2nd nofdp IDSS enduser Workshop

Report summarising feedback and conclusions

Workshop held, 7.11.2006, Marriott Hotel, Cologne

Report compiled by Axel Winterscheid (TUD), December 2006

Content

1. Aims and objective of the 2nd Enduser workshop

The increasing demand for communication in the field of flood damage prevention and nature development sets the framework for the development of the nofdp IDSS. The abbreviation IDSS stands for Information & Decision Support System. In July 2006 Björnsen Consulting Engineers and WIL Delft Hydraulics started the implementation of the written concept that was developed by the nofdp project in the period April 2004 to March 2006. The concept description is available for download under www.nofdp.net. It was the aim of this workshop to test with potential endusers the first prototype version of the nofdp IDSS. Feedback by the participants was the desired deliverable of the workshop in order to improve structure, content, design and functionality of the next prototype version. The release of the coming prototype version is scheduled for April 2007. The release of the final nofdp IDSS software is scheduled for October 2007.

2. Agenda of the workshop

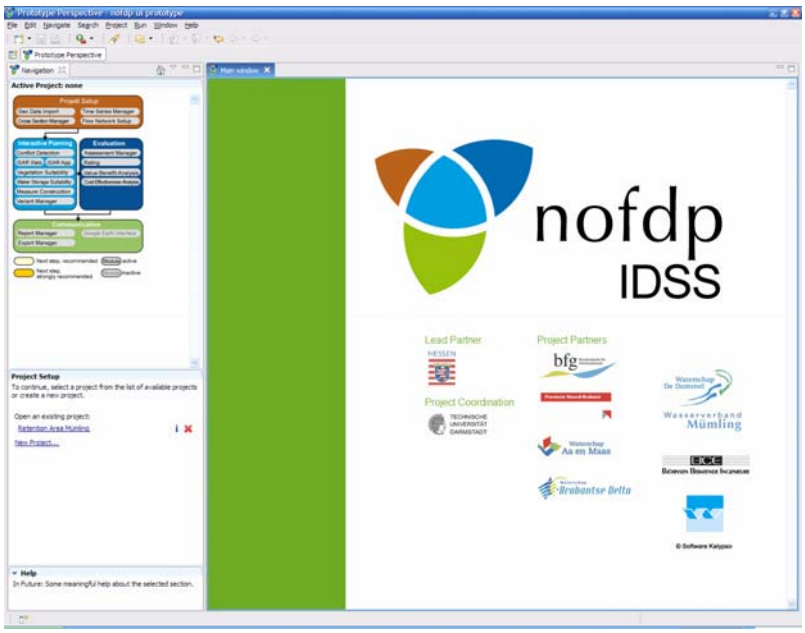
10:00		Adress of Welcome
10:00	10:30	Warm-up: Presentation of the Hochwasserschutzzentrale Köln (by Reinhard Vogt und Yvonne Wieczorrek)[1]
10:30	10:45	Introduction to the nofdp Project (by Axel Winterscheid, TU Darmstadt)
10:45	12:00	Presentation of the nofdp IDSS prototype (by Thorsten Hens, Björnsen Consulting Engineers)
12:00	13:00	Lunch
13:00	13:30	Introduction to the break - out groups (by Björnsen Consulting Engineers)
13:30	14:30	Break - out group session (testing the prototype by the participants)
14:30	15:00	Coffee break
15:00	16:00	Feedback & conclusion (moderation by Prof. Dr.-Ing. Manfred Ostrowski, TU - Darmstadt and Dr. Kaj Lippert, Björnsen Consulting Engineers
16:00		Closure of the workshop

