatic generalisation of (topographic) maps. But also giving room to small innovations boosted by employees and customers, is part of the used approach.

UAV Experiment

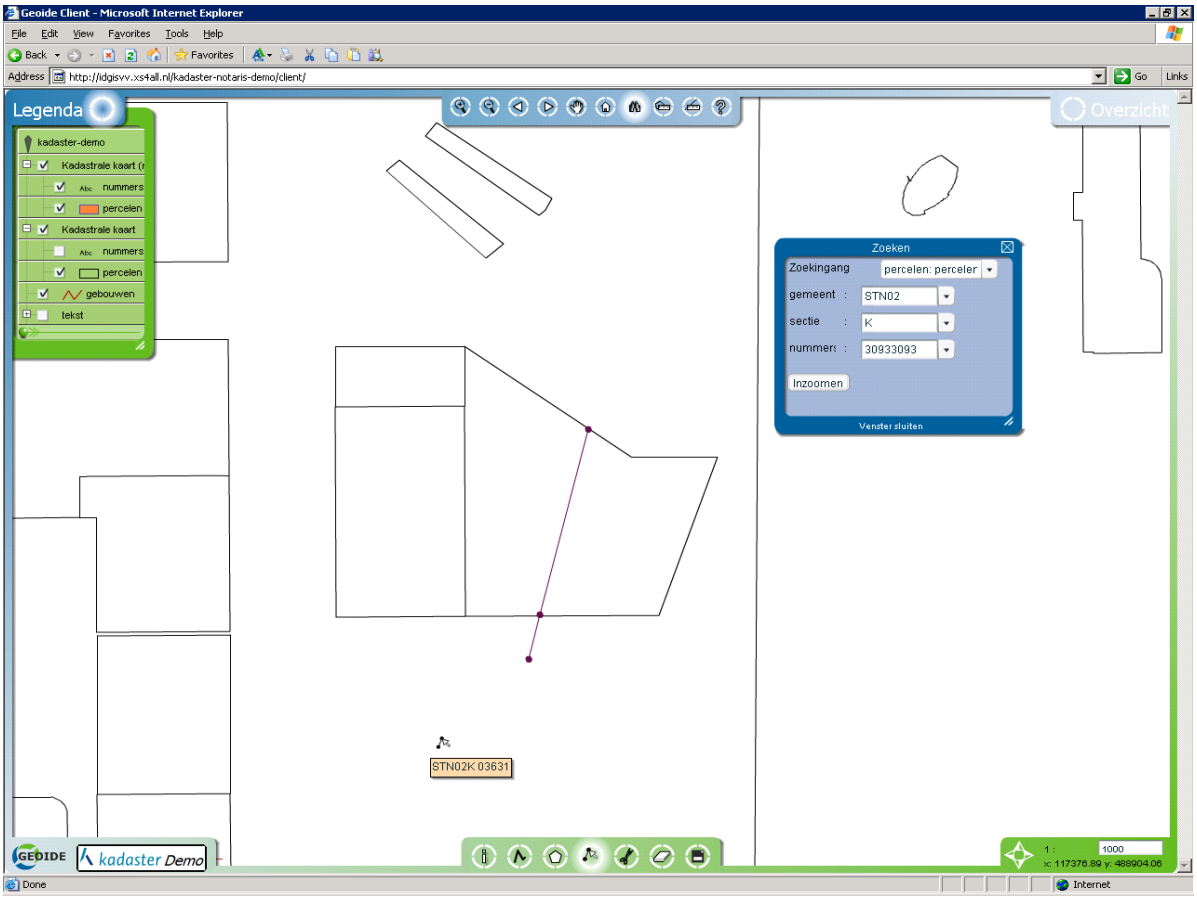
Kadaster succeeded in generating ortophotos with a geometrical precision of 3 centimetres made by an Unmanned Aerial Vehicle (UAV). The experiment was started to investigate the use of orthophotos in cadastral verification and surveying borders of ownership. Several experimental flights were made above Austerlitz and Nunspeet (The Netherlands). Automatically taken pictures were stitched, geo-referenced and post-processed to orthophotos.



Online splitting of parcels (SPLITS)

Normally in the Netherlands, when selling part of a parcel, you first have to measure the new boundaries. Seller and buyer have to point them out exactly. Only then Kadaster can form and register the new parcels. This process takes about 4 weeks. However, it is not always possible to mark the boundaries, especially in construction areas.

