eNorway and Norway Digital as Tools in Good Governance, Risk and Environment Management

Kari STRANDE, Norway

Key words: eGovernment, Knowledge society, Thematic wep-maps, Interoperability and integration, Interaction and local participation, Geographic Information Systems (GIS), National Spatial Data Infrastructure (NSDI)

SUMMARY

eNorway 2009 The Norwegian government wants to support a knowledge society where everyone can participate and where the potential of the use of information and communication technology is optimised. The needs of the citizens and the private industry shall be the driving force for the development of the eNorway services. *eNorway 2009* is about how the government wants to use and realise the opportunities.

*Norway digita*l is the Norwegian government´s initiative to build the national geographical infrastructure. Norway digital is already a working co-operation and infrastructure with reference data and thematic data available, more then 100 operational web map services, geoportal and other services. Thus Norway digital is an existing implementation of the infrastructure described by the European Inspire- directive.

Geoportal (www.geonorge.no.) An important activity is establishing a national portal for geographic data and services .This geoportal gives free access to a number of map services through user applications on the Internet. This will contribute to simplify the interaction between the citizens and the public sector.

My page. As a part of the eNorway 2009 program it is a goal that all relevant interactive public services for the citizens shall be available through the citizens' portal My Page by 2009. As part of development and demonstration projects some examples is set up by use of interactive map related to "My Page" for the citizens to access information related to his own neighbourhood.

Risk and Environment management
In Norway the municipalities are responsible for spatial planning and building permits. As part of the municipal spatial master plan it is now a demand that the municipality should carry out risk and vulnerability mapping and analyses. It is a municipal task to make sure that spatial planning and building permits is carried out so it can be guaranteed that it will not create danger for people, environment and material values. It is a demand to have an overview of the risk and vulnerability in the municipality. Some guidelines are made to assist the municipalities in this work. «GIS in risk management and spatial planning ». These guidelines give good examples on how to use spatial data and GIS tools in these fields.

eNorway and Norway Digital as Tools in Good Governance, Risk and Environment Management

Kari STRANDE, Norway

1. eNORWAY 2009

The Norwegian Government has set up an objective of making everyday life simpler for the citizens and securing the future welfare. ICT, used in the appropriate way, is a contribution to achieve these goals. ICT is a natural part of everyday life for most people. The Norwegian government wants to support a knowledge society where everyone can participate and where the potential of the use of information and communication technology is optimised. The needs of the citizens and the private industry shall be the driving force for the development of the eNorway services. *eNorway 2009* is about how the government want to use and realise the opportunities The Norwegian Government wants to support a knowledge society where everyone can participate and where the potential of the use of information and communication technology is optimised. ICT shall support the development of public authorities to be a safe and efficient distributor of services and resources.

The government has initiated a co-operation between representatives from governmental and municipal institutions, private enterprises, professional organisations and NGOs. With a strong and constructive commitment from the various actors, there is achieved a lot of results in relatively short time. eNorway 2009 will support the governments policy on economic growth and value for society. Good environment for research, high digital competence amongst the citizens, a high level of investments in ICT and a good ICT infrastructure are factors which contribute to get Norway in a good position in this field.

The first eNorway plan was presented in June 2000. The three first eNorway plans (eNorway 1.0, 2.0, 3.0) was to a great extent visualisation of concrete development within the various ministries. In 2002 a core framework across the ministries was initiated through eNorway 2005. eNorway 2009 is about use and realise the IT possibilities. Actions and projects will contribute to release value for society of IT. It is not only about technology but also about the way we communicate, work, learn and organise our public sector and about how value adding services are to be created in the Norwegian society.

eNorway 2009 has three main focused areas:

- The citizens in the Norwegian digital environment.
- Innovation and growth in the private industry
- A co-ordinated and user approached public sector.
- eNorway 2009 is focusing on cross sector initiatives and projects both across the sectors and between public and private sector.

Some of the goals from eNorway 2009 relevant for the GI society.