1) Central office for flood protection, City of Cologne, Germany

3. Screenshots of the nofdp IDSS Prototype (version 0.1, November 2006)

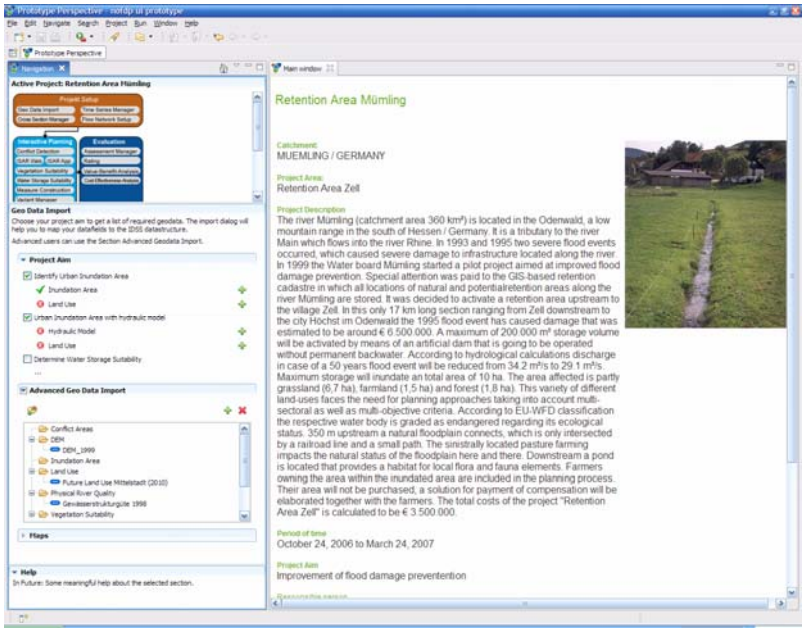
This section shortly introduces the modules which are already implemented in this prototype version of the nofdp IDSS. One should consider that the recent development was dominated by the implementation of rather technical modules. However, these technical modules provide elementary functionality like data management and data operations when using the more communication-oriented and interactive modules. These are considered as key functionality of the nofdp IDSS. Therefore, the focus of the coming development steps will be set on the evaluation, interactive planning and communication functionality.

Start of the project



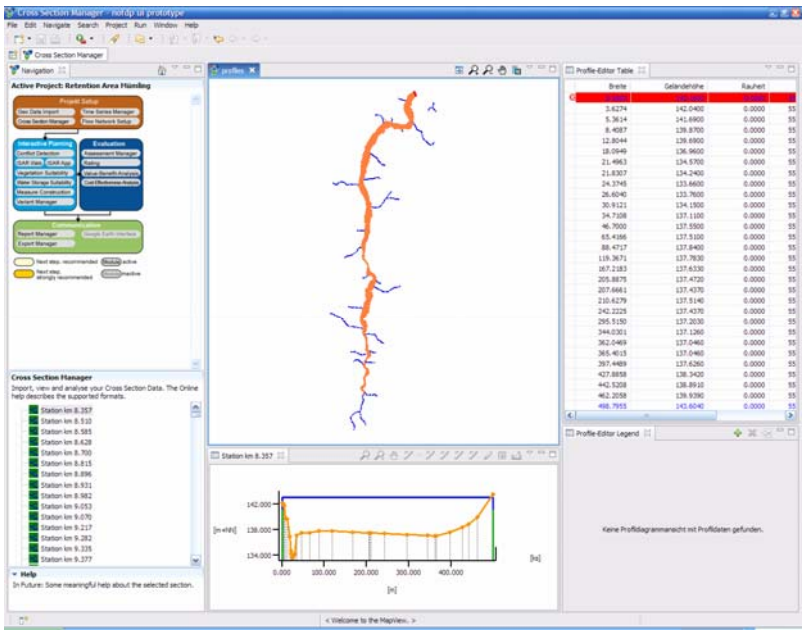
The screen of the nofdp IDSS is structured into three parts. In the upper left corner a navigation scheme is placed to navigate the user through the modules of the nofdp IDSS. Below the scheme a legend provides information about the currently active module and gives a recommendation for the next logical step in the workflow. Once a module is selected buttons and menus are shown in the lower left area to operate the active module. Starting the nofdp IDSS here the user creates new projects or opens existing projects.