The new method to split up a parcel uses the input of the seller. By using a web application, developed by Kadaster, a notary can select a parcel directly from the cadastral database of Kadaster. On screen, new parcels can be formed by drawing lines or by importing coordinates. The new boundaries are immediately visible. The web application sends a request to Kadaster to form new parcels. After verification and acceptance, Kadaster automatically registers the new parcels. Within a few minutes, the notary has the identification numbers of the new parcels available. The owner and all rights, are identical to the original parcel. With this data the notary can make a deed to sell one or more new parcels to the buyer. The new boundaries still need to be measured in the field. They remain provisional until Kadaster has done so.

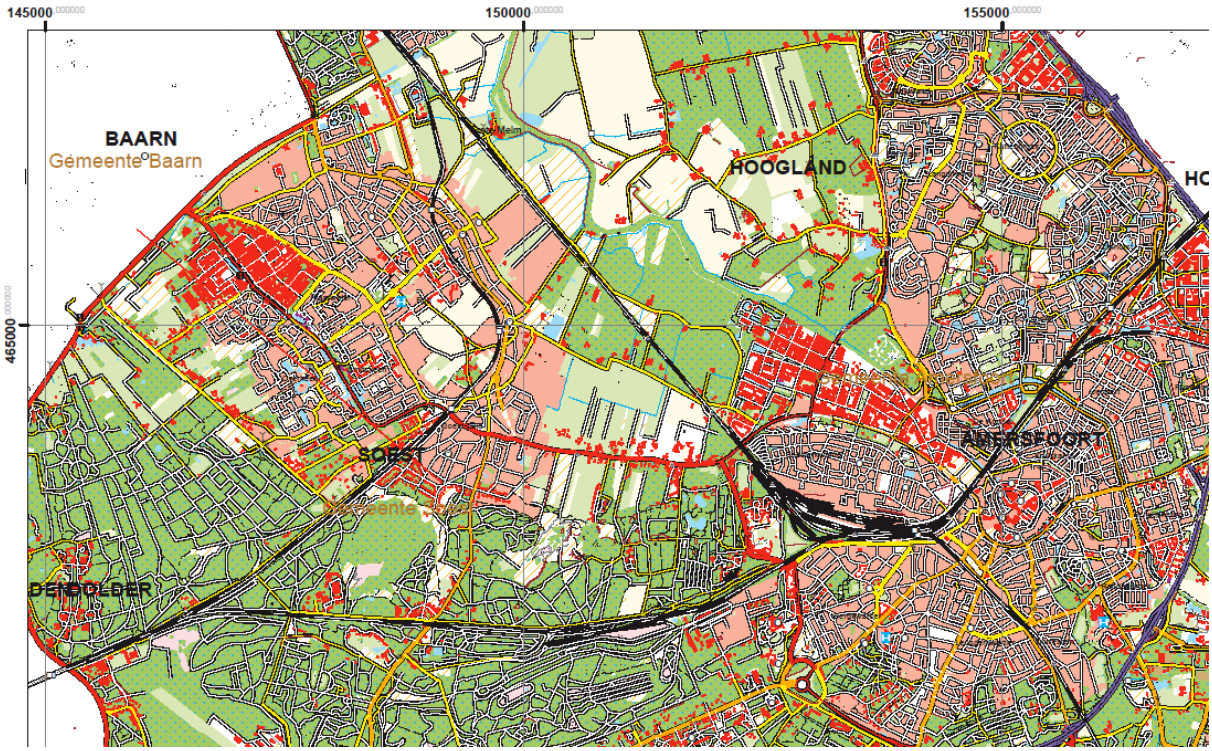


New production line for topographic maps: AutoGen

Kadaster updates its topographic base date (TOP10NL) in a two-year cycle from aerial photography. Until recently, actuality was an issue in the derivation of smaller map scales. These products were traditionally generalised by hand and it was impossible to meet the actuality demands with the current budget and staff size. Since 2013 automatic generalisation (AutoGen) is used to produce smaller-scale maps, following successful pilot projects in 2011 and 2012. The Netherlands is one of the first countries in the world to use fully automated generalisation to produce topographical maps.

