



**Geo-information for Disaster Management**

# DELFT

Methodology for Making  
Geographic Information Relevant  
to Crisis Management

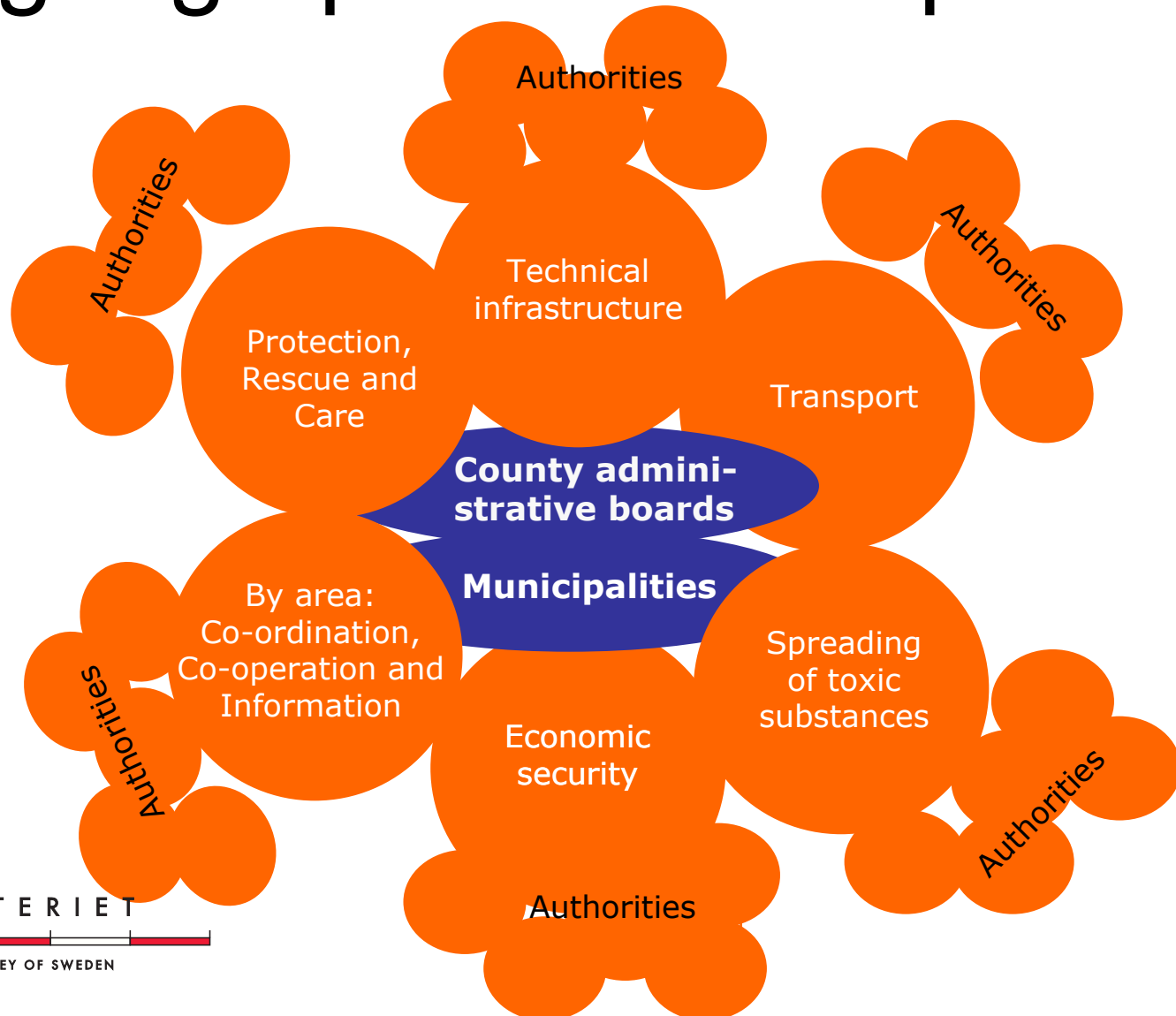
# Disposition

- Swedish emergency system
- Sector Geographic information
- Relevant information
- KRIS-GIS (GIS for Crisis Management)
- GIRD
- Geographic information
- INSPIRE
- Examples Exercise
- Conclusion

# The Swedish Emergency Management Agency (SEMA)

- co-ordinates the work
- works together with municipalities, county councils and government authorities, as well as the business community and several organisations

# The co-ordination areas and players with geographic area responsibility



# What is a co-ordination area?



- An activity that is considered essential to society's capacity
- Includes the activities carried out by public bodies (authorities, county administrative boards, county councils, municipalities, organisations and companies) that are strongly interrelated.
- Consists of the authorities with co-ordination responsibilities

# Sector Geographic information

L A N T M Ä T E R I E T



NATIONAL LAND SURVEY OF SWEDEN

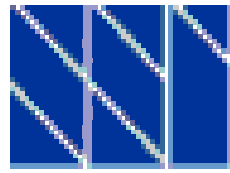


Swedish Meteorological and Hydrological Institute



**Vägverket**

Swedish Road Administration (SRA).



*Statens strålskyddsinstitut*  
Swedish Radiation Protection Authority



SWEDISH MARITIME  
ADMINISTRATION

**SGU**

Sveriges Geologiska Undersökning  
Geological Survey of Sweden



Swedish  
Geotechnical  
Institute



RÄDDNINGSS  
VERKET

**SRSA - Swedish Rescue  
Services Agency**

# Government Authorities

- **The Swedish Geotechnical Institute** is a government agency dealing with geotechnical research, information and consultancy. The purpose of the Institute is to achieve better techniques, safety and economy by the correct application of geotechnical knowledge in the building process.
- **Swedish Meteorological and Hydrological Institute**, SMHI, offers comprehensive competence within the areas of meteorology, hydrology and oceanography.  
**The Geological Survey of Sweden** (SGU) is the central government agency responsible for matters relating to the geology of Sweden and the management of mineral resources.
- **The Swedish Road Administration** is the national authority assigned the overall sectoral responsibility for the entire road transport system. The Swedish Road administration is also responsible for drawing up and applying road transport regulations. And for the planning, construction, operation and maintenance of the state roads.
- **Lantmäteriet** provides Swedish society - the public and private sectors, the general public and a wide range of other users - with geographic information in the form of maps, aerial photography and satellite imagery.
- **The Swedish Maritime Administration's** primary tasks include responsibility for providing infrastructural services in the form of safe and accessible fairways to meet the needs of shipping.
- **The Swedish Rescue Services Agency** promotes practice that improves emergency prevention and response, and in the event of an incident/accident limits injury and damage

# Relevant information

- Spatial data for risk management
  - Risk or opportunity???
- Is spatial data needed in risk management systems?
- What's the use of spatial data in a risk management system?
- Is there a difference in the way a decision maker must think
  - before, under or after crisis???