- eServices for everyone including those who does not have internet access by 2007
- 80% of public web sites shall fulfil the quality criteria of Norway.no for availability by 2007
- ICT shall be integrated in all subjects through the education plans
- All relevant interactive public services for the citizens shall be available through the citizens portal My Page by 2009
- All Citizens can choose to receive public information and communication from the public electronic by 2007
- All agreements for reuse of public data shall be assessed for adaptation to the PSI directive by 2007
- Governmental authorities within the geodata field and most of the municipalities shall be part of Norway Digital and have an update system for their own data.
- There will be modern electronic charts available for all Norwegian coastal water by 2008
- All non-sensitive communication between public authorities shall be done electronic
- All public institutions shall use electronic supported administrative systems and electronic archives
- All public institutions shall use eID and eSignature for all relevant services
- All new ICT systems in public sector shall be based upon open source standards by 2009

The Ministry of Environment in co-operation with other ministries, the municipalities and Norwegian Mapping and Cadastre Authority are given the responsibility for the priority tasks in eNorway 2009 relevant for the Geographic Information Society

2. NORWAY DIGITAL

Norway digital is the Norwegian government´s initiative to build the national geographical infrastructure. Norway digital is already a working co-operation and infrastructure with reference data and thematic data available, more then 100 operational web map services, geoportal and other services. Thus Norway digital is an existing implementation of the infrastructure described by the European Inspire- directive. The major concept is the building of a national geospatial infrastructure in support of eGovernment. The aim is to enhance the availability and use of quality geographic information among a broad range of users, primarily in the public sector. A broad representation of Norwegian public bodies are preparing to participate, at national level ministries and their directorates, at local and regional level all Norwegian Municipalitites and different regional public bodies. The co-operation is based on the white paper on the National Spatial Data Infrastructure presented by the Norwegian government and accepted by the Parliament on June 18. 2003.

Norway has a long tradition for co-operation between public and private sector in general and between organisations in both public and private sectors. The national standard known as SOSI is a very good example of this co-operation. Within the framework of SOSI, there is nation-wide acceptance of the data structure of nearly all relevant application fields, and also a standardised method of exchanging the data. The current policy for the SDI development is based on three main components:

- a geodata portal
- a geographic information metadata service
- a range of access services

Through Norway Digital all public producers, authorities and main national users of geographic information (maps, geodata and property data) are establishing a co-ordinated and user friendly distribution service. This service will make all standardised geodata available through a core portal. The data will be free of charge for internal use for all the participants in the program and the service will be available on commercial basis and as a free of charge view service for the citizens.

All institutions participating in Norway digital will bring own data into the infrastructure making it available to the other partners. The spatial data is divided in two main categories, reference data and thematic data. Norway digital will treat both kinds of data. Reference data include topographical data, hydrography, roads and other infrastructure, land use, buildings and cadastral information, elevation and bathymetry, orthophotos. There is a joint funding of reference data through Norway digital, based on the Geovekst model. Thematic data include a broad range of information produced by national institutions and municipalities at the local level. The themes cover aspects such as demography, risks and risk management, protected sites, biodiversity and nature values, pollution, fisheries, geology, mineral resources, agricultural and forest resources, cultural heritage and outdoor recreation facilities.

The activities in Norway digital are regulated through standardised agreements and a core technological platform based on internet technology. The Norwegian mapping and cadastre authority are the co-ordinator of Norway digital. The task will increase the availability of geographic information, and improve the quality and availability for all.

One of the important elements in Norway digital is co-operation. Today more than 40 Governmental agencies, 19 counties and 430 municipalities are involved in Norway digital either as data suppliers or as potential users of the information accessible through GeoNorge... Another important element in Norway digital is standardisation. Large effort has been made in working out specifications of several different environmental data sets. The specifications have been developed based on the principles of the national de facto standard for geographic information (SOSI).The future development now is to adapt to the ISO and CEN standards and to the INSPIRE directive

2.1 GeoPortal – www.geonorge.no

The main objective for the portal is to make spatial data and environmental data available and ready for use to local and regional planners, officials and politicians. The needs for environmental decision making and planning will have priority. The Portals shall also in general serve the government, private sector and citizens with environmental GI on the Internet.

The dissemination of the information in Norway digital is based on new technologies for Internet distribution. There is a rapidly growing interest among the partners to disseminate data as web map services.(WMS) Downloadable data are available on standard formats. Metadata is delivered together with the data. The Geoportal architecture is based on national components and on WMS, WFS, WCS web services and based on international standards

(ISO and OGC). It includes both regional and local components and is used to build both a national portal (www.geonorge.no) and regional and local portals. Also some organisation/thematic specific portals are based on the same architecture The development addresses all and any potential application field for geospatial information. It has a big variety of content, a rich set of functionality reference and thematic data and services. Much is now in daily, fully operational use such as the national portal, wms services from a large amount of agencies with national coverage, Web services and portals from local authorities. A new extension including more support of eCitizens was designed in 2006.