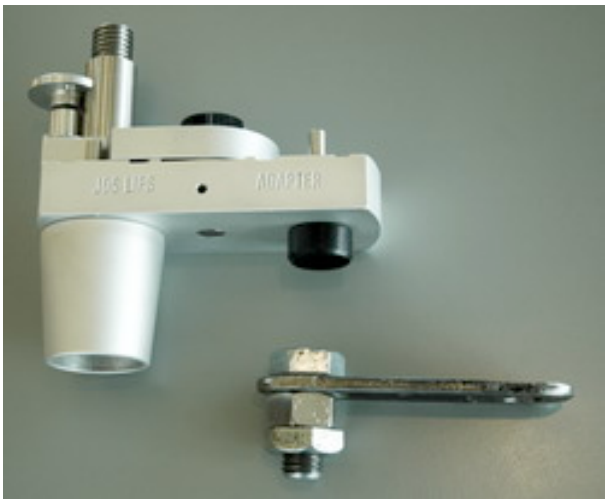
Benefits are:

- Compliance with legal obligations;
- Cost effectiveness;
- An actuality for all map series of at least two years;
- All small-scale map series are derived from the same source;
- Uniformity;
- Improvement of the source base data.



Small innovations example: A GPS adaptor

As most innovation comes forward from frustration in day to day working situations, it is important to give room to employees to improve their daily work. A good example is the development of an adaptor to the standard GPS equipment, available to the surveyors of Kadaster. In order to easily measure the coordinates of the corner of a wall, displacement of the GPS device from its pole was desired. A provisional device was made and used for this purpose. Based on this proven concept Kadaster supported the professional production of a GPS adaptor (weather prove, safe and matching the required precision).



Urban reallotment

Reallotment means exchanging and redistributing land ownership in an area. In the Netherlands, reallotment has been an instrument in rural land planning for over 90 years.

The aim is that the new land allotment realises development goals of rural land owners and users, like nature preservation, road development or farming improvement. Urban planning also aims to realise objectives. It concerns for instance: housing, offices or shopping areas. To establish if land reallotment can be applied in urban areas in the Netherlands, Kadaster conducted a pilot project together with the Radboud University Nijmegen and two land planning agencies. Kadaster brings in its systems, knowledge and experience regarding rural land reallotment. Reallotment is tested and calculated in an imaginary urban quarter. The parcel measurements, prices and buildings have real life features. In urban reallotment, the property owners and users themselves make the plan together. Based on their combined property and wishes, everything is redistributed. Nobody is bought out or disowned. As a result, the costs are much lower than traditional planning. Furthermore, the involvement and support of all parties increases the probability of them all benefitting. The pilot results are promising.