## KRIS-GIS® Training & information



Mini Kolinda  
Step by step exercises



As a decision-maker, an emergency services co-coordinator or head of security it is vital that you have access to the latest available information for your planning before you take decisions, during crisis situation, and for following up the impact of crisis situations on society. This is important as similar information can exist in several databases. The information will help to prevent, restrict and restore and repair. KRIS-GIS is a training programme designed to increase your ability to analyse needs, so that you will be able to request the information that is really relevant. The starting point is the risk and vulnerability analysis that must be carried out by all local authorities and government agencies.

## KRIS-GIS® Exercises

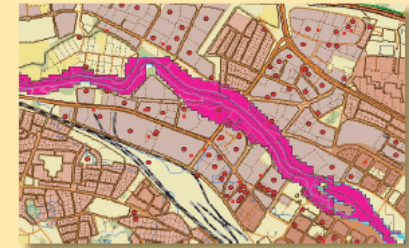


Mini Kolinda  
S1, Enköping

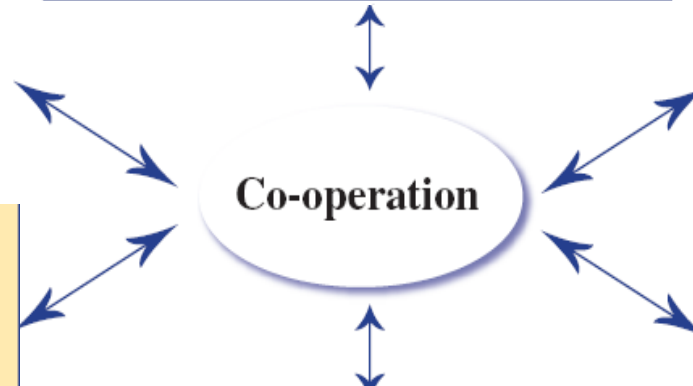
In the KRIS-GIS part you will carry out exercises showing how integrated information can form the basis for planning and decision making in connection with crisis management, such as where flooding risks are acute or for granting or rejecting building permission in coastal or riparian areas. In GIS-lab you can test the relevance of information in real-life situations and evaluate how a common geographic information base can be created.

## KRIS-GIS® R&D

Analysis as the basis for decisions



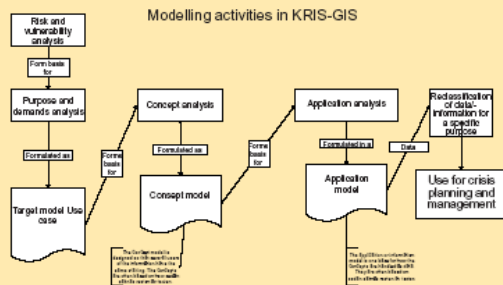
KRIS-GIS R&D evaluates the relationship between quality and classification in specific information and how the results can be interpreted. Studies of water flow have been carried out along the central sections of Eskilstunaån and the terrain elevation model that was used was not accurate enough to show, with certainty, whether there is a risk for flooding or land slides. During 2004 a more accurate terrain model, produced from data collected using airborne laser scanning, will be produced and be used for new water flow studies. Comparative analyses of the results of the two studies are planned to begin during January 2005. During 2005 studies of the transportation of hazardous goods are also planned to be started.



Co-operation

## KRIS-GIS® Method support

Standard and quality



It is important that these concepts are fully understood. When joint decisions involving several persons are to be taken, it is vital that all speak the same technical language. This is certainly something we have all experienced in our own every day activities. For crisis management it is absolutely crucial that no misunderstanding can arise in interpreting concepts, symbols etc. as the decisions that are taken based on them can involve life or death. Method support helps all involved to reach a common understanding of a situation.

## KRIS-GIS® Testing



Doing experiments to test how geographic information can be used for simulating a series of events, such as flooding, with the help of 3D tools is a part of the KRIS-GIS concept. A test module is being developed for training planners and decision-makers who use the crisis management system to choose the correct type of support for taking decisions before, during and after serious emergencies.

## KRIS-GIS® Method support

Geodata and action

Where are there risks for earth slip and landslides?

	Computation of slope	Redattribution	Redclassification	Search and overlay analysis	Manual selection	Presentation
Elevationdata, raster	•					
Slope, raster	•					
Landslide classified slope, raster				•		
Soil type, raster					•	
Landslide classified soil type, raster						•
Area with risk for landslides, raster						•
Topographic Map, raster						•
Rdim/R100, vektor						•
General Map, vektor						•
Result, graphic						•

