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UK Case studies and "regional" description

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Collaboration in the Qualitative Reasoning Workbench

Anders Bouwer, Jochem Liem, Bert Bredeweg

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NATURNET-REDIME PORTAL TOOLS
Map Project Manager

K.Charvat, P. Horak

The NaturNet-Redime web portal is designed and implemented as advanced distributed interoperable knowledge and educational web services that will support awareness and learning about information and tools solving environmental, economical and social problems of sustainability across Europe. The new geographical and location-based services are combined with 3D of objects and advanced learning tools. Due the interoperability on the level of data as well as services the portal offers access to distributed sources and also offers the possibility to integrate external knowledge

The **Map Project Manager (MapMan)** is a software tool for users who want to create new map projects and compositions. You can use the tool for works focused on the use and display of GIS data in the Internet environment. MapMan is capable of creating various map compositions and you can use different data sources – data on the local server, but also data available through web services, which are saved on an external server. In the framework NATURNET-REDIME the portal MapMan is closely linked to other portal components – metadata systems and the DHTML map client. You can use this functionality for searching for data on external servers.

Functionality

Map project selection –the user can make a selection from a list of completed projects and he can display them in a map client. The detailed description of project and the preview can be included in the list of projects. Each of the projects is linked to the DHTML map client and there it opens in the map client window according to the project settings. You can access the list of projects also from other applications and you can use it if you make new lectures, information pages, etc.

Creating a user project is a basic MapMan function for generating a new project. If you create a new project, you can define data layers from different sources and according to data types you can set special parameters for data display. You can save the data layers and data layer settings into a Repository for a future use in another project. The setting can be defined as “private“ – only for the user who made it, or “public“ – the setting will be available to every user.

Creating and setting a data parameters display – using MapMan you can create your personal symbol set, you can create new symbols, define their setting and colour, you can combine symbols and make special graphic symbols. The possibilities are limited by the character of real data layer – e.g. the data from the local server or data through WFS can be displayed according to the user´s setting without any problem.

Components

Project Window

Project window is a basic part of MapMan. You can choose from the list of available projects, which contains project descriptions and data previews.

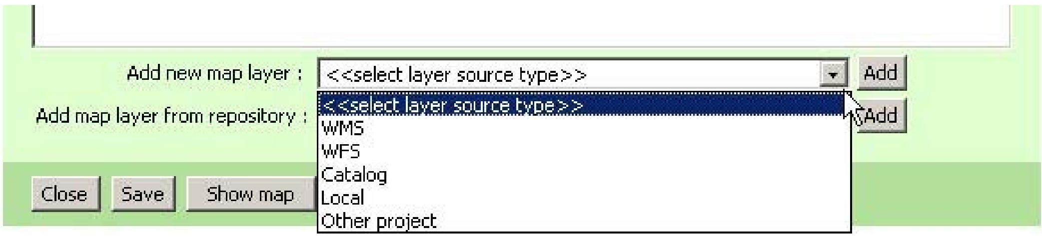
Project Editor

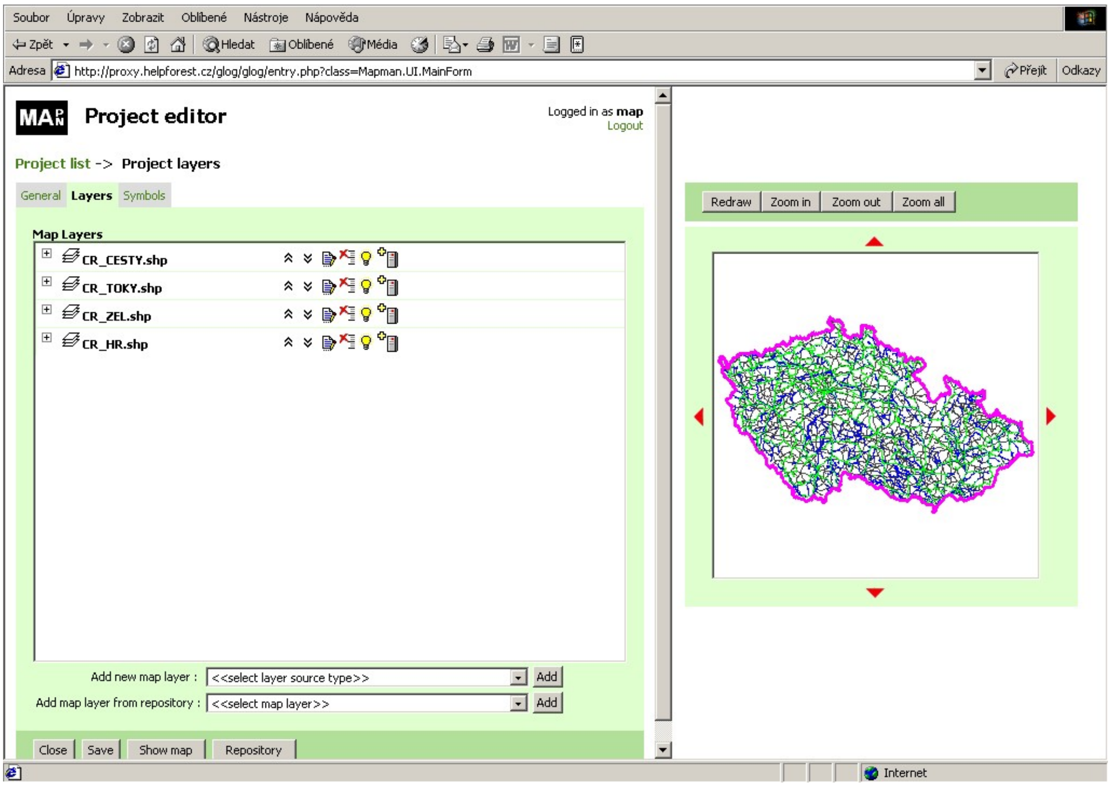
The main Mapman component is a Project editor. Using the component you can build a new project, choose coordinate systems, define data sources, and certainly you can make a new presentation design of data – symbols, colours, etc. You can also define “ the user view“ as a part of the whole map project

A new project can be made by editing a different project or by building a new independent project by means of searching and using new data layers. The layers can be saved on different data sources (servers) and they may contain various data types.

Data sources:

- Web Map Services
- Web Features Service
- Catalog
- Local data (internal server)
- Other projects





The Web Map Services and Web Features Services provide the transfer of information from external servers. Using MapMan the user can ask for data directly from external servers or use an interconnection to metadata catalogs (Micka and GeoNetwork) – in this case one can specify more precisely the request for a selection of data layers. Metadata catalog will find him only the layers which correspond to the defined requirements.

The user who has access rights to data on an internal server can use the data directly for creating a map project – one doesn't have to use the web services. If needed one can also define the cartography design of the data.

To create a new project you can use already existing projects. Building of a map composition can be difficult but you can use an existing project or a part of project as a source and you can only change the settings which are needed for the new project. This way of creating is easier and user friendlier.

You can combine the layers which are loaded in MapMan with other layers, you can change the order of layers, provide changes of display settings (if it is possible for the type of data), etc. The project will be saved as an xml file and the DHTML map client integrated in the NNR portal can use it for data presentation.