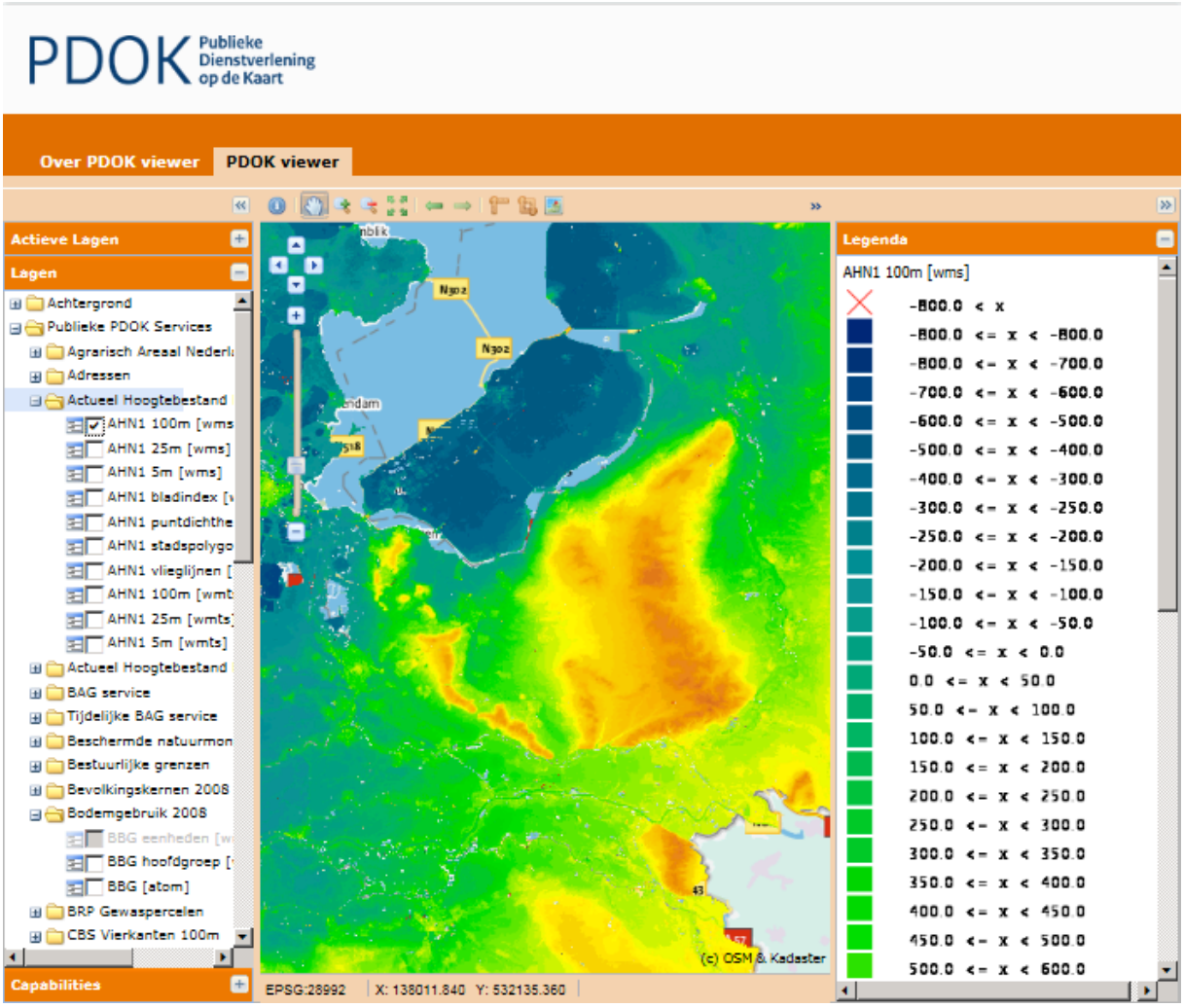
4.2. Information services

In the domain of information services our contributions to a national system of key registers is important, as new services like public web map services (PDOK), in which many national organisations work together. The provision of information to excavators on cables and pipelines (KLIC) has become a success, and land consolidation processes in the Netherlands are supported with new information products, such as ‘the agricultural report’.

Maps for Services: PDOK

Information about a location or region plays an important role in analysing many social issues. Having up-to-date and adequate information about locations is essential for both government agencies and companies, whether this involves plans for roads, new neighbourhoods or finding the right location for a new branch of a business. Maps for Services (PDOK) helps with this process. PDOK offers geographic accessibility of nationwide datasets from government parties. The data is reliable, actual and also available for the business community and citizens. The data is easy to find via the (Dutch-language) website www.pdok.nl. This website offers an overview of the available PDOK services, files and practical examples. PDOK services meet national and international data standards, including the European INSPIRE standard for geographic data and the Dutch e-government standards. Both data services and files are made available on the basis of open standards.

As of the end of 2012, the PDOK portal offered already access to 41 public datasets, including the Key Register Topography and the national facility Buildings and addresses (BAG). At that time there were around 1 million visits to the portal every week to acquire data. The content of the service is growing every month.