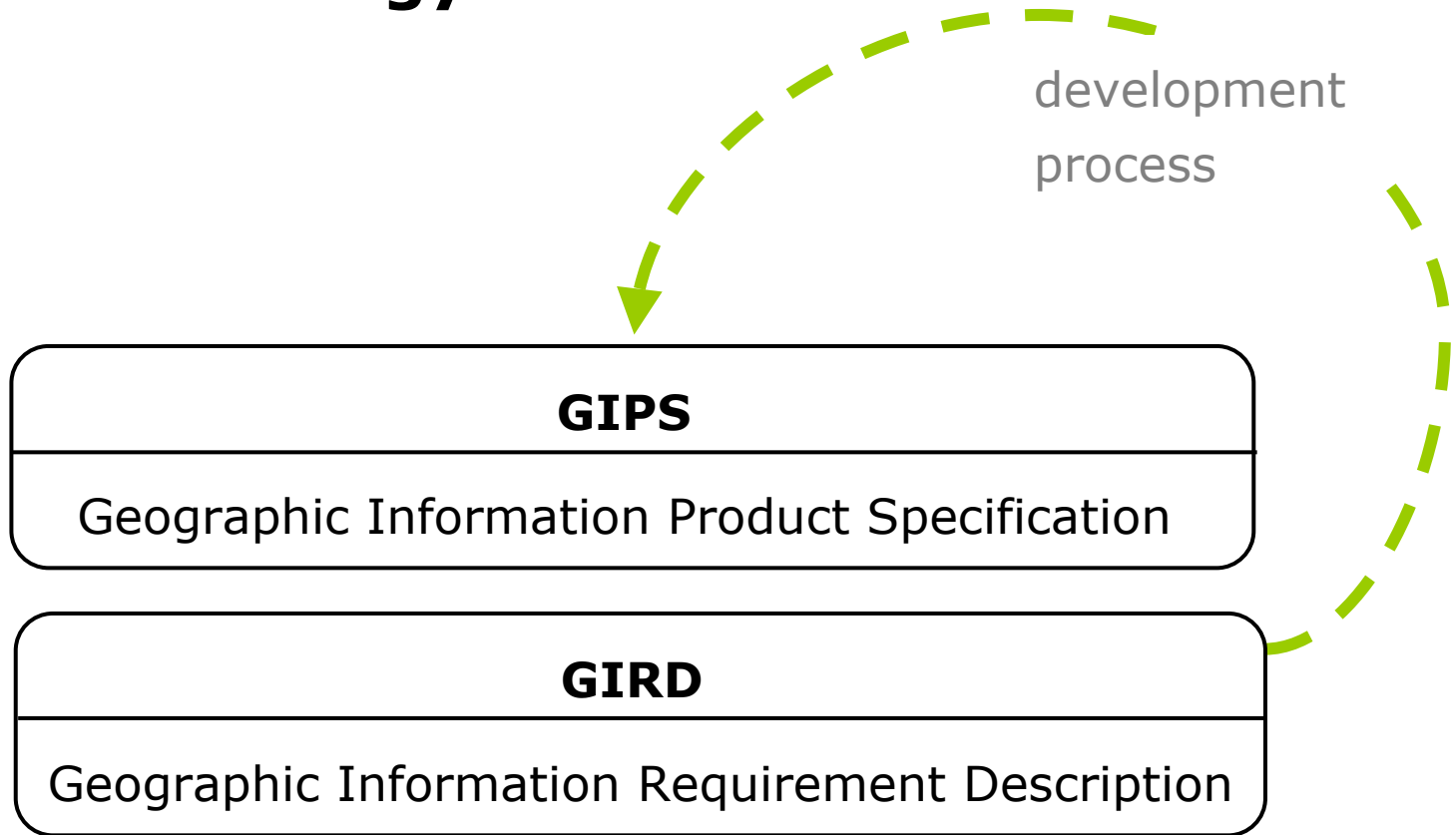
What sort of information will be needed? What sort of information do we have and what additional information must we have access to and how can we get it? The GIBB method – a description of the need for geographic information – is used. GIBB is a matrix which helps you identify the type and content of the information that is required. The KRIS-GIS concept is a way of finding functional forms for crisis management support and, therefore, requires close co-operation between all involved parties.

# Disposition

- Swedish emergency system
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- **GIRD**
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# Method and support