DHTML Client

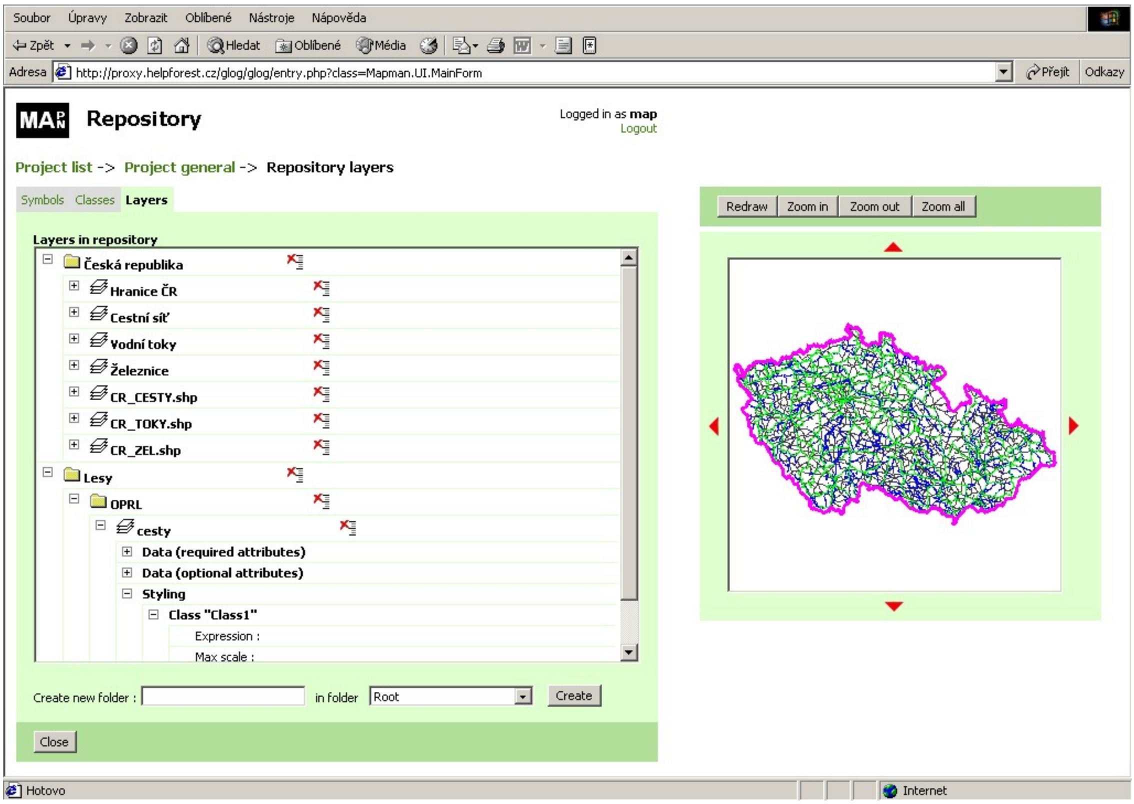
MapMan is closely linked to DHTML map client. DHTML map client is a tool for presentation of GIS data.

MapMan cooperates with Map client in two ways:

- the finished project saved in the List of projects is opened in full DHTML map client. The user can use all map functions and work with the map in a standard way. Data of the project are displayed on the basis of the project settings
- light version of DHTML map client is included in the MapMan project editor . You can operate, control and check your work easily while you prepare the project. The functionality of the DHTML map client is limited to simple operations for work with map (zoom, move, etc.)

Repository

Repository is a component for storing elements and parts of the project which could be useful for building and editing new projects. Above all there are settings of colours and symbols but also complete layers. If the user has access rights, he can use the setting layer and elements for a project. He can also store his own setting in the repository for future work.



Repository contains:

- Symbols – basic definition of object form presentation
- Classes – detailed specification of a symbol – a symbol also can be composed from other symbols with different color, size, form, display parameters, etc
- Layers – settings for all layers – layers are saved with all settings, the user does not have to make new settings

Authorization

Access rights for MapMan will be solved for three levels

- standard user – for people who want to work with complete projects
- expert – for users who want to change projects or to make new projects
- administrator – for programmers

The settings of access rights will be solved in the framework of access rights for all NNR portals

Integrated river management and ecology: sustainable development of the River Kamp landscape

A. Zitek, S. Preis & S. Muhar

The Austrian case study "Integrated river management and ecology: sustainable development of the River Kamp landscape" focuses on the integration of the basic socio-economical and ecological factors that have to be considered to achieve a sustainable development of riverine landscapes. The representation of key processes driving the sustainable development of riverine landscapes in QR with GARP will help to organize the information in a comprehensible way and will be used to communicate potential development scenarios. The models will be developed within a collaborative QR-workbench (collaborative modelling and learning environment) in close collaboration with a case study from England. Both case studies take into account activities and needs at a catchment level, as the main focus of the EU-Water-Framework-Directive (WFD, a new European water legislation launched in the year 2000) is the management of river basins, the natural geographic and hydrologic unit. As one of the key objectives of the WFD is to achieve the "good ecological status" of running waters by 2015, the case study uses the ecological status of the river as an indicator for sustainability on a catchment level.

The River Kamp lies in the North-Eastern part of Austria (Fig. 1). It has a length of 160 km and a catchment area of 1753 km²; the mean slope of the river in the project area is between 1‰ and 3.4‰. The discharge regime and the temperature regime of the river are heavily modified by large impoundments in the upstream part of the project area (Fig. 2).

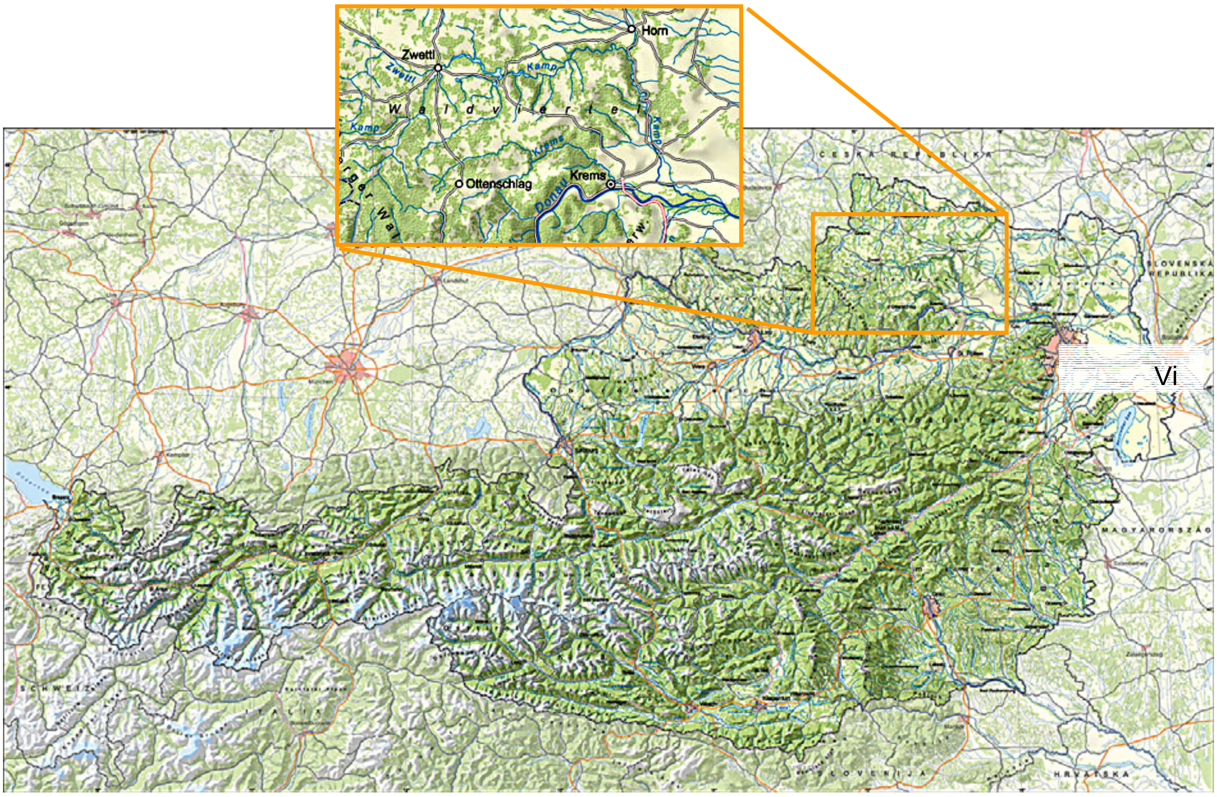


Figure 1: Situation of the River Kamp in Austria.