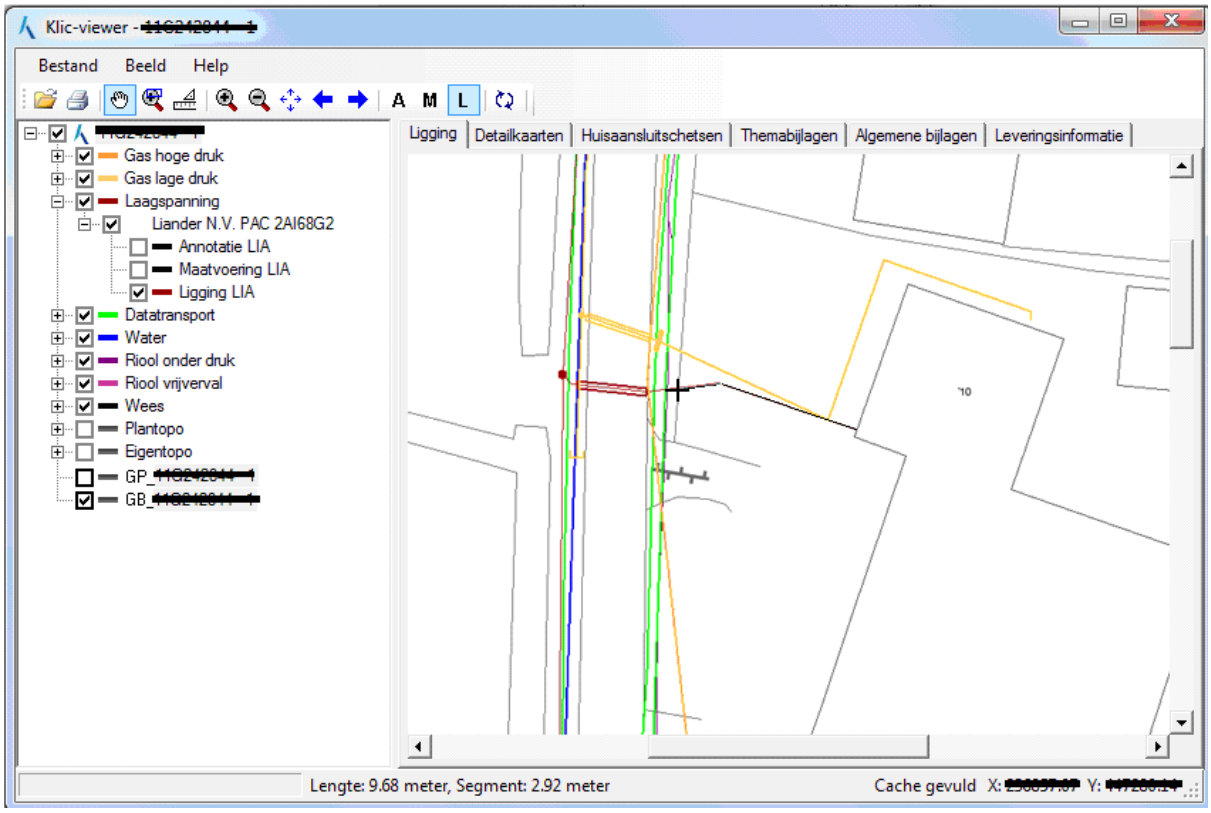


The Cables and Pipelines Information Centre (KLIC)

In the Netherlands, more than 1.7 million kilometres of telephone lines, electricity lines and gas pipes are located underground. Kadaster provides information about the location of cables and pipelines. We also register these networks.