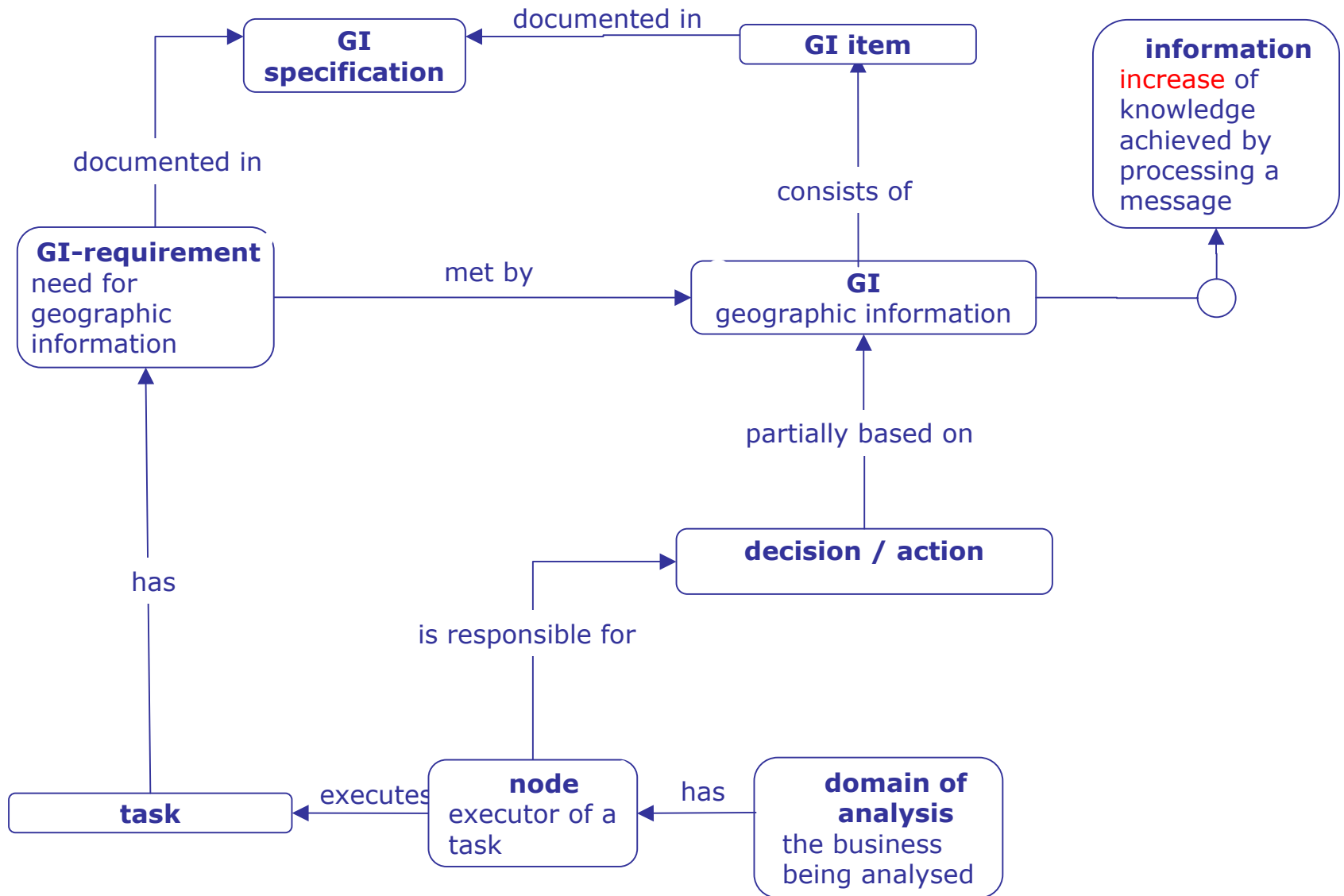
## Terminology



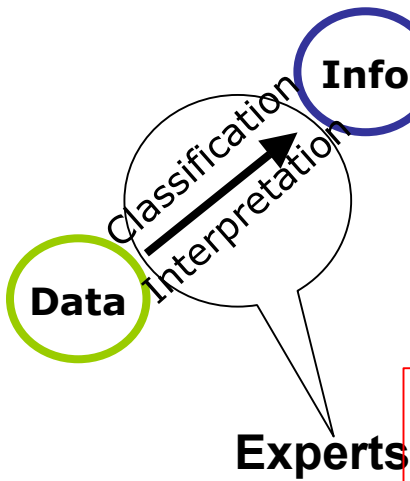
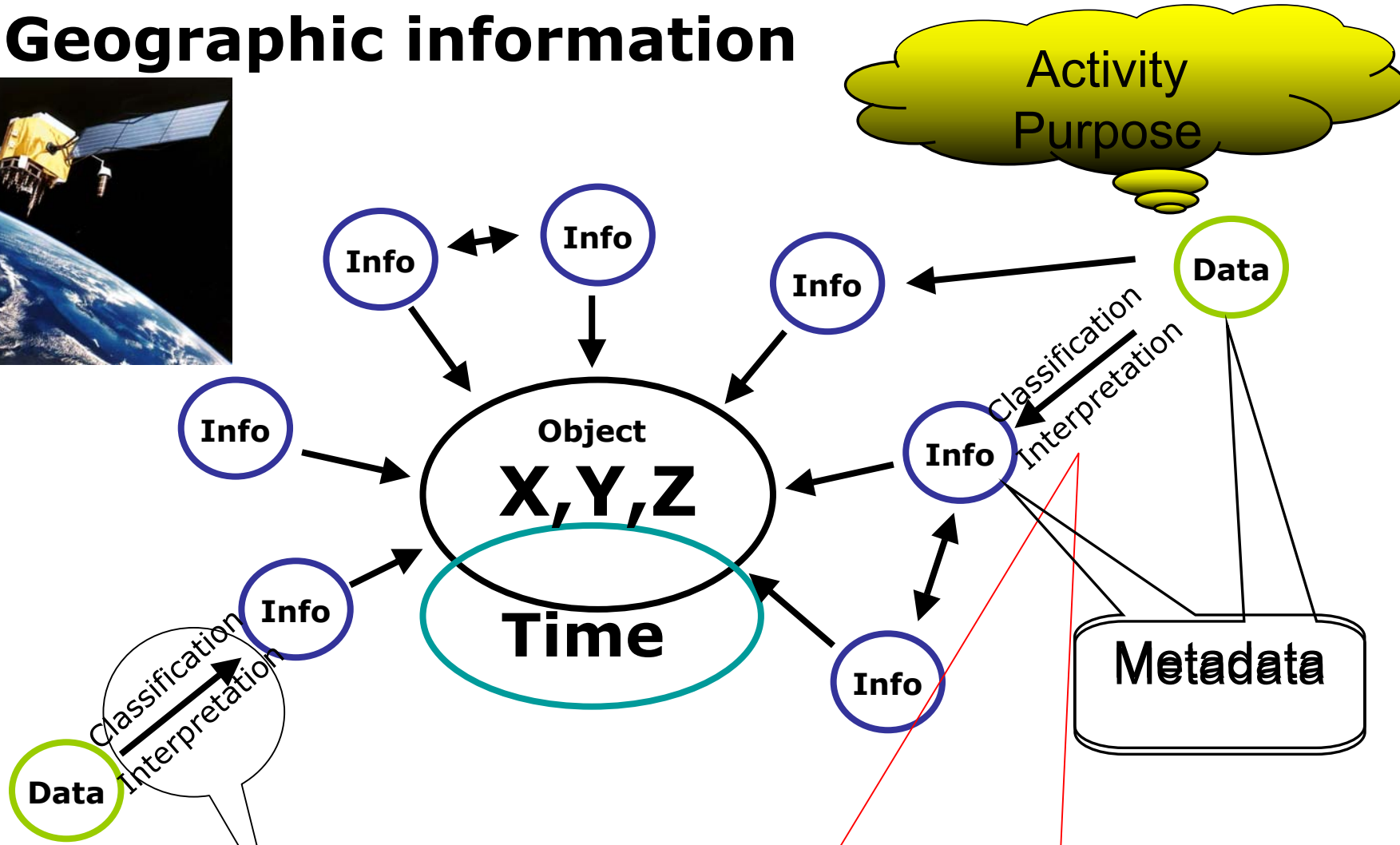
# What is GIRD?

GIRD is a method for analysis and documentation of the needs for geographic information.