The geoportals and gateway focus on four main topics :

- GI catalogue/metadataservice
- Web mapping, web map server clients
- Downloading functionality
- Information, specification, standardisation

2.1.1 Download Functionality, Access Points

Many users in the environment and risk management field will need the thematic data sets for use on their own GIS applications. The portals will be an access point making spatial data-sets available through a set of download functions. It will be distributed solutions where the data will be provided directly from the various agencies own servers. The geoportals will offer the download functionality as service to other data suppliers. In this context it is a challenge to handle the differences regarding copyright and pricing policies. Today this is ranging form full cost recovery and strict licensing regimes to general free access and use. Several metadata catalogues are now running and more than 210.000 datasets with reference data and more than 50.000 datasets with thematic data are accessible through the portal.

2.2 AREALIS and Norway digital

In Norway we have had several development and pilot programmes for co-ordinated access, electronic distribution and use of Geographic information during the period from 1990 to 2006. Based on the experiences especially from the Arealis program and GeoVEKST co-operation, the Government presented a white paper to the Parliament in 2002 called Norway digital. The main principles for the GI policy are to have a standardised infrastructure of Geographic information in Norway based on co-operation between the various governmental and municipal producers. Another principle also stated in the eNorway policy is to have one main Portal for access to Spatial Information. Arealis was a program focusing on the environment management and to make sure that there was a sustainable approach in the spatial planning and that relevant information was made available both for the planners, the politicians and the public

2.3 Municipal Initiatives

In Norway, many of the local municipalities are relatively small and have limited financial and human resources. After the Arealis and GeoVEKST with a broad collaboration most of

the local municipalities today participate in Norway digital. The local communities struggle to meet the GI challenge (and other challenges). Especially as the number of GI data sets grows due to demands from central government in the field of environmental and area management and spatial planning. To meet the challenge a formalised co-operation between neighbouring municipalities about core GI portals are established. An increasing number of regional GI portals are opened the last two years. The collaboration often has defined two main activities. One activity is to join forces in first time data capture/storage, maintenance and distribution of various spatial data sets. The second activity is to develop and run is a common web-mapping application. Two major benefits achieved from such collaboration is

- GI catalogue/metadata service
- Shared cost through establishing a common IT/GIS infrastructure and
- Access to GI expertise by employing a project manager with long GIS experience.

Further work at local level are focused on further data capture and technical development towards implementing the OGC WMS specification. In

2.3.1 Municipal Experiences and Opportunities

The Government has brought up the idea of " My Page" as an entrance page for the citizens for all connection and interaction to the public sector where you can search for relevant kindergartens in your neighbourhood, the actual school for your children, take part in discussions on municipal planning processes, get forms for building application and letter to neighbours, qualify your application and get the permission.

In the municipalities there are new possibilities with WMS as important condition for better access to data and better participation in municipal processes.A good example is Bærum municipality who has participated active in the geoPortal project. Bærum municipality has long experience with internet distribution of geographic information both to the public and for internal use. Bærum is an active municipality within development and use of new solution within ICT and GIT, they have interested and demanding users within the municipality, a liberal attitude to the spread of information but they recognize sometimes conflict between the objective on free float of information and the demand for income of the same information. The chief surveyor in Bærum summarise the basic improvement with WMS as increased information access, information directly from the source, always updated information (or at least dated) and independent of system and organisation.

In a municipal context this means better preparation for decisions, core information basis and a more efficient distribution system compared to the print and copy process today. WMS gives better information exchange within the organisation and with the citizens in hearings and makes it easier to make regional (intermunicipal) map solutions – flexible for different demands and he summarises in the end that it is really fun.

What are the conditions for realising geoportals and WMS within the municipalities;

- User functionality must be as good as our solutions today
- It must be good interface to various external registries
- Demand for stable access to external WMS data all day and night
- Neighbouring municipalities accessible on the net
- Simple catalogue access to external WMS servers
- Quick communication
- External WMS data delivered within the municpality's UTM zone
- Good specifications and for the national data sets
- Integration with map management tools and GIS tools
- Good and relevant web-services

For even more success there is a need to get good ordering and payment solutions and electronic self service of data. When preparing for start there is important to know what contribution can come from others and to get good demonstrations of the possibilities by best praxis. Information in local and regional media is important to get a broad involvement both from the staff and from the citizens. It is crucial to invest in competence and good guidance. It is also important to test the possibilities and the limits within the organisation and to choose a solution that is most suitable for your municipality if you should have in house services or buy services at a web-hotel.