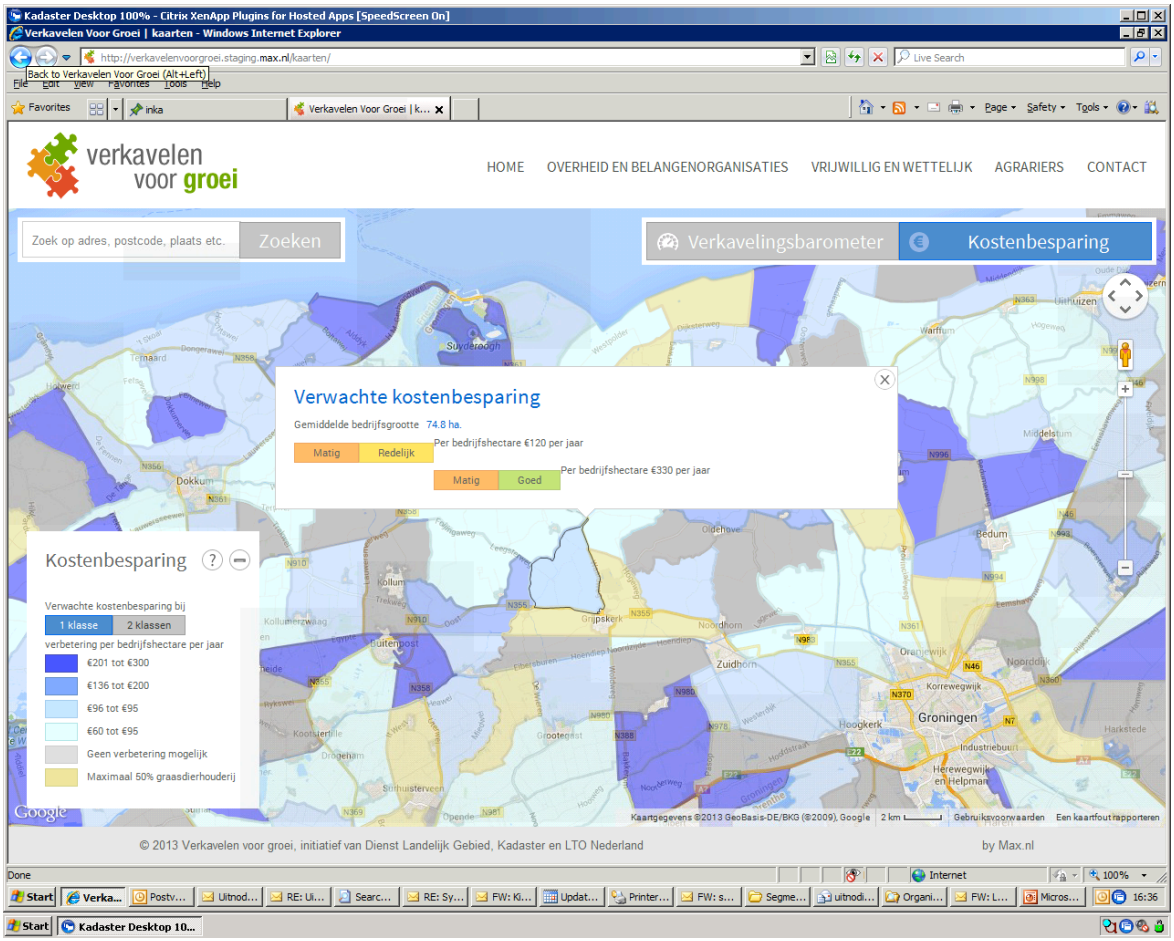
Damaging gas pipes and electricity cables can create dangerous situations. And the financial damage can also be considerable. This is why anyone intending to use mechanical equipment for excavation purposes, is obliged to report this in advance to the Cables and Pipelines Information Centre (KLIC). Kadaster - responsible for managing KLIC since 2008 - ensures that the operators of underground networks pass on the location of their cables or pipelines to the excavator.

Excavators send a request for a report about the location where they want to excavate. After submitting this request, the excavator receives a digital file with information about the location of underground cables. Kadaster has created a geographic viewer to access the digital file. With this KLIC-viewer, the excavator can view and print the cable and pipeline information. This will help him to excavate without damage.
A network of cables and pipes, either located in or above the ground, is an immovable property. Therefore it needs to be registered at Kadaster by a notary. The owner of the network needs to provide network drawings on the cadastral map before the network can be registered. When it is registered, the network will receive a cadastral designation. This guarantees legal certainty for the owner.



'Allotting land for growth'
Central Dutch government is making less and less money available for spatial planning. Therefore, Kadaster and a number of partners have developed a practical, fast method for carrying out reallotment projects. It is called 'Allotting land for growth', which applies to both voluntary exchange of plots and legally authorised reallotment. We have cut the process up into building blocks. This gives clients, particularly farmers and provinces, greater choice. The process runs from identifying the land's intended use, through to the actual land exchange.
One of the cost savings entails the exchange of plots of equal value. By comparing the condition of the plots in advance, people are likely to face fewer expenses afterwards for having to align the two exchanged plots as regards their condition. Kadaster helps in this

process by clearly identifying the condition of the land in advance. We also simplify and accelerate the administrative procedure by means of automation and digitisation at Kadaster. For example, owners can use the Internet to indicate their interest in exchanging and to obtain insight into their personal situation. Many provinces see 'Allotment of land for growth' as a means to achieve important objectives in rural spatial planning despite limited budgets.



A national facility on real estate valuation (LV WOZ)

The Registration of Immovable Property (in Dutch called: WOZ) is part of the national governmental system of Key Registers. More than 400 municipalities in The Netherlands are source holder of the WOZ. They determine the property value of homes, shops, offices and plots. This property value affects the height of some taxes, such as property and income tax.

Since 2013 the property value and related data as addresses and cadastral designation, are offered through a national facility. This way, customers can access WOZ data easier and more efficient. Kadaster manages this facility for all municipalities (called LV WOZ), in which data are available at a national scale with a uniform format. Kadaster makes the data digitally available to government organisations and various buyers.