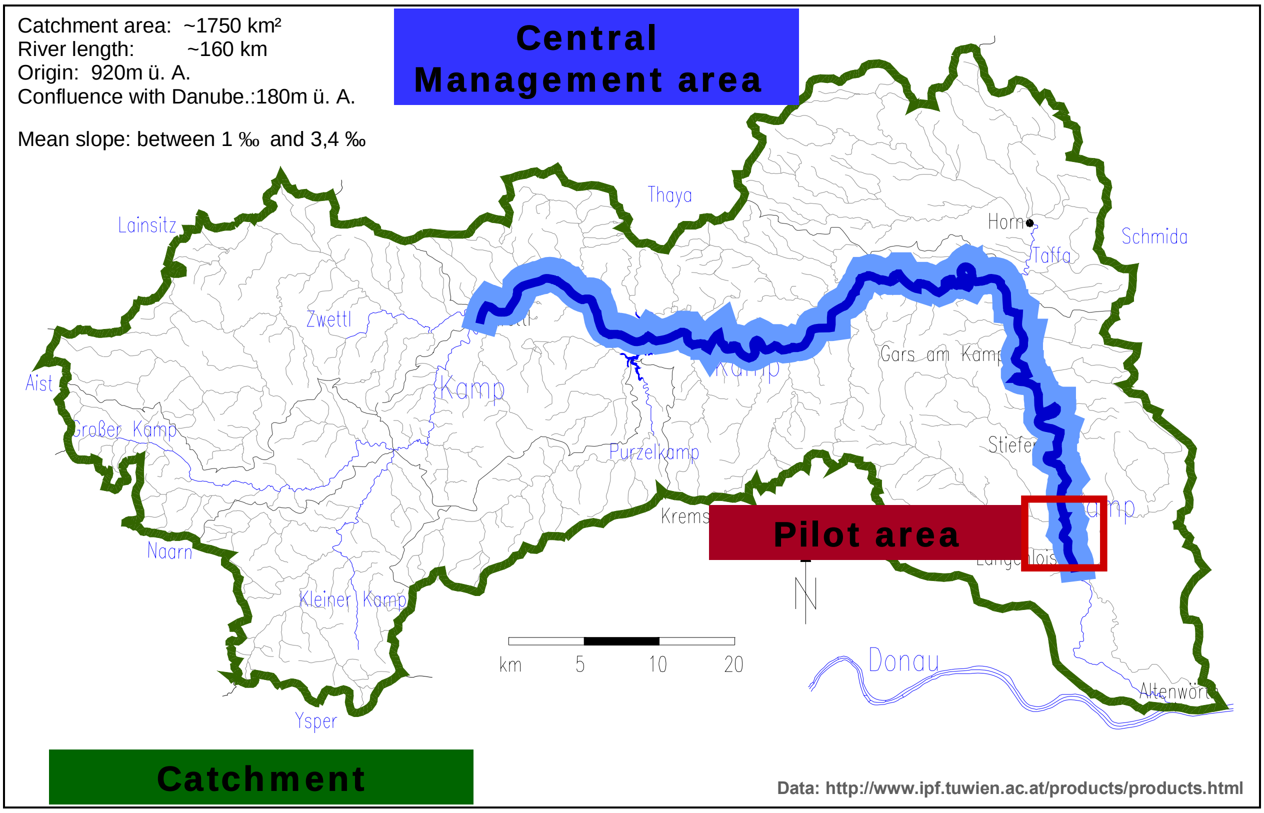


Figure 2: Location of the project area within the catchment of the River Kamp in Lower Austria.

Catastrophic floods and inundations in August 2002 set new conditions for life and economy in the in the Kamp-valley. Flood control management and landscape architecture & planning face essential and future challenges. From an ecological point of view, the extreme event led to an extraordinary development of the river landscape within the valley: it resulted in the re-formation of natural unconstrained river sections, habitats that when rebuilt by man in other rivers in Austria have required large financial expenditure (for example within the framework of Life-Nature projects). At the same time the question of an EU-WRRL-consistent treatment of the topics flood control/natural retention/prevention is arising. Consequently, the high water event finally represents a chance to develop the riverine landscape together with the local population as well as with the concerned scientific disciplines considering social, economic and ecological claims. On this basis an overall integrated concept towards the sustainable development of the River Kamp landscape is being developed at the University of Natural Resources and Applied Life Sciences, Vienna. The study starts at plans for flood control measures, flood forecasting and action plans for emergencies, which have been developed by the local government. Main task of the project is the elaboration of aims and directives for a sustainable development from a regional point of view and to outline different future scenarios synchronized with the actual situation, the different uses and functions of the valley (settlement area - free surrounding area). A management plan for the central valley area, which is in turn a basis for a detailed planning for a selected municipality, is developed. Besides the consideration of the spatial scale (from catchment level up to planning onto municipalities) the interdisciplinary work of the different disciplines biology/nature conservation, landscape planning, water resources management, regional planning, agriculture and forestry and hydropower production is of central relevance for the success of the project (Fig. 3). Moreover, planning is conducted in participation with authorities, stakeholders and the local population. The integration of the population into the planning activities exceeds pure information policy with the possibility for the local population to actively participate in developing the future scenarios for their valley. The following working tasks are treated within the project (Fig. 4):

(1) A comprehensive investigation and representation of the current situation of the Kamp valley (fluvial topography) as well as of the different claims of stakeholders (uses, expectations, etc.).

(2) Adjustment and integration of planned and ongoing activities (flood control measures, flood forecasting and action plans for emergencies).

(3) Elaboration of sectoral mission statement concepts for the development of the valley from the viewpoint of the different disciplines as well as the municipalities/population (Fig. 5).

- ➢ Content and characteristics of a sectoral mission statement:

- *Visionary & operative mission statement ("limits of reality")*
- *Values and deficits*
- *Development of actions ("Increase and protect values and decrease deficits")*

(4) Collective elaboration of scenarios and actions for the future development of the riverine landscape of the Kamp valley (flood control, settlements, agriculture, ecology, hydropower industry, leisure time and regeneration, tourism...) which integrate the sectorial concepts/targets/requests considering the general basic local parameters (conditions/general regulations, like the aims of the WFD, FFH, ..) (Fig. 5).

- ➢ In total 320 actions out of 14 sectoral mission statements were defined and have been grouped according to superordinated issues (i.e. residual flow, morphology) and local situations (hydropower production, agriculture, tourism…)
- ➢ Visualization of reciprocal actions of the single actions to identify potential conflicts or positive interactions based on a matrix
- ➢ Identification of potential solutions

(5) Development of a super ordinate management plan on the basis of the scenarios developed in (4) (Fig. 5).

(6) Detailed planning at a pilot municipality.

Figure 3: An integrative view of the riverine landscape "Kamp".