# The metamodel of the GIRD method

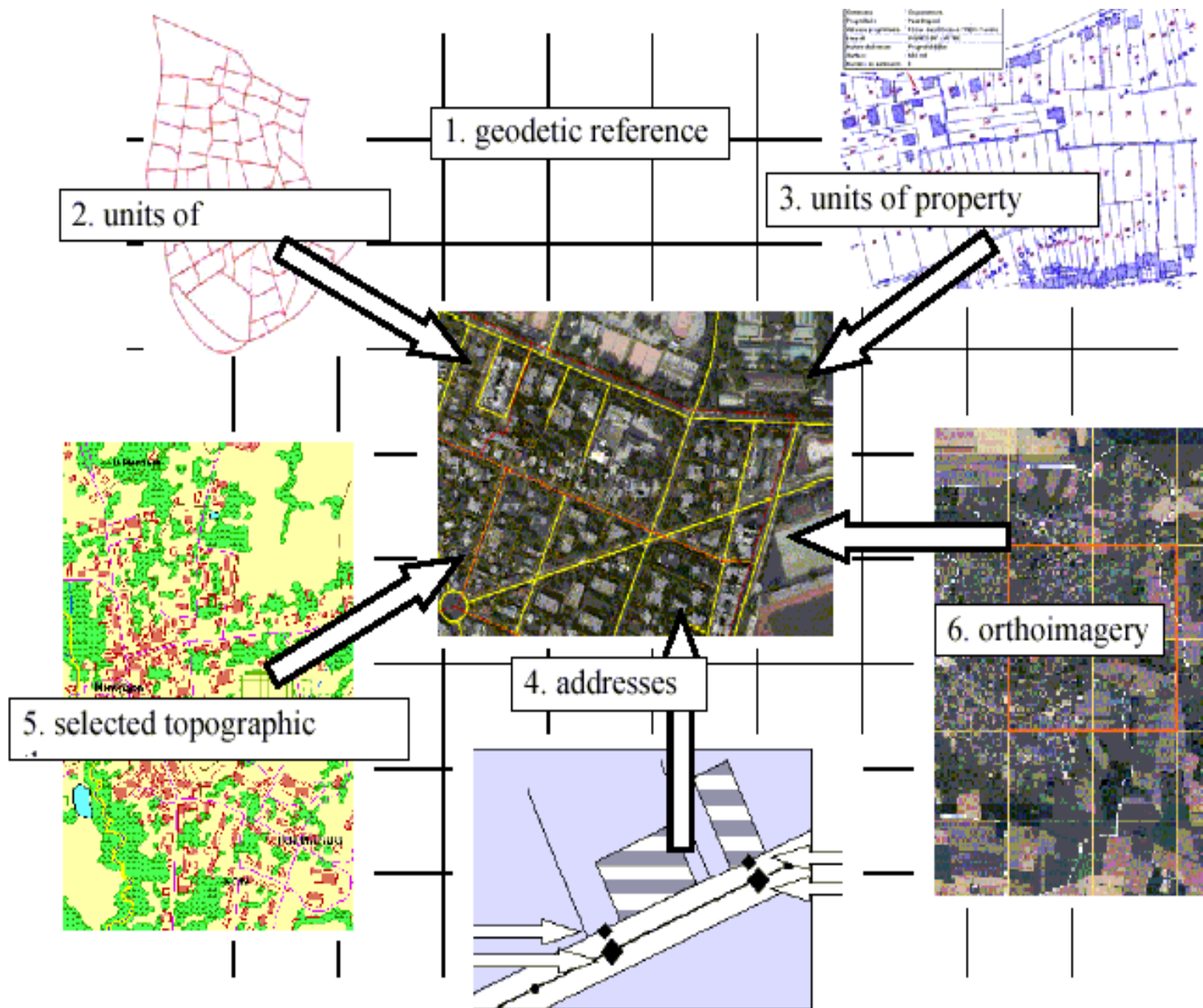


# Geographic information



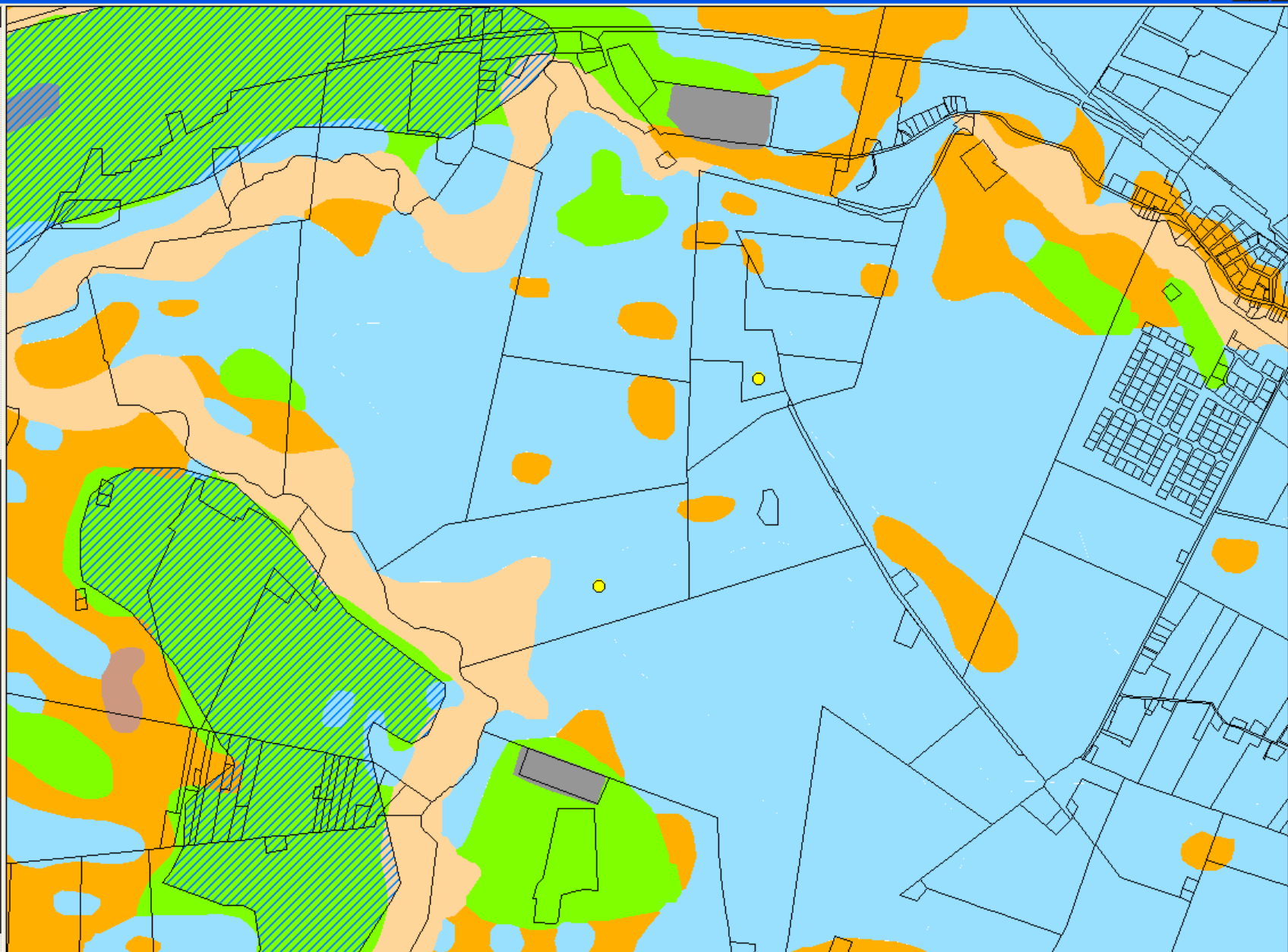
**Daily issues**  
**Crisis** before, under and after