One example for the use of WMS is when a family are about to move from one city to another and need to find an appropriate place to live. They can set up a list of criteria for the area where they wish to buy a house. That could be walking distance to school and kinder garden, short distance to jogging area, avoiding pollution area and traffic noise. The family can use the web to access a service that present exactly the information they want, on one map on the screen. Traffic densities along the main routes are given, area regulations are shown, schools and pollution sources are plotted, real estate is depicted and specific information about each property is a mouse-click away. All this information is collected directly from its primary sources, so it is just as fresh to the family as to the city planners.

2.3.2 Examples from Hole Municipality

As a local politician I would like to give some examples from my own municipality Hole in Buskerud County. I will demonstrate some applications, especially applications for interactive participation from the users side inclusive some examples of integrated service in our web page and municipal services. Hole Municipality established its internet portal in1996 and was the first municipality with selective options from the post list. All non restricted documents are available on the net. Hole has been appointed several prices as best municipality on interactivity and openness. Through our web site there is invitation for questions to the Municipal board which are used my many of the citizens. In the first meeting in 2007 more than 7 questions was presented to the Municipal board and response given by the Major. A majority of the questions concerned a proposed local plan for new housing area. There is established interactive dialogue for the citizens with the politicians and the municipal administration. The goal for the web page is to contribute to the 24/7 Municipality and create engagement and local identity, through interactivity, by openness, by access to all user

groups. Also when accidents occurs the web page are used for active and interactive information. One example is from a big fire last summer.
In 2006 the local geoportal was opened with access both to the municipal maps and geographic information as well as to the national basic and thematic data.

2.4 My Page

As a part of the eNorway 2009 program it is a goal that all relevant interactive public services for the citizens shall be available through the citizens' portal My Page by 2009. As part of development and demonstration projects some examples is set up by use of interactive map related to "My Page" for the citizens to access information related to his own neighbourhood. Actual information is environmental information like pollution and sewage, cultural heritage sites, landslide risk zones, protected areas, meteorological information property information, transportation, school location etc.

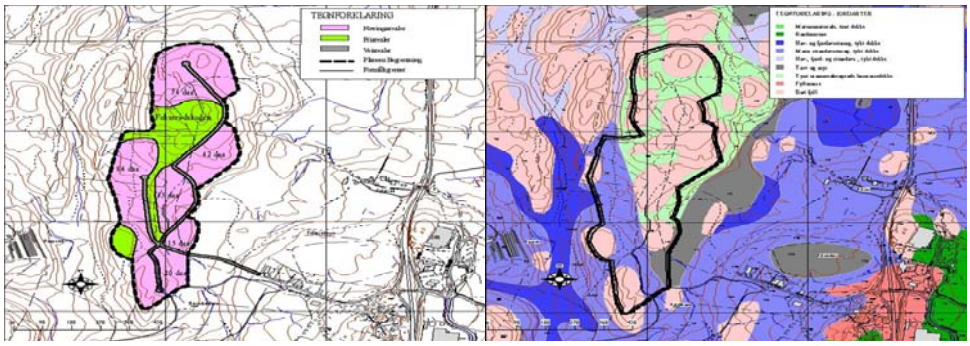
Openness, service and respect to the democracy are focused.

3. RISK AND ENVIRONMENT MANAGEMENT

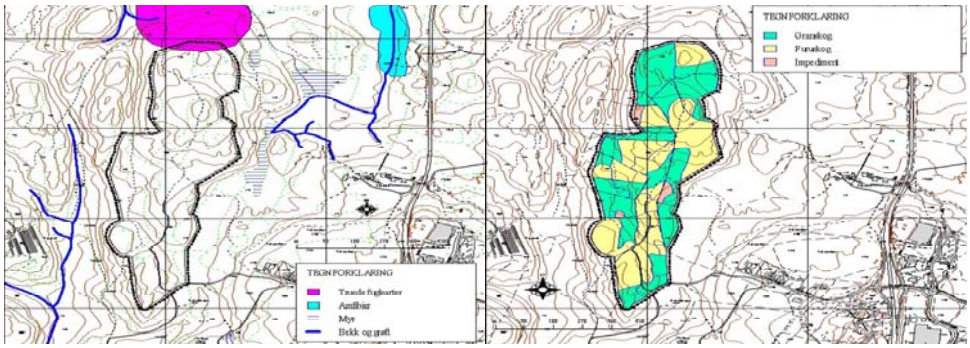
3.1 Environment Management and Spatial Planning