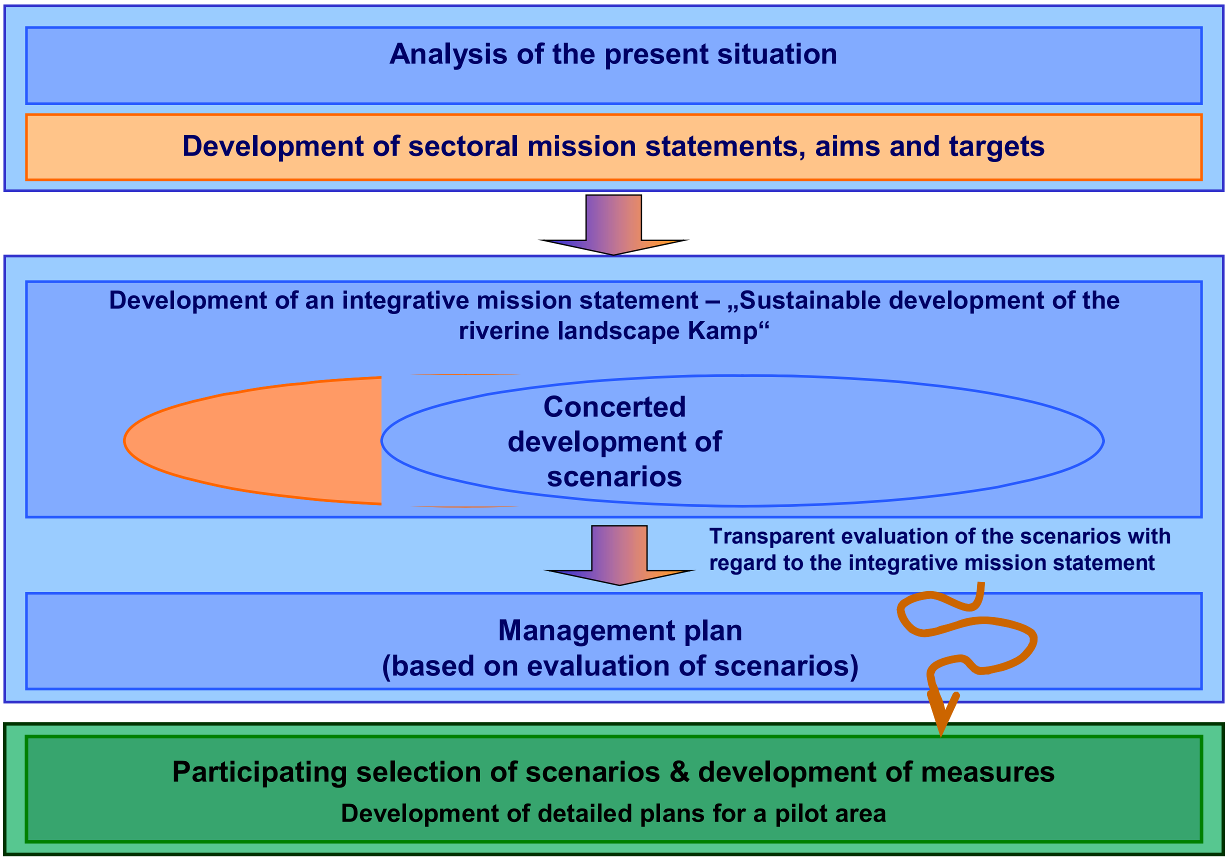


Figure 4: Project structure.

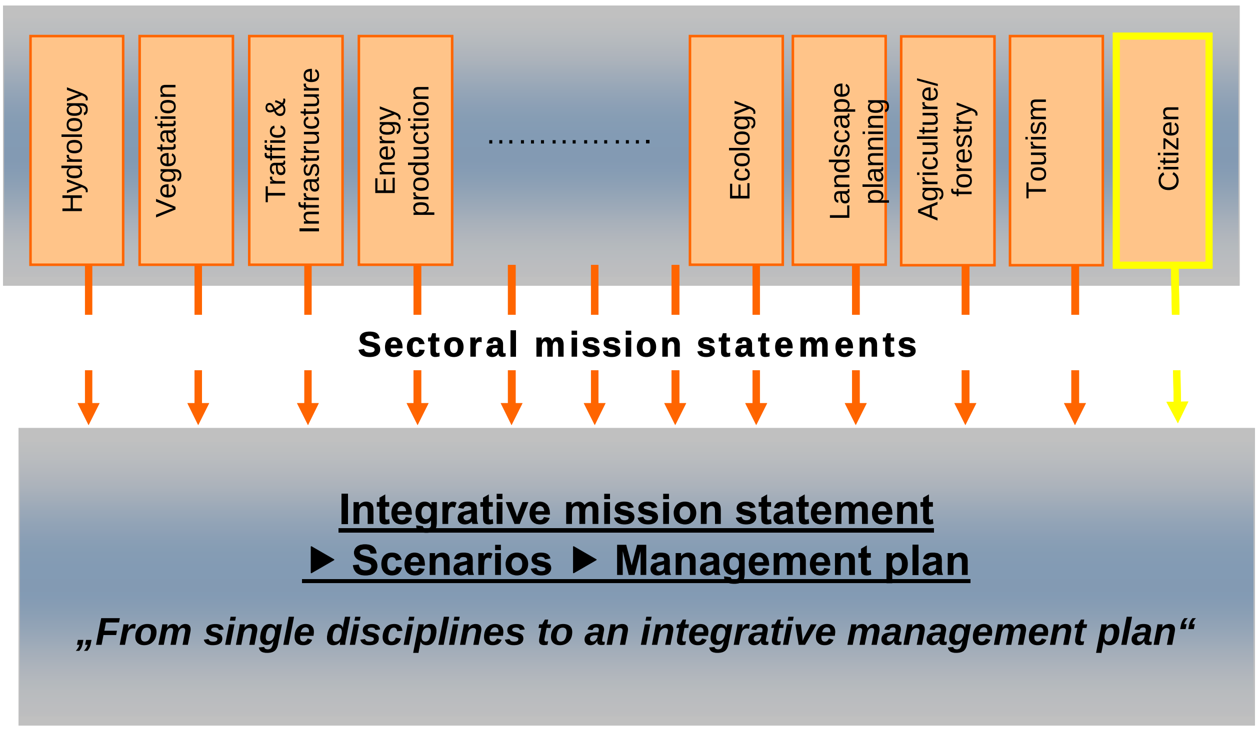


Figure 5: From single disciplines to an integrative management plan.

Figure 7: Potential other pictures…

The Role of Foresight & State of the Art in the EU

Patrick Crehan

The time horizon - 2025 is relevant to imagine actual structural changes in the rural regions of Europe. The extent of changes likely to take place on this time-scale means that trend analysis on its own is unlikely to yield useful results. Foresight is a global, interdisciplinary approach to creating knowledge about the future for policy development. It takes account not only the 'drivers of change' but their mutual interactions as well. The Commission has published the following definition:

"Foresight can be defined as a systematic, participatory, future intelligence gathering and medium to long term vision building process aimed at present day decisions and mobilising joint actions" (EU Commission, 2002).

In the last decade the term has come to represent an approach to policy related knowledge creation that emphasises the role of stakeholders and the manner of their involvement in policy related processes. It helps to resolve the tension that exists between the idealistic approach to the creation of knowledge for policy development by scientists and the pragmatic need for unambiguous recommendations, stakeholder buy-in and acceptance by those engaged in policy development and implementation. Foresight refers not only to a sequence of rigorous exercises of a scientific nature but to a rigorous process for the engagement of stakeholders in the creation of knowledge about the future for policy related process such as:

- The identification of research priorities for S+T research programmes,
- The identification of investment priorities for regional development,
- The mobilisation of actors to address long-term issues,
- The orientation of actors on complex cross cutting policy issues.

The European Commission FP5 STRATA Program financed a number of RTD and accompanying measures on the application of foresight in regions of the EU and accession countries. In July 2002 the DG Research published a working document entitled *Strengthening the Dimension of Foresight in the European Research Area* and in 2003 the FP6 STRATA program financed a project called FOREN to develop a 'Users Guide to Regional Foresight'. This document has been localised for the countries of the EU25 in terms of language and content for ease of use by practitioners. This series of guides is available freely on the IPTS website and is widely used as a basic reference by foresight practitioners.

In 2003 the European Commission DG Research K2 Unit established a 'High Level Working Group on Blueprints for Regional Foresight' that will work until mid 2004 on the design of a series of 6 blueprints for generic foresight actions adapted to the needs of regional administration across the EU25+. Many of the partners in this project are already involved in the work of this group. In particular Prof. Liam Downey working for the coordinating partner NUIM is chairman of this High Level Working Group. Dr. Patrick Crehan of the subcontracted organisation CKA is coordinator of the AGRIBLUE' blueprint for foresight applied to sustainable territorial development. Dr. Yves Leon of P3 – INRA and Prof. Atanas Atanassov of P8 – ABI are also deeply involved in the work of AGRIBLUE. In this sense the FORSURE project is very close to the cutting edge of thinking about foresight in Europe and incorporates access to a considerable body of experience in the practical design and implementation of foresight exercises in different contexts.

The manual on regional foresight identifies the following key aspects of a foresight approach. Foresight examines long-term futures with more of a holistic analysis than is typical in conventional forecasting techniques, and with greater links to action than do many futures studies. It examines a wide range of factors, draws on widely distributed knowledge and has a highly participative dimension. It uses formal techniques and methods to provide more operational results. These techniques can be quantitative or qualitative and frequently involve the use of experts. While the Foresight approach is clear, the precise techniques to be used will depend on the task in hand. In many ways Foresight resembles a strategic planning process and indeed many of the tools that may be employed in a foresight activity have been borrowed or adapted from those of strategic management. The main difference is the emphasis that is placed on stakeholder involvement. While strategic planning can take place in a backroom and involve a small number of elite or privileged players, foresight is a transparent and open process that involves a broader set of stakeholders.