# INSPIRE

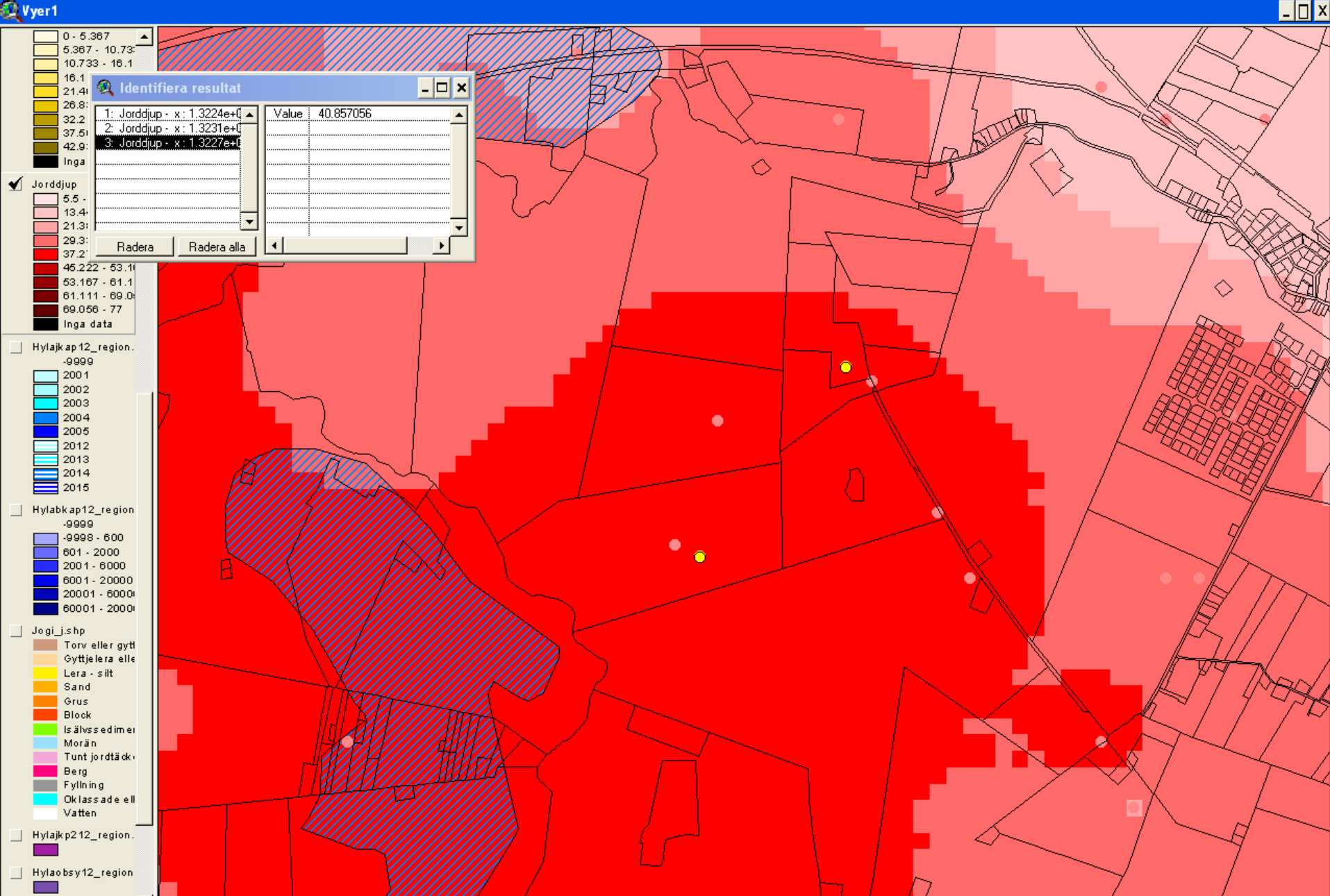




- Jorddjup
  - 37.507 - 42.9
  - 42.933 - 48.3
  - Inga data
- Hylajkap12\_region.
  - 9999
  - 2001
  - 2002
  - 2003
  - 2004
  - 2005
  - 2012
  - 2013
  - 2014
  - 2015
- Hylabkap12\_region
  - 9999
  - 9998 - 600
  - 601 - 2000
  - 2001 - 6000
  - 6001 - 20000
  - 20001 - 60000
  - 60001 - 20000
- Jogi\_j.shp
  - Torv eller gytt
  - Gyttjeler eller
  - Lera - silt
  - Sand
  - Grus
  - Block
  - Isälvsedimer
  - Morän
  - Tunt jordtäck.
  - Berg
  - Fyllning
  - Oklassade ell
  - Vatten
- Hylajkp212\_region.
  -
- Hylaobsy12\_region
  -







**Identifiera resultat**

	Value
1: Jorddjup - x: 1.3224e+0	40.857056
2: Jorddjup - x: 1.3231e+0	
3: Jorddjup - x: 1.3227e+0	

Buttons: Radera, Radera alla

# GIS-example

Is there a possibility to "bury" the birds at the real estate? (Epizootic grave)?