5. INTO THE FUTURE

To fulfil the demands of our customers and society, Kadaster has a strong focus on the innovation of products (the 'what?' question) and processes (the 'how?' question). A firm investment in information technology, primary IT systems and infrastructure is indispensible to meet up to these requirements. But there is a limit to possibilities of up scaling. Keywords these days are 'open source, the crowd and the cloud'.

As community driven software development reaches a quality level comparable to commercial software packages, the use of open source software becomes within reach of governmental organisations. Especially as the technical support of open source software is taken up as a new service by private companies. Kadaster has a cautious policy in the use of open source software, but is open for development. The use of open versus closed source software is highly related to the security level and life cycle of applications. For database management systems our closed source systems are still in place. In the field of analysis and operational tools a mixture of closed source and open source arises, while at the front end (portals, web interfaces, apps, etc.) a majority of open source applications develops.

With respect to 'crowd sourcing' (or voluntary geo-information provision) Kadaster is a partner in several pilot projects, involving the general public in data provision for our key registries. This paper will not go into detail on possibilities and limitations. But an important restriction one should realise is that in our case, crowd sourcing for cadastral purposes is not a community based initiative, but an effort to support a professional organisation in cost efficient data gathering. This requires a different attitude from both the Kadaster as from the volunteers providing this data.

In the IT world 'cloud computing' is strongly believed to be the only way to keep up track with user demands for data storage and retrieval, management and analysis. Commercial parties start offering software, platforms and infrastructures in a cloud environment. Kadaster is in a phase of reconnaissance of our possibilities. It is realised that it is unavoidable and offering a lot of potential, but also that many quality and security issues are still to be solved or to be clarified, before certainly right data can be brought into 'the cloud'.

Apart from the financial investment that is required, effort is being put into capacity building of our own personnel and the clever building up of networks and alliances. Our organisation transforms from a production type organisation into a knowledge driven shared service centre, with a national and international importance, based on our independent knowledge and experience. This asks for continuous adjustments to our position, personnel and functions. Coming from a national monopolist situation, we become more and more an indispensible link in a chain and an international context. Its becomes our task to co-create the evolution of land administration and spatial data information systems. We have to match users' expectations and technical possibilities with existing (and often sound) legal and business rules and processes (de Zeeuw *et al.*, 2011).

Finally, we have to react to trends in the gathering, management and distribution of data. 'Big data', 'Open data' and 'authoritative data' are becoming new trend to which organisations have to react. For Dutch Kadaster this means that primary IT systems need frequent updating, certification of data and the good management of meta-data are needed and new business models have to be developed.

5.1. New business models

New business models, like governmental open data policy, influence our way of work and the area of application changes both in theme and geography. In Europe, cross border developments become more important. Also the role of the user is changing (both professionals and the general public), resulting in self service and crowd sourcing initiatives. Meanwhile, the collaboration between governmental organisations, universities, NGO's and private companies is becoming more and more a prerequisite for keeping pace with developments and user demands.

The organisational and institutional framework and business model are mainly political defined and influenced by (long term) strategic decisions. The issues defining the business model of a geospatial information authority are:

- The financing model: is our data infrastructure financed by a (local) taxpaying system, a subsidy system or is a cost recovery model applied. Also mixed models can be applied;
- Is there a national Open Data policy, or is data available at cost price or even on commercial basis (with or without profit);
- Can data and information services recover for the costs of data collection, management and provision (also possible in combination with an Open Data policy);
- The institutional landscape. What is the capacity and competition within the country or region at governmental, scientific and governmental level?
- The legislative system. Is, for example, registration of land compulsory by law, is there a national (binding) standardisation for data exchange?
- The trustworthiness of an organisation. This is also defined by metadata management, actuality of data, certification and audit mechanisms.

The strong societal demand for a national 'Open Data Policy' strongly effects the way Kadaster services and products will be developed in the future. Coming from a cost recovery business model on our products and services, the societal demand for open data forces our organisation (and other governmental bodies) to set up a good mixture of cost recovery and budget financed developments. Also it forces our organisation to develop from a data providing organisation, towards a information services providing organisation and to a knowledge centre (in order to generate income). The added value Kadaster can deliver to society will be more in the services and knowledge, than in the data and information itself.

5.2. International context

Finally, being part of an international context is considered very important to achieve all these objectives. Developments within Kadaster can no longer be seen without the context of international developments.