Foresight techniques and tools include techniques for managing stakeholder engagement such as:

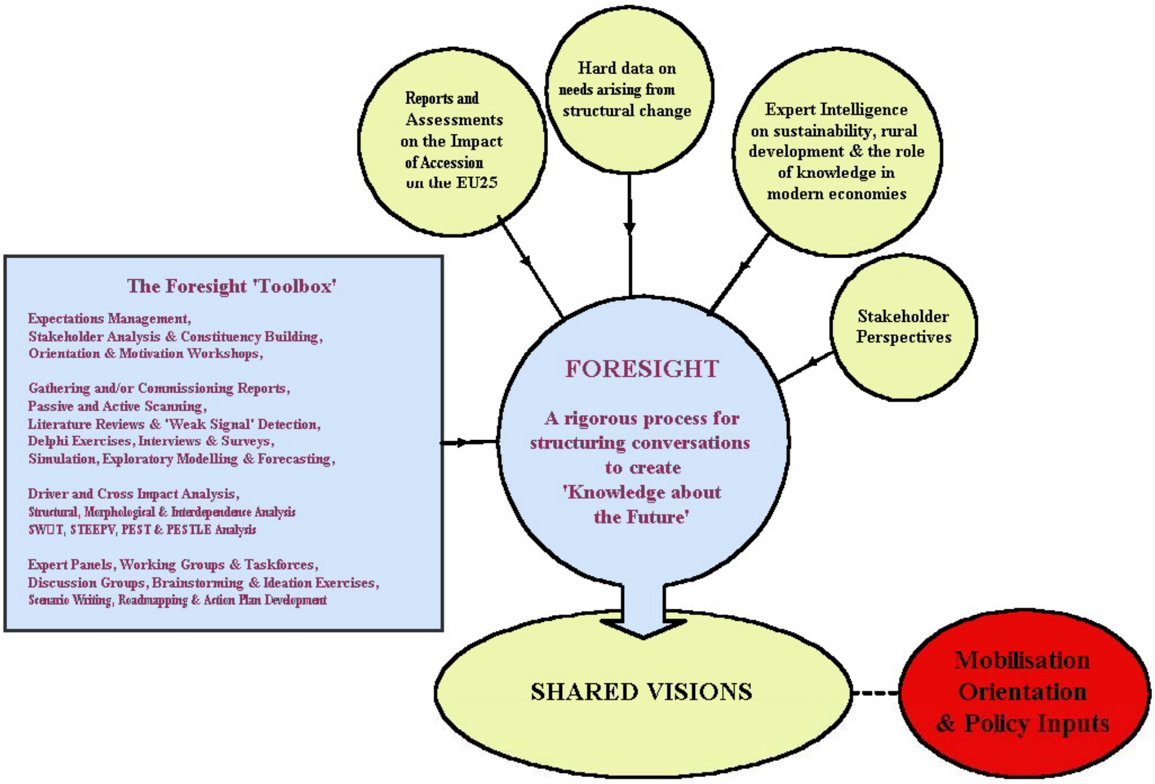
- Expectations Management,
- Orientation and Motivation Workshops,
- Stakeholder Analysis and Constituency Building.

This work can be followed up by methods for initial gathering of intelligence such as:

- Gathering and/or Commissioning Reports,
- Passive and Active Scanning for Trends,
- Literature Reviews & 'Weak Signal' Detection,
- Delphi Exercises, Surveys & Interviews,
- Simulation, Exploratory Modelling & Forecasting,

This intelligence is then used to support interactive and highly participative exercises with the stakeholders intended to develop deep familiarity with the material as well as ownership of the issues and options available such as:

- Driver and Cross Impact Analysis,
- Structural, Morphological & Interdependence Analysis,
- Analysis:
    - SWOT = analysis of Strengths, Weaknesses, Opportunities and Threats
    - STEEPV = analysis of Social, Technological, Economic, Environmental, Political & human Value factors
    - PEST = analysis of Political, Economic, Social and Technological trends
    - PESTLE = analysis of Political, Economic, Social, Technological, Legislative and Environmental factors or trends



A Schematic View of the Role of Foresight in Creating Knowledge for Policy Development

UK Case studies and “regional” description

Richard Noble

Background to case studies

The two studies being considered in the NNR project by the UK partner, the University of Hull International Fisheries Institute, are considering the socio-economic and ecological implications of the sustainable development of UK rivers under the EU-Water Framework Directive (WFD). In the case of the UK many of our larger rivers have suffered a legacy of alteration and pollution that have resulted in losses of habitats and species as well as the rivers capacity to provide clean water. As the historical legacy of the industrial revolution is slowly cleaned up the mangement of these rivers is beginning to address the rehabilitation of the ecological interests of these habitats, whilst also developing other water resource issues and services derived from them.

Much of the effort in rehabilitation of these rivers has focussed on the improvement of water quality. Improvement in water quality has resulted in many rivers being cleaned up and some most river which were once considered lifeless now have thriving animal life. However, the physical alterations to the rivers (weirs, sluices, dams and channelisation) are still existing and have to be addressed as these impede the longitudinal and lateral connectivity of the rivers. The UK case studies will examine what is required to rehabilitate features for lateral and longitudinal connectivity together with the socio-economic implications and benefits of such activities. Two case studies will be considered, firstly the Great Ouse where floodplain lateral connectivity is an issue and secondly the River Trent where longitudinal connectivity is a major issue. Such analyses will reflect the work required for implimentation of river basin management plans under the WFD.

Great Ouse catchment

The Great Ouse is one of the largest (8585 km^2) and driest river catchments in Eastern England, draining approximately 7 % of England, covering much of East Anglia. The overall catchment extends from west of the headwaters, north-west of Buckingham in central England, to the Wash Estuary at King’s Lynn. The main river length is 1251 km. The lower part of the catchment is low-lying fenland. The catchment suffers from a legacy of channel modification and river regulation. During the 17th century, the Fens were transformed from wetlands with raised islands of clay, into productive arable land. The area is now covered by an extensive network of drainage channels varying in size from ditches to large waterways. Of particular note are the New Bedford River or Hundred Foot Drain, and Old Bedford River, which carry water between sluice complexes at Earith and Denver, bypassing much of the central part of the main river (not outside the catchment). These artificial channels are considered to be of high value for nature conservation, principally floodplain wash lands. Upstream of Bedford, regulation for flood control and resource management has been limited mainly to in-stream water retention (weir construction), land drainage (i.e. dredging, weed cutting) and the reclamation of abandoned meanders. Downstream of Bedford, regulation for small-craft navigation, as well as for flood control and water retention, has resulted in the loss of many flood meadows, oxbow lakes, etc. for agriculture or quarrying. This has resulted in a dredged and embanked main channel with few natural features.

The predominately vertical banks along much of the lowland river, a result of land drainage, navigation and river regulation, have resulted in a lack of suitable instream habitat for spawning and or for feeding and shelter of juvenile lowland river fish species. Additionally the lack of off-channel floodplain habitats has detrimental consequences for fish recruitment and consequently consequences for angling interests and the wider ecological value of the river.

The recognition of the ecological value of wetland floodplain habitats together with the implementation of the WFD for the sustainable management of river basins has resulted in holistic projects which attempt to integrate both conservation interests and the development of ecosystem services provided by the Great Ouse catchment. Within these projects the feasilbility of re-establishing off-channel floodplain habitats has been considered to enhance the ecological quality of the Great Ouse catchment.

Within the NNR project the aim of this case study will be to develop a model which can be used to inform various stakeholders of the requirements for, and benefits of, improving the lateral connectivity of rivers.

Lowland river drainage channels in the Great Ouse catchment which have resulted in losses of wetland and floodplain habitats.