Data-import

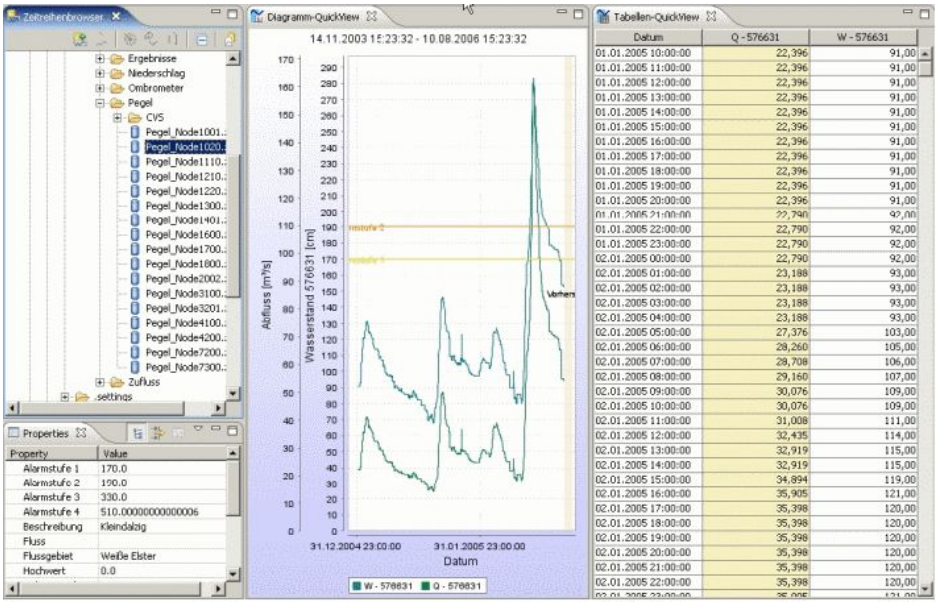


The data-import manager structures the process of geodata and time-series import. It provides a basic structure for possible contents of geodata which might by necessary to reach the defined aim of the current project. The nofdp IDSS will provide a number of different interfaces for data import and coupling to external models via the OpenMI interface. Spatial data will be displayed within GIS environment.