Arealis was a national project initiated by the Norwegian Ministry of the Environment in 1997. The main objective of the project was to make environmental data and land use information available at national, regional and local level and especially for planning and natural resource management. The project focused on co-operation, standardisation and extensive information activities to achieve the objective. From the very beginning the Arealis project has chosen the Internet as a strategic information channel. The Internet related work followed two main tracks. The first was the Arealis web-site, a traditional 'home-page' like site. However, the site now holds a huge amount of information ranging from the latest news to all specifications and data-set definitions. The second track was development of web-mapping applications. Following both tracks has been very successful.

Several successful web-mapping applications focusing on GI for environment and area planning has been launched both on national, regional and local level. The further development gives an opportunity for better access and participating from the citizens in planning processes. The needs for environmental decision making and planning will have priority. Project including 3D visualisation is also tested for planners and citizens to view consequences of various construction proposals like landscape analysis, risk assessment, tourist information etc.

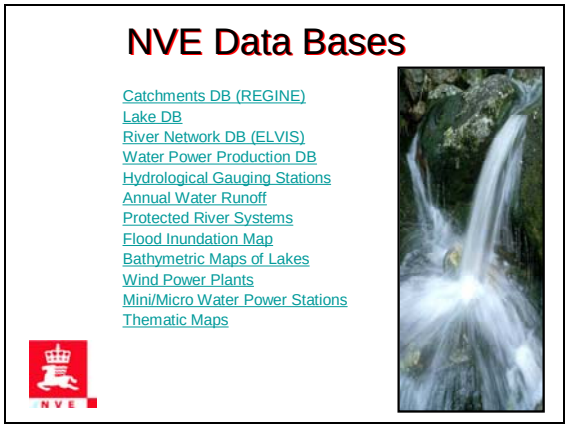


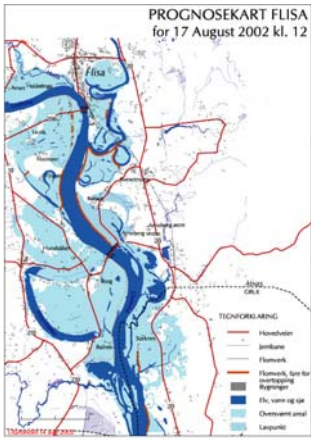
Planning tool: GIS - local level - suitable industrial sites - biodiversity values



Another program is developed by the Electricity and Power supply Authority to combine many sources related to water and hydrology information. The project creates new services and gives a new picture of Norway based on Internet, GI technology and data from distributed models, and various observation sites. This gives a living archive with millions of maps showing the situation from day to day, year to year. This project will secure an increased reuse of data from various sources and play an important role also in risk management.

NVE Data Bases



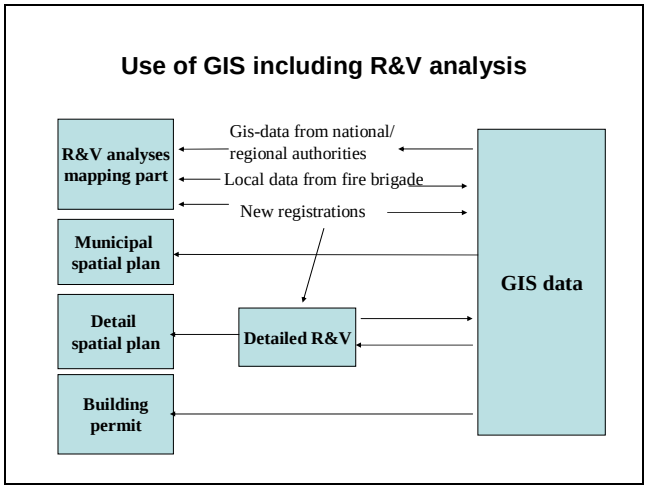


Dynamic Flood inundation warning map

In my presentation I will demonstrate some more examples for environment management