River Trent catchment

The River Trent is 274 km long from its source on Biddulph Moor in north Staffordshire to its confluence with the Yorkshire Ouse and the Humber Estuary at Trent Falls. The River Trent is the third largest river in England and Wales, with a catchment area of 10 500 km^2. Through its tributaries, the Trent drains a number of large conurbations, including Birmingham, Leicester, Derby, Stoke-on-Trent and Nottingham. The intense industrialisation and urbanisation associated with these areas following the industrial revolution led to a deterioration in the water quality of the Trent. Prior to the industrial revolution, the Trent had diverse and prolific fish stocks, and supported salmon (*Salmo salar* L.) and eel (*Anguilla anguilla* (L.)) fisheries. In the past the River Trent was undoubtedly an important salmon river and was well known for its commercial salmon fisheries and there was also a notable rod and line fishery. Even in the late nineteenth century, when a large part of the catchment was already denied to salmon as a result of impassable barriers, records of indicated that the Trent had a run of at least 3000 fish. However, with the expansion of industry, the fishery began to decline, and by 1920 the River Tame, a major tributary of the Trent, was devoid of fish. Water quality reached its lowest level in the 1950s, and long stretches of the Trent suffered from a lack of dissolved oxygen and were devoid of fish until the 1970s. Since the 1970's improvements in waste water treatment and management have led to great improvements in water quality to the point where these are no longer considered to be limiting factors to ecological recovery.

The limiting factor for the re-development of migrating salmon stocks are now migration barriers. The River Trent and its tributaries contain many obstructions to the upstream passage of migratory fish. The vast majority were built at the time of the industrial revolution to supply power to the mills and create navigable waters for distribution of the produce, though some of the navigation weirs on the River Trent were reconstructed and enlarged in the 1920s to accommodate deeper draught vessels passing up to Nottingham. The functions of watercourse obstructions were varied, they served to supply water or electrical power to mills and factories, to impound water for abstraction purposes, for the purpose of navigation, to alleviate flooding and for angling, aesthetic or amenity value. However, many of these obstructions now no longer serve the purpuse for which they were originally intended due to changes in industry and navigation in the area. In recent times much consideration has been given to the potential to rehabilitate some of these semi-redundant and to rehabilitate the salmon populations of the Trent.

Much of the promotion of the potential rehabilitation of salmon populations lies around the fact that beyond their ecological and conservation value salmon fisheries may have a high social and economic value. However, whilst there are potential socio-economic beneifits of re-establishing salmon popultaions to the Trent catchment, alterations to the longitudinal barriers on the Trent will have knock on effects to other user groups (e.g. navigation, abstraction, hydropower and other fisheries) which may be considered detrimental to the continued development of other resources. If salmon are re-introduced these conflicts between users will have to be resolved through negotiation with the various user groups. In addition, future proposals on the river will have to be evaluated to prevent degradation of the catchment and permit the sustained development of the salmon stocks.

Within the NNR project the aim of this case study will be to develop a model which can be used to inform various stakeholders of the requirements for, and benefits of, improving the longitudinal connectivity of rivers and the potential rehabilitation of a highly valuable and conservation protected species.

Photo of Holmes Sluices at Nottingham on the River Trent - originally totally impassible to migrating fish until the construction of the canoe slalom fish pass (www.trentriverstrust.co.uk).

Collaboration in the Qualitative Reasoning Workbench

Anders Bouwer, Jochem Liem, Bert Bredeweg

Introduction

One of the goals the NaturNet-Redime project is to deliver a Collaborative Qualitative Reasoning (QR) Workbench, which allows stake-holders to work together on models and model parts. Collaboration can in principle be asynchronously as well as synchronously. Collaborating separately (asynchronously) involves storing, searching and exchanging models and model parts easily. To this end, a model repository will be created, in which models are stored in a format that adheres to the Web Ontology Language (OWL). Garp3 has been extended with OWL export and import functionality, and in the coming months functionality will be added to enable model merging. To support model builders in working together synchronously, it is crucial to represent initial and sketchy ideas along the way to the final model, to develop mutual understanding from the start. To this end, the single-user version of the QR workbench (Garp3) [1] is extended with the Sketch environment, in which users can record their initial and intermediate ideas. Below we describe ongoing work on these two issues.

Qualitative Model Repository and Model Merging

The NaturNet-Redime project partners need to be able to collaboratively build qualitative models about sustainable development and share these both within and outside the project. The envisioned solution to facilitate collaboration is a qualitative model repository, which keeps track of different versions of models. Furthermore, it should enable users to search for, store, update, and retrieve models. To be able to cope with a large amount of models, an indexing mechanism will be created that describes the different categories of models within the repository.

The proposed interaction between the qualitative reasoning and modeling software Garp3, and the qualitative model repository is shown in Figure 1. From the Garp3 software a model can be exported to a new format, which describes the content of and the meta-data about the model. The model in the new representation uses concepts defined in the qualitative reasoning vocabulary. These models can be stored in and retrieved from the qualitative model repository. This repository is indexed using an ontology describing the categories in which the models can be stored. Users are able to search for models, submit and update them, and download models. Other desired functionality is leaving feedback and ratings and using this information in the model search.

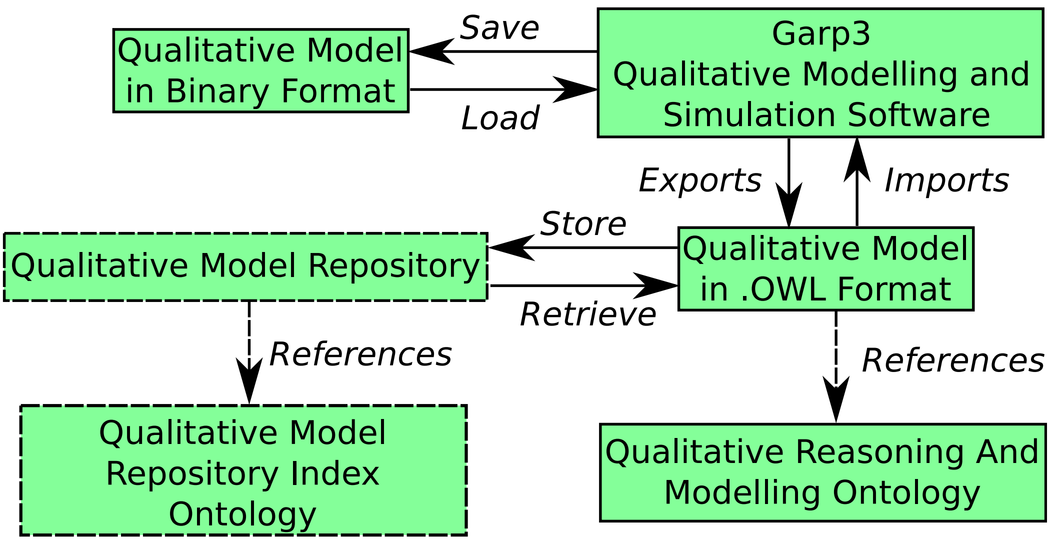


Figure 1: The interaction of the qualitative reasoning and modelling workbench Garp3, the model represented in OWL, the vocabulary formalised in OWL, and the qualitative model repository (using an ontology about its content).

A significant part of the work towards the realization of the qualitative model repository has already been finalized. To be able to search for specific structures in qualitative models using a model repository, these models have to be represented using a formalism that is open and accessible. The default file format of the qualitative reasoning and modeling tool Garp3 is a binary file, which is unsuitable for this purpose. The Web Ontology Language (OWL) was chosen as a new formalism to represent qualitative models, as it is a standard and allows the semantic description of models. Using the OWL formalism, the qualitative model vocabulary has been formalized (see Figure 2). The vocabulary distinguishes model building blocks from model aggregates such as model fragments, and structural from behavioural aspects of a model [4].

Based on the qualitative model vocabulary a representation of qualitative models has been developed. These representations of models in OWL use concepts defined in the vocabulary ontology. Functionality to export and import qualitative models to its OWL counterpart has been added to the qualitative reasoning and modelling workbench Garp3.

The implementation of the OWL import and export functionality in Garp3 works in a fundamentally different way compared to interacting with the original binary format. Loading the original file worked by actually loading the binary data directly into the system memory. To export the OWL file the model has to be parsed and translated. The order in which this happens is essential. The definitions of model ingredients have to be exported before the instances of these definitions can be used in model fragments. Relations between objects can only be exported if the identifiers of these objects are known, so these have to be exported first. Since model fragments can contain other model fragments, reused model fragments have to be exported before the model fragments in which they are used.

Similar issues are present during the import of a model. Importing a model requires parsing of the OWL file and recreating the model. This recreation is actually identical to the way a user would create the model. Again, the order of the creation of the model ingredients is essential. First, the definitions have to be imported, then the model fragments which do not contain other model fragments, then the rest of the content starting at the objects, afterwards the relations, etc.