Cross Section Manager

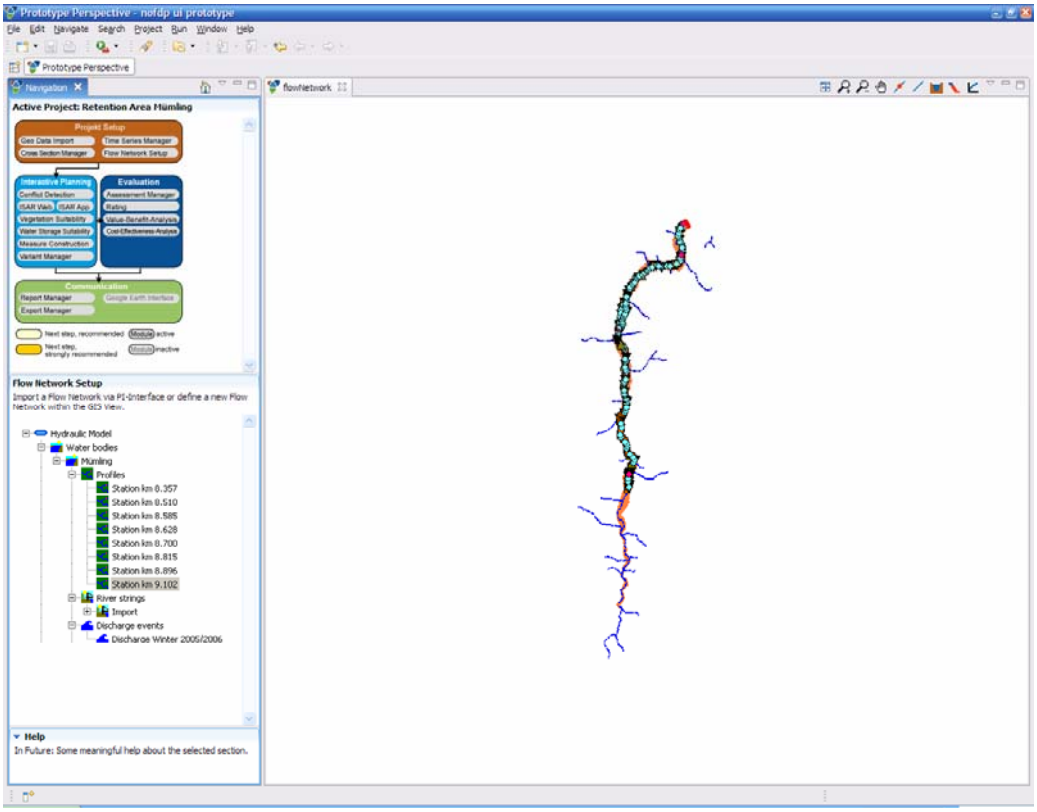


Time Series Manager



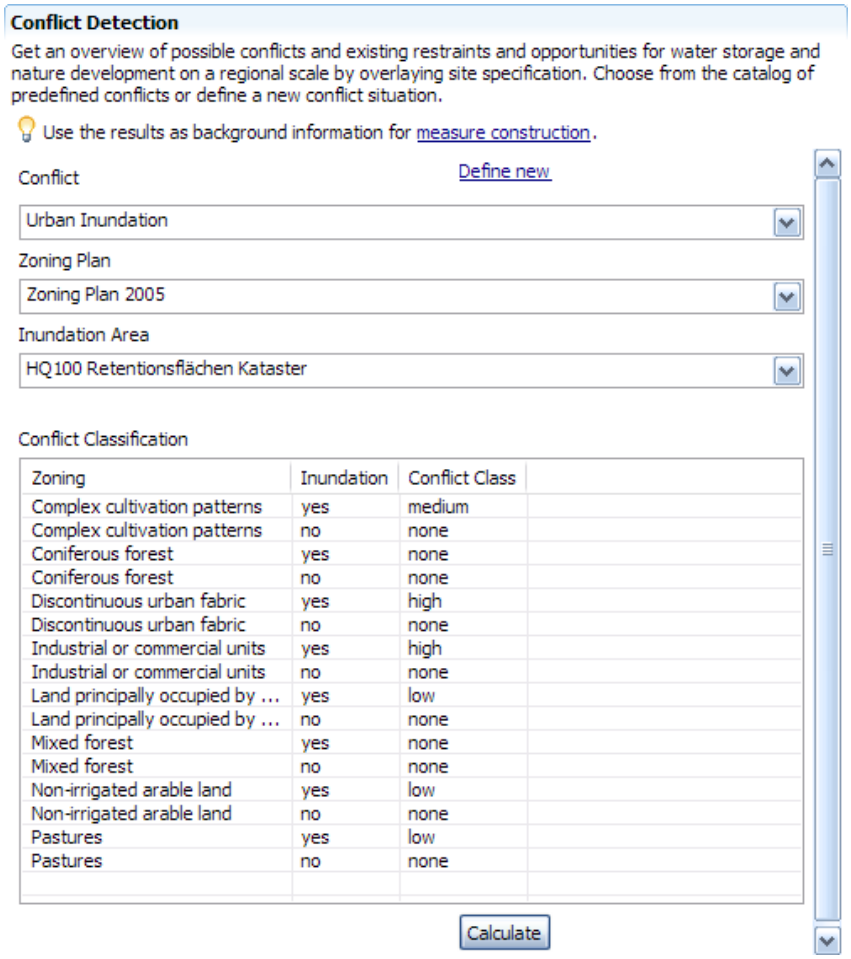
The nofdp IDSS includes a cross-section and time-series manager in order to define, edit and display time series and cross sections.

Flow Network Setup



The nofdp IDSS contains an internal hydraulic model. This module enables the user to make rough estimations of the hydraulic impacts / effects of the measures planned. In case the organisation is running an own hydraulic model time series can be coupled via the OpenMI interface[1]. Together with the nofdp IDSS a free-version of the Sobek hydraulic model[2] (1-D instationary, licence limited to the calculation of 500 knots) is delivered. Export of the flow network to Sobek software is possible via the Published Interface (PI). The Sobek hydraulic model will be launched by the nofdp IDSS. An external access of the Sobek software will not be required. Calculated time series are returned to the nofdp IDSS via the Published Interface (PI).

Conflict Detection Tool



The module ‘Conflict Detection‘ is the first of a number of interactive modules included in the nofdp IDSS. It is designed to overlay two or more layers containing geodata. The

[1] For more information refer to http://www.harmonit.org/
[2] For more information refer to http://www.sobek.nl/

user can define conflict classes (ranging from low to high). A conflict derives due to the overlay of specified attributes of different layers at one location. The module contains a list of pre-defined conflicts. Nevertheless, the user is able to complement self-specified conflicts to that list. It is the aim of the module to determine restriction areas that must be considered when planning to realise measures of flood damage prevention and nature development. The example shows a conflict which results from the inundation of certain areas. Input are CORINE land coverage data and a layer containing inundated areas in case of flooding.