Used information :

- Soilmap from SGU
- Well archive from SGU
- A diversity of hydrological layers from SGU
- Elevation from Lantmäteriet
- Real estate boundaries from Lantmäteriet

Common picture:

- Proper soil, moraine clayey
- Deep soil, 30-40 m (interpolated)
- No big elevation differences (flowing off slowly)

# GIS-example

If there is a need to transport all the dead birds to a destruction facility.













Which way is the safest?

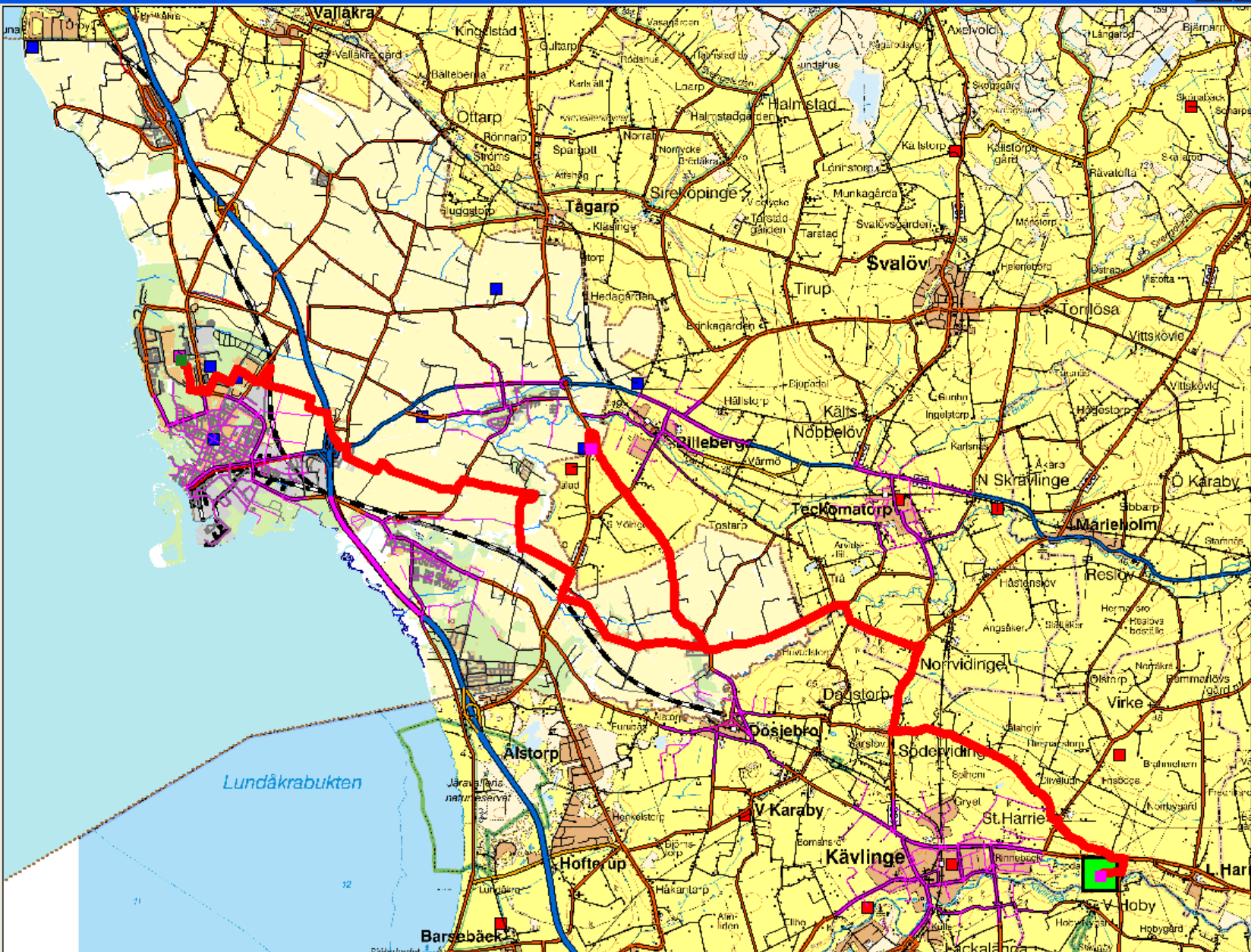
**Needed information:**

- **GSD Roadmap vector networked from Lantmäteriet**
- **GSD roadmap raster as a background from Lantmäteriet**
- **Regional map vector over the municipality of Landskrona**

**Common picture:?**

4 - Landskrona skånekartan

- Route2 
- Route1 
- Destruktion\_kävlinge.shp 
- VI\_m\_klipp.shp
- Buff3km\_moinge.shp 
- Buff3km\_duvor.shp 
- Buff10km\_moinge.shp 
- Buff10km\_duvor.shp 
- Veterinär\_totalt.shp 
- Fjaderfa\_landskrona.shp 
- text adress nr
- text vägar små
- text vägar stora
- text byggelse
- text anläggningar
- text terräng
- text vatten
- text natur o kultur
- transformatorer 
- kraftledningar 
- administrativa gränser 



# GIS-example

Which way is the safest?

So that it minimize the possibility to transmitt  
the infection to other birds.