Another ongoing effort to facilitate collaboration is model merging. To be able to reuse model fragments from qualitative models it should become possible to “copy/paste” parts of models into other models. For text documents such functionality is trivial to implement, however in qualitative models this is rather complex. Definitions of model ingredients and model fragments are reused within the same model. Therefore, pasting a model fragment into another model requires the definitions to be transferred to the other model too. Furthermore, there are all kinds of name clashes that may occur, which have to be dealt with in a user-friendly way. Another issue is that the qualitative reasoning and modelling workbench Garp3 was not designed to have multiple models open at the same time. This is a first requirement to implement the copy/paste functionality, and will require some architectural changes to the software.

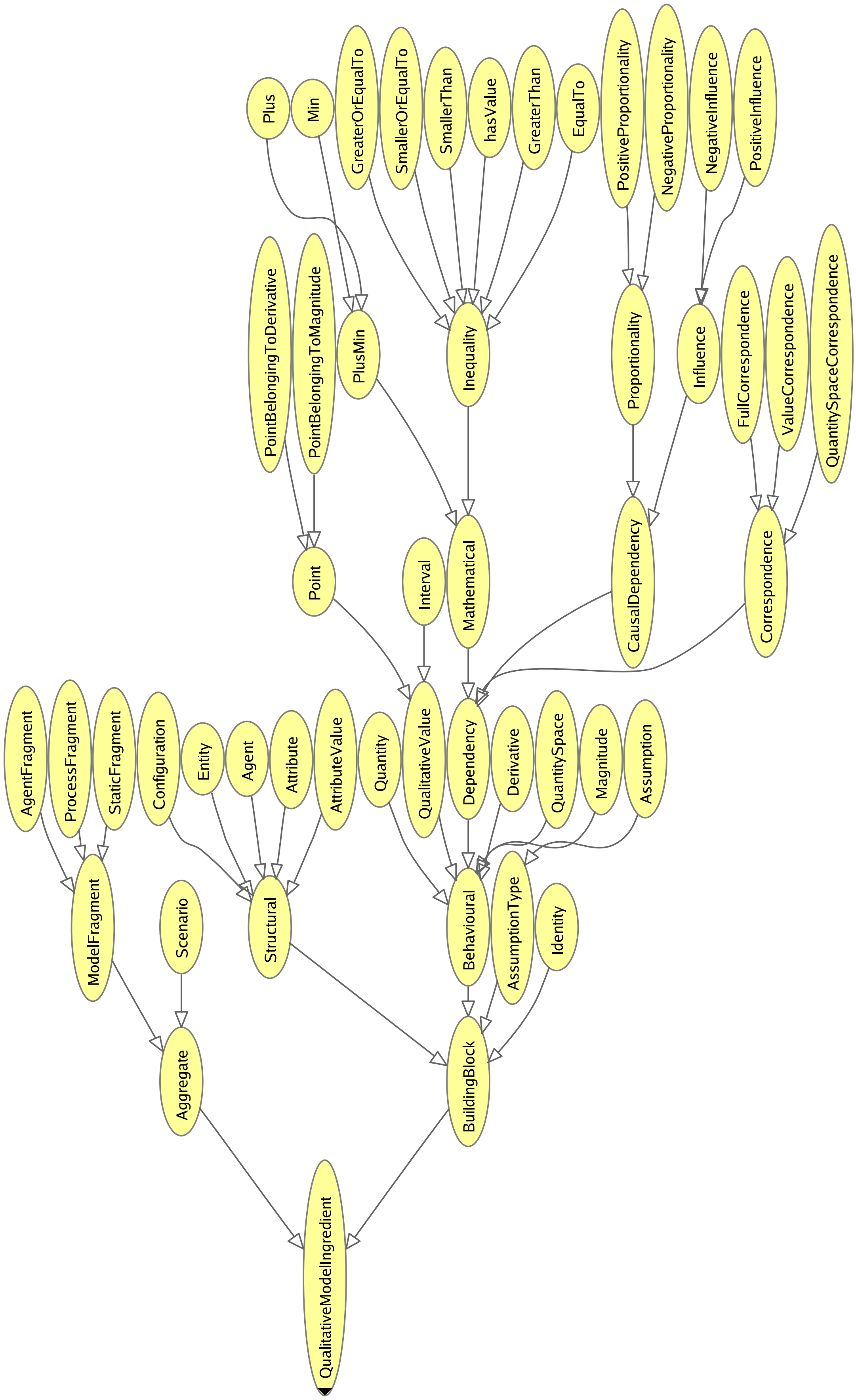


Figure 2: The qualitative reasoning vocabulary

The Sketch Environment

The Sketch environment is intended to support the initial stages of modelling, before the actual implementation takes place. Following the structured modelling methodology [2], we focus on the first three (of six) steps in building qualitative models:

- Step 1. Orientation and initial specification of the system (model goals, concept map);
- Step 2. System selection & structural model (entities, configurations, etc.);
- Step 3. Global behaviour (causal model, expected behaviour graph, etc.).

How to support these steps in the modelling process? The philosophy behind the design of the Sketch environment consists of the following ideas:

- It should support the creation of intermediate results;
- Users should be free to specify ideas without bothering about unnecessary details;
- The interface should be relatively simple and sparse;
- Different look-and-feel from Build mode (but similar way of interaction).

Based on these ideas, and additional considerations in the design document [3], designs have been made for several screens to be included in the collaborative version of the Garp3 workbench: editors for the concept map, structural model, causal model, and behaviour graph. Currently, a working prototype exists which contains a concept map editor and a causal model editor. The concept map editor allows users to specify concepts and relations between them, without having to resort to other software. The visualization is kept sparse by using text labels without icons, and only two buttons are present to perform the necessary actions. The causal model editor allows users to specify quantities and causal dependencies (influences and proportionalities) between them, without the need to consider entities or quantity spaces for quantities (as is necessary in Build mode). This allows a simple interface with few buttons, and a very compact visualization. The interface for the structural model editor will resemble that of the concept map editor, but with buttons for adding entities, configurations, etc.

Work in progress concerns the state-transition graph editor, in which users can specify the expected behaviour in terms of values and inequalities that apply to certain states. The rest of the intermediate modelling results, including model goals, assumptions, processes, and scenario descriptions will be supported using text-based interfaces with structured text fields, similar to the interface that is currently used in the meta-data editor in Garp3

[1]. Future work will address ways to support the move from these initial modelling steps to the implementation and debugging stages. An issue here is whether and how to ensure upward consistency between, for example, a concept map, and model implementation.

Concluding remarks

An important step in the NaturNet-Redime project was the development of the 'single user workbench' for articulating, simulating, and inspecting conceptual models on issues relevant to sustainable development. Now that this software is available, further goals are to augment the workbench with facilities that support collaboration among users. Ongoing research therefore focuses on the implementation of the qualitative model repository, the model merging functionality, and the sketch environment. Consult the qualitative reasoning and modelling (QRM) portal for further information on the Garp3 workbench: http://hcs.science.uva.nl/QRM/.

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FAO/WFP/UNEP/UNOCHA GeoNetwork Spatial Information Management Development

Release of GeoNetwork 2.02

GeoNetwork opensource is a standardized and decentralized spatial information management environment, designed to enable access to geo-referenced databases, cartographic products and related metadata from a variety of sources, enhancing the spatial information exchange and sharing between organizations and their audience, using the capacities of the internet. This approach of geographic information management aims at facilitating a wide community of spatial information users to have easy and timely access to available spatial data and to existing thematic maps that might support informed decision making.

Maps, including those derived from satellite imagery, are effective communicational tools and play an important role in the work of various types of users:

Decision Makers: e.g. Sustainable development planners and humanitarian and emergency managers in need of quick, reliable and up to date user-friendly cartographic products as a basis for action and better plan and monitor their activities.

GIS Experts in need of exchanging consistent and updated geographical data.

Spatial Analysts in need of multidisciplinary data to perform preliminary geographical analysis and reliable forecasts to better set up appropriate interventions in vulnerable areas.

The main goal of the **GeoNetwork opensource** software is to improve the accessibility of a wide variety of data, together with the associated information, at different scale and from multidisciplinary sources, organized and documented in a standard and consistent way.