3.2 Risk Management.

In Norway the municipalities are responsible for spatial planning and building permits. As part of the municipal spatial master plan it is now a demand that the municipality should carry out risk and vulnerability mapping and analyses. Such maps and analyses can also be required at a more detailed level before building permits can be given. It is a municipal task to make sure that spatial planning and building permits is carried out so it can be guaranteed that it will not create danger for people, environment and material values. It is a demand to have an overview of the risk and vulnerability in the municipality. Some guidelines are made to assist the municipalities in this work. «GIS in risk management and spatial planning ». These guidelines give good examples on how to use spatial data and GIS tools in these fields.



The data flow in such processes can be like this:

- Spatial data from national and regional authorities are collected and supplemented with local existing data.
- Data is used in a rough R&V analyse as input to the municipal spatial master plan.
- The analyses and the data are used also in assessment of location for new build up areas and later in the more detailed planning. Here it is often necessary with additional detailed investigations
- All data from new investigations goes back to the GI data storage
- GI–data will also be used in the individual building permit handling

Through a good planning process the municipality make sure that new building areas are located so they are secure. It is important that risk information are easily available when the building permit are handled, so we do not locate new buildings in slide exposed areas, and that flood possibilities are taken into consideration. Many of the risk related GI data can be used for preparedness and risk management, by the risk management organisation, the fire corps, the social security management etc.

Some of the most important datasets will be delivered from national authorities, but others must be established locally. Important national datasets are information about land slide

exposed areas, snow and clay, data about flood and hydro infrastructure, data about risk exposed organisations. Various items can be grouped as follows:

- Nature risk
- Business risk
- Vulnerable objects
- Infrastructure
- Preparedness
- R&V analyses

Under each item it is defined one or more datasets with detailed specifications based on the Norwegian SOSI-standard for object types, coding and connected applications.

When a R&V analyses points out potential risk, this must be further investigated if it relates to a potential area for buildings or other constructions. Spatial information about exposed areas an about companies or infrastructure that is vulnerable or could cause risk for its environment, will be used on all levels.

Rough analyses :

1. Map and descriptions of relevant problems related to the areas in the municipality
2. Description of demands for security
3. Historic view on negative occurrences in the municipality
4. Collecting and establishment of spatial data to demonstrate the R&V situation
5. Assessment of the concrete R&V problems and the consequences of these
6. Assessment of the need of more detailed analyses

Questions to be asked in these processes:
What can go wrong in this municipality, in this area?
What are the reasons to the potential occurrence?
Some items are more obvious than others, but there will be big variation from one municipality to another. Some obvious items:

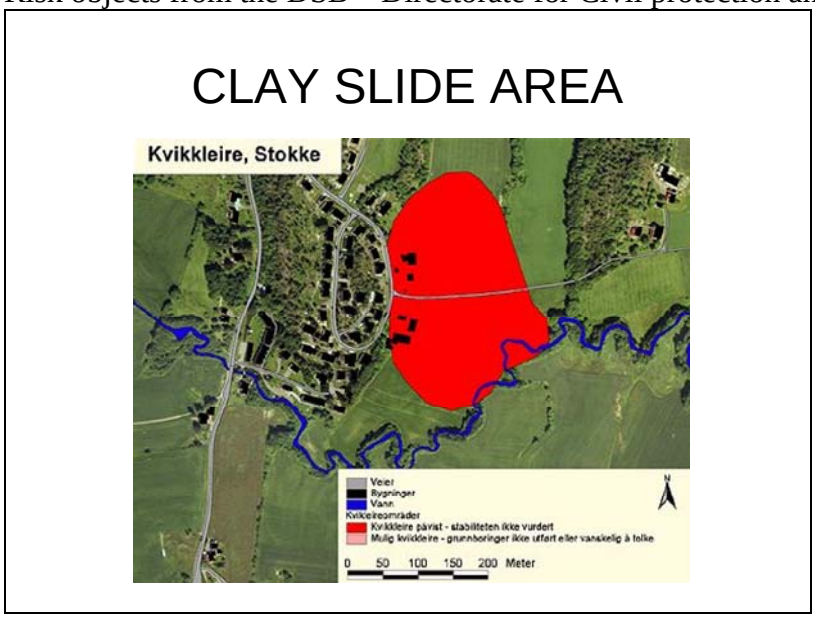
Flood zones
Slide exposed areas
Other ground situation
Risk activities
Traffic security
Water supply
Other infrastructure

There is made some checklists for the municipalities that list the most typical risk and vulnerability problems that could be present in a municipality. For all R&V item there is also an overview over relevant laws, directives and rules that put up demands for security precaution in the spatial planning, like rules for water management, noise descriptions, slide and other exposed areas, demands for security zones around industry areas. The municipality could also put out its own objectives for security in the planning like for traffic security.