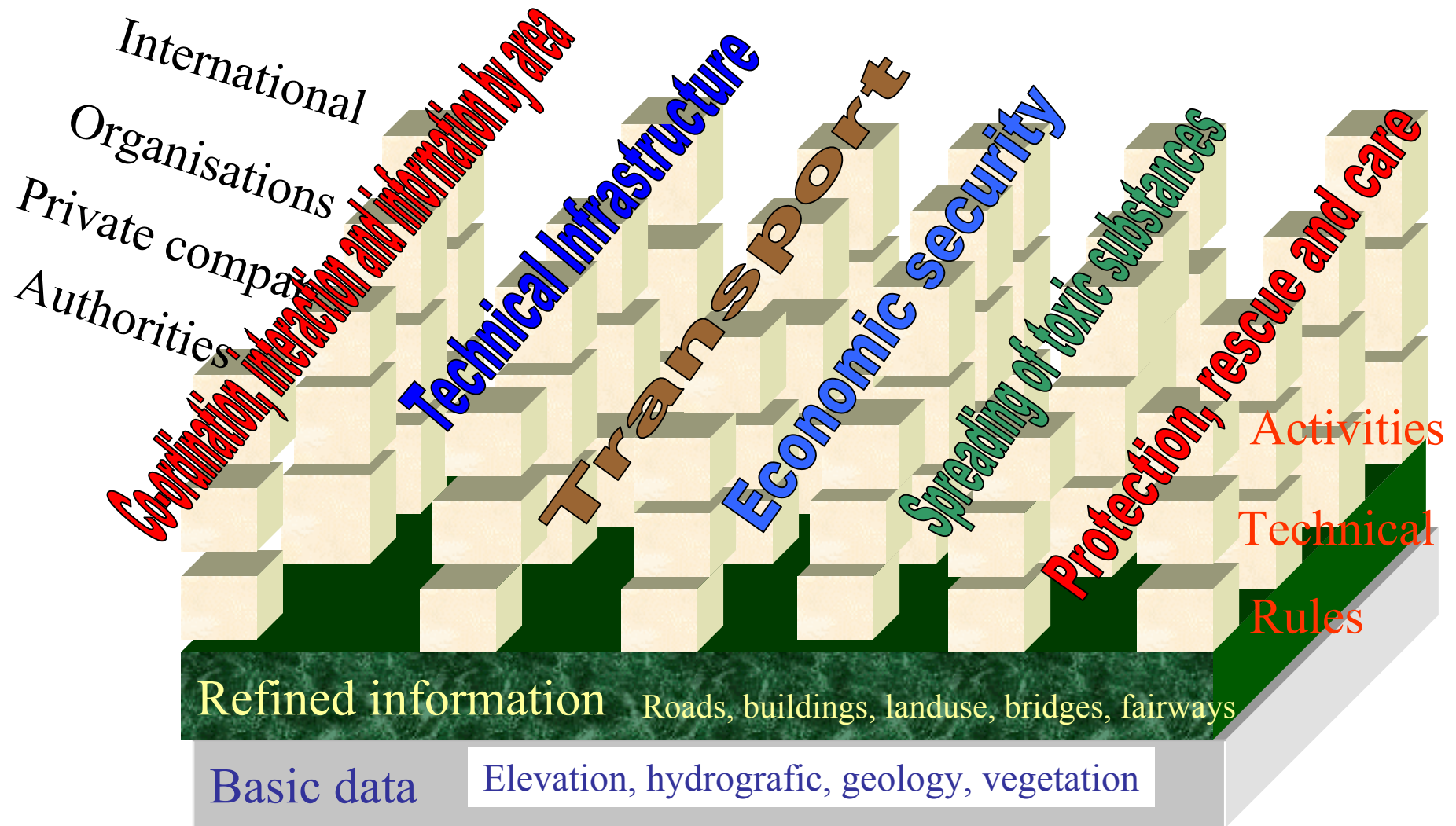
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Common picture:?

- **Proposed network analysis so that:**
  - **No urban areas will be passed through**
  - **No real estates that have birds will be passed through**

# Support from the sector geographic information



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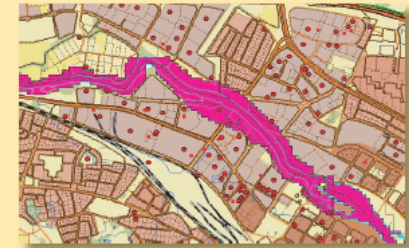


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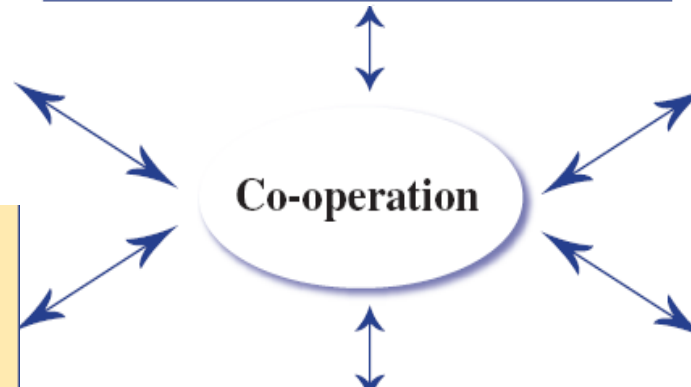
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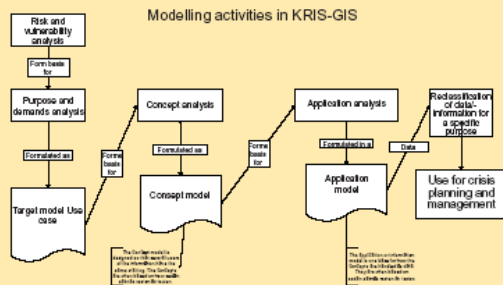
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Soil type, raster				●		
Landslide classified soil type, raster					●	
Area with risk for landslides, raster						●
Topographic Map, raster						●
Rdim/R100, vektor						●
General Map, vektor						●
Result, graphic						●

What sort of information will be needed? What sort of information do we have and what additional information must we have access to and how can we get it? The GIBB method – a description of the need for geographic information – is used. GIBB is a matrix which helps you identify the type and content of the information that is required. The KRIS-GIS concept is a way of finding functional forms for crisis management support and, therefore, requires close co-operation between all involved parties.

# Relevant information

- Spatial data for risk management
  - Risk or opportunity??? **Both**
- Is spatial data needed in risk management systems? **Yes**
- What's the use of spatial data in a risk management system? **Common picture**
- Is there a difference in the way a decision maker must think
  - before, under or after crisis??? **Yes and no**



# Conclusion

- The customer is not always right
- Information available- information needs
- Co-operation
- Lessons learned - best practises
- Geosupport Experts

???????

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