As a monopolist organisation Kadaster has no competition at the national level. Of course, close co-operation with the private sector, academia, scientific organisations and other governmental bodies is an important issue for a customer oriented organisation. Kadaster has the ambition to collaborate internationally and looks for opportunities to share its knowledge and experience world wide. To accommodate this, a separate organisation unit, Kadaster International, has been established almost two decades ago. International advisory services and cooperation projects are the core business, but also the coordination of Kadaster's international activities are the responsibility of this organisational unit.

Sharing of our knowledge consists of three important components: *giving, getting and influencing*. 'Giving' refers to our corporate social responsibility. By providing advisory services on a cost recovery basis, not only our services and products find it's way to society, but also our knowledge and experience. Our contribution to the development of a Land Administration Domain Model (LADM) is a good example of this. Many years of experience, have been synthesised into a model that helps other national cadastral organisations in setting up a good cadastral system for good governance and as a basis for the national SDI.

By working in the international context, Kadaster employees are 'getting' also a lot in return. New insights are obtained and employees are inspired to develop new methods and products that would never had been thought of in the home environment. For example, the lessons learned on the decision making for process and product innovation as applied in Turkey and Korea, influence the approach that is applied within our own organisation nowadays.

Finally, 'influencing' is an important international aspect. By operating outside the national borders, influence can be acquired in standardisation and international law development. It also allows for anticipating on developments that are expected to influence our work in the (near) future. For example, timely anticipation to the impact on Kadaster of the upcoming INSPIRE directive in Europe, was possible by international interaction. Similarly, the developments at a global level at UN GGIM[2] are within our scope of daily operation. Also an important contribution is made to EULIS ((European Land Information Service). EULIS provides subscribed land registry customers such as banks, lenders, estate agents and lawyers, reliable, direct and easy access to land and property information in member European countries. As member of the European Land Registry Association (ELRA) contributes to the development and understanding of the role of land registration in real property and capital markets. With initiatives as the Crobeco project, true cross border registration in foreign Land Registers is under development.

[2] The UN initiative on Global Geospatial Information Management (UN GGIM)

6. CONCLUSIONS

The concept of sustainable development helps the Dutch Kadaster in defining it's future role and institutional development.

To adapt to the changing environment (technological push and societal demand), Kadaster has restructured its organisation from a registration and mapping division, to two new divisions: Data Collection and Information Services.

Not only data provision and information services, but also the sharing of knowledge will become an important competence of Kadaster's future organisation. This requires an open mind for new business strategies and the handling of an open data policy and the development of new knowledge based services. Basis for this, is a modern view on the public key functions.

International cooperation is considered an important means to share knowledge. Sharing knowledge outside the national borders is part of an organisations corporate social responsibility, enforces the capacity of your own organisation and allows for influencing international standardisation and legacy.

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BIOGRAPHICAL NOTES

Kees de Zeeuw is Director of Kadaster International at the Cadastre, Land Registry and Mapping Agency (Kadaster), The Netherlands. He holds an MSc degree in land and water management (1989). After long term contracts in Rwanda and Bolivia he has been working more than 10 years in environmental and geo-information sciences at Wageningen University and ResearchCentre. After being responsible at Kadaster for product and process innovation (2007 – 2010), he now is responsible for the coordination of Kadaster's international activities and international cooperation projects. Kadaster International provides world wide advisory services in the domain of land administration, e-governance, geo-information services and SDI.

Frank Tierolff LL.M is Director of Land Registry, Land consolidation and Cadastre at the Dutch Cadastre, Land Registry and Mapping Agency (Kadaster), The Netherlands. After studying Dutch law in Maastricht, Frank Tierolff started his career at Kadaster as a Legal Advisor for the national Land Registry. Over the years leading up to 2006, he held various positions including Senior Policy Advisor to the Executive Board; Deputy Head of the Executive Bureau; Director of Facility Services; as well as Region Director of Land Registry and Surveying. Since 2006 Frank has been working as Director of Land Registry and Land Reform. He is also being an Executive Board Member of Eulis. Since the beginning of the year 2013, due to an organisational restructuring in the Board, Frank is member of the new Directory Board in the position of Director of Land Registry, Land consolidation and Cadastre. His division is comprised of 800 employees, with a targeted turnover of 180 million euro.

CONTACTS

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