If an area causes a vulnerable or risk situation the planners should seek for other locations or they would have to plan for risk preventing actions. If they choose to continue with the location they must document how to reduce the risk so that the area could be used safely.

The municipality can set up regulations for the area and demand the constructor to carry out special arrangement to take hand of the water, stream and rivers in the area or similar.
Some relevant data to consider in the R&V analyses

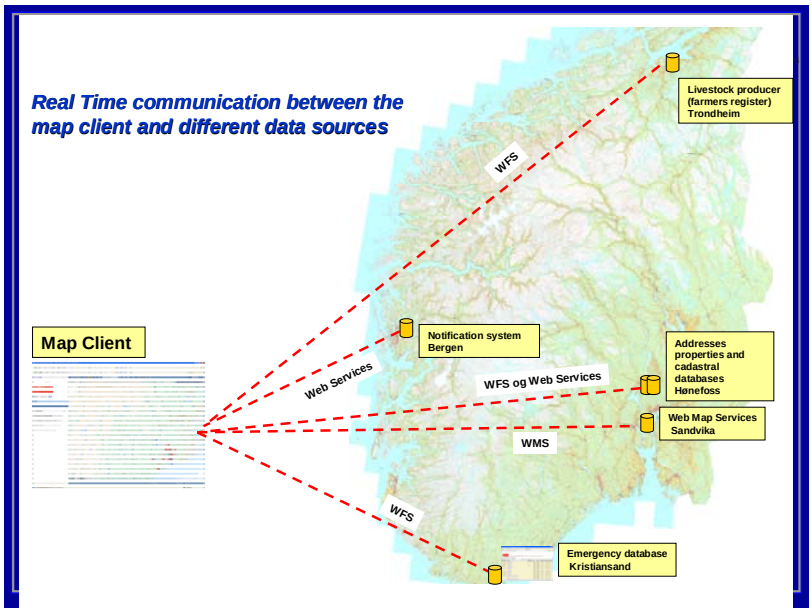
Many of the relevant data can be downloaded from Norway digital portal GeoNorge
Risk objects from the DSB – Directorate for Civil protection and Emergency Planning



One example of use of spatial information and internet for emergency situation is the SmartRap system. It is a pilot program developed by the National Food Secureity Agency, the National Mapping and Cadastre Authority, the private companies Gecko and NorKart.

The main objectives are to design and build distributed systems for use in case of emergency, such as natural or manmade disasters. The system is designed so all information is collected in real time by different Web Services and Geospatial Services directly from official databases. The system shall have the capability to produce notification lists with names and addresses inside a defined buffer zone and send warnings by SMS and voice mail directly to the people, companies or farmers inside this buffer (notification Zone)

The distributed systems for use in case of Emergency consist of three different modules that communicate with each other and with several web services in real time. A registration module, a map client and a notification module.



Notification list including

- all official addresses
- all official owners
- all telephone subscribers (mobile, landline)
- all livestock producers (cattle, pork, poultry, goat, sheep)

I will demonstrate some more examples at my presentation

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The Directorate of Nature Management: http://english.dirnat.no
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The ISO TC 211 web-site : www.isotc211.org
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BIOGRAPHICAL NOTES

Kari Strande is International Director at the Norwegian Mapping and Cadastre Authority. She is chair of FIG WG 3.1 task e-Government for e-Citizens. She is a local politician and engaged in promoting better tools for decisions for land management and environment. She is also working with development cooperation and geospatial infrastructure projects as tool for development. She is coordinating an exchange program for young surveyors in Vietnam, Laos and Norway

CONTACTS

International Director Kari Strande
Norwegian mapping and cadastre authority
N-3507 Hønefoss
NORWAY
Tel. + 47 32 11 81 00 / +47 90 99 65 15
Fax + 47 32 11 81 01
Email: kari.strande@statkart.no
Web site: www.statkart.no