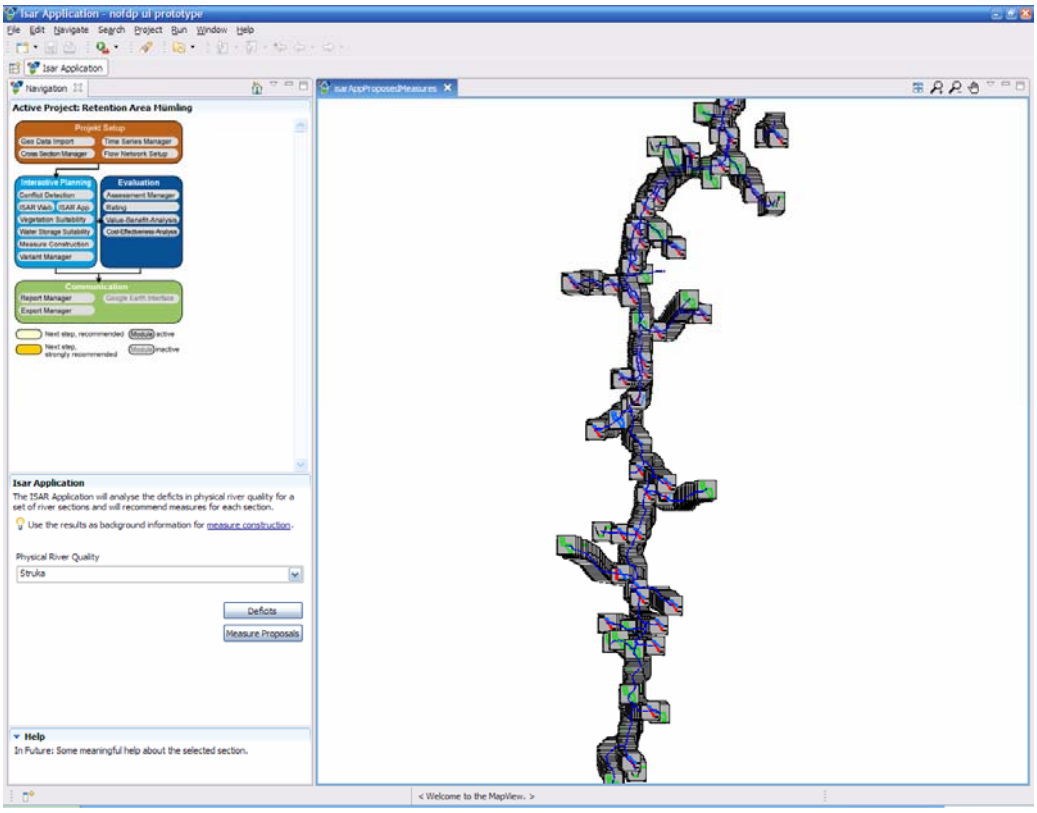
ISAR web

Another analytical tool included in the nofdp IDSS is the module 'ISAR'. The abbreviation ISAR stands for 'Informationssystem für die Auswahl effizienter Renaturierungsmaßnahmen für Fließgewässer' (in English: Information system to select efficient measures of renaturalisation for rivers). ISAR analyses the deficit situation for a specific river section based on data records of the physical river quality. For all possible deficit situations ISAR recommends a catalog of possible measures ranked by a pre-defined cost-benefit relation. The benefit is measured as the ability of the measure to improve the deficit situation. The costs are expressed in EUR/100m. ISAR was

developed by the Fraunhofer Institute (Karlsruhe, Germany) and financed by the Hessian Ministry of the Environment, Rural Development and Consumer Protection.

The user has two possibilities of access to the ISAR tool. The first possiblity we call ISAR-Web. It refers to the original ISAR published in the Internet[3]. In the ISAR-Web the user can analyse the deficit situation of a river section under consideration by means of reference photos.

ISAR Application