The challenge is to enhance the data exchange and sharing between the organizations to avoid duplication, increase the cooperation and coordination of efforts in collecting data and make them available to benefit everybody, saving resources and at the same time preserving data and information ownership.

FAO and WFP, and more recently UNEP and UN-OCHA have combined their research and mapping expertise to develop **GeoNetwork opensource** as a common strategy to effectively share their spatial databases including digital maps, satellite images and related statistics. The three agencies make extensive use of computer-based data visualization tools, known as Geographic Information System (GIS) and Remote Sensing (RS) software, mostly to create maps that combine various layers of information. **GeoNetwork opensource** provides them with the capacity to access a wide selection of maps and other spatial information stored in different databases around the world through a single entry point.

GeoNetwork opensource has been developed to connect spatial information communities and their data using a modern architecture, which is at the same time powerful and low cost, based on the principles of Free and Open Source Software (FOSS) and International and Open Standards for services and protocols (a.o. from ISO/TC211 and OGC).

The **GeoNetwork opensource** architecture, in fact, is largely compatible with the **Geospatial Portal Reference Architecture**, which is the **Open Geospatial Consortium (OGC) Guide** to implement a standardized geospatial portal, and is made available as an opensource project on the SourceForge.net site (http://geonetwork.sourceforge.net and http://sourceforge.net/projects/geonetwork). As a result the GeoNetwork opensource software can be used by any interested party as a straightforward and cost-effective means of publishing geographical metadata and data on the web.

So far the **GeoNetwork opensource** software has been deployed at a number of organizations around the world, the first ones being **FAO-GeoNetwork** (http://www.fao.org/geonetwork) and **VAM-SIE-GeoNetwork** in WFP (http://vam.wfp.org/geonetwork), both at their Headquarters in Rome - Italy. Furthermore, WHO, UNEP, CGIAR and the Global Change Information and Research Centre (GCIRC) of China are working on **GeoNetwork opensource** implementations as their spatial information management capacity.

Technical Specification

GeoNetwork opensource implements both the Portal component and the Catalog database of a Spatial Data Infrastructure (SDI) defined in the OGC Reference Architecture. It provides tools for managing and publishing metadata on spatial data and related services. **GeoNetwork opensource** allows a distributed search providing access to a huge volume of metadata that come from different Clearinghouses and also provides a web-based interactive map viewer that allows people to composite maps picking layers from distributed servers on the internet.

In more detail, **GeoNetwork opensource**, like the OGC Reference Architecture, employs:

Portal Services that provide the access to the geospatial information as well as the management and administration of the portal and users. A set of rules allows **Authentication** and **Access Control** that regulate, through controlled privileges, the access to reserved information and services. In addition, the Portal Platform offers an **Advanced Metadata Editor Module** that is able to create and edit ISO compliant metadata records for geographic data using the Standard ISO 19115. The map viewer, part of the portal services, is provided by **InterMap**, another joint FAO-WFP opensource project (http://sourceforge.org/projects/intermap). Intermap allows the user to select map layers from several servers, overlay them and create a customized composite map. It can use the WMS protocol to talk to OGC servers and can interact with ESRI-based servers using the ArcIMS protocol. Intermap provides support for access to temporal web map services (like time-series of satellite data) and WMServices that provide different types of symbology (SLD). Finally, InterMap offers metadata support allowing linking back to a data description once the layer has been displayed on the web.

Catalog Services that allow the collection, registration and maintenance of descriptive information about the data stored in the database. The Catalog Services implements a Metadata Clearinghouse which includes a facility to retrieve all the information on the spatial data made available by other Clearinghouses. More precisely, the OGC Web Catalog services Z3950 protocol allow distributed search capabilities, i.e. **GeoNetwork opensource** can access other databases and *vice versa*, taking into account security settings on metadata and data.

Data Services components that are being implemented by **GeoNetwork opensource** to complete the OpenGIS Framework of the Reference Architecture. This particular class of services provides access to spatial content in repositories and databases and allow data processing through defined common encodings and interfaces. Furthermore the Data Services can be distributed across the Internet thus they don`t need to be resident on the operational portal.

GeoNetwork opensource does not directly provide the **Map Portrayal**, the fourth component of the OGC Reference Architecture, which makes possible the visualization on the Internet of geospatial information. However, several open source projects exist which implements the Map Portrayal component that can be integrated with the **GeoNetwork opensource** package; for instance Deegree, MapServer and GeoServer. **GeoNetwork opensource version 1** has been available with an embedded Deegree server, providing all components of the OGC Reference Architecture as an integrated package. This effort has been improved recently joining the OpenSDI group, which has the purpose of aiding the integration of different OCG Reference Architecture components; the **GeoNetwork opensource** team is working closely with that group to support seamless integration of **GeoNetwork opensource** with these and other projects implementing OGC standards.

Events of interest

16th and 17th May 2006, Prague

Information Systems in Agriculture and Forestry, http://www.isaf.cz/index_en.php?iMenu=1

31st May – 3rd June 2006

7th EC conference on Safeguarded Cultural Heritage Understanding & Viability for the Enlarged Europe. The conference will take place in Prague, The Czech Republic. www.arcchip.cz/ec-conference

18th – 21th June 2006, Santorini

9th International Conference on Technology Policy and Innovation "SCIENCE, SOCIETY AND SUSTAINABILITY" Santorini, Greece http://laertis.chemeng.ntua.gr/santorini/

24th – 26th July 2006, Orlando

The 4th World Congress of Computers in Agriculture and Natural Resources, Orlando, Florida, USA from. It is a collaborative effort among agricultural information technology associations worldwide, http://www.wcca2006.org

30th August – 1st September 2006, Grenoble

POSITIVE SYSTEMS: THEORY AND APPLICATIONS, POSTA06 - Second Multidisciplinary International, Grenoble (France), http://www.lag.ensieg.inpg.fr/POSTA06/index.php

22nd – 24th November, Helsinki

IST 2006, Helsinki, Finland, http://europa.eu.int/information_society/activities/istevent/index_en.html

XII. European Conference
Information Systems in Agriculture and Forestry
on Through scientific development to prosperity

16th and 17th May 2006, Prague

Conference topics

- scientific opportunities and directions in European Union
- at the beginning of i2010 iniciative
- information and communication technologies for rural areas
- applications for agriculture and forestry
- eLearning for rural areas
- human aspect of information society development
- food safety and traceability
- knowledge based bio economy

The conference will host presentations of

- implemented projects: , A-BARD, NODES, AMI@NetFood, a others,
- activities of EFITA SIGs: broadband@rural, eLearning@rural, eContent@rural

Conference languages

Conference languages are Czech and English. Interpretation services are arranged.

Additional workshops

European Federation for Information Technology in Agriculture, Food and Environment (EFITA) and the rural@work Community launched four special interest groups (SIGs) during the conference on Rural areas as engines for the Lisbon strategy held in Brussels in late November. rural@work is a member of the so called AMI@Work Family of self-organising communities that link experts from all 25 EU Member States (and beyond) for the European Research and Innovation Area (ERA) at work. The Family facilitates innovation with respect to introducing the so called ambient intelligence into our professional and private lives, especially in the context of ERA and the 6th and 7th Framework Programmes.

The following SIGs serve to different purposes and are related to different areas of interest. They include:

- broadband@rural SIG
- eLearning@rural SIG
- eContent@rural SIG

Website of conference: **http://www.isaf.cz/index_en.php?iMenu=1**

SIXTH FRAMEWORK PROGRAMME
Educational programmes on social, economic, and environmental
tools for the implementation of the EU Strategy on Sustainable Development
at both EU and international levels

NATURNET-REDIME

New Education and Decision Support Model for Active Behaviour in Sustainable Development Based on Innovative Web Services and Qualitative Reasoning

Project no.	004074		
Instrument:	SPECIFIC TARGETED RESEARCH PROJECT		
Thematic Priority:	SUSTDEV-2004-3.VIII.2.e		
Start date of project:	1st March 2005	Duration:	30 months
Web:	http://www.naturnet.org		
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Project co-funded by the European Commission within the Sixth Framework Programme (2002-2006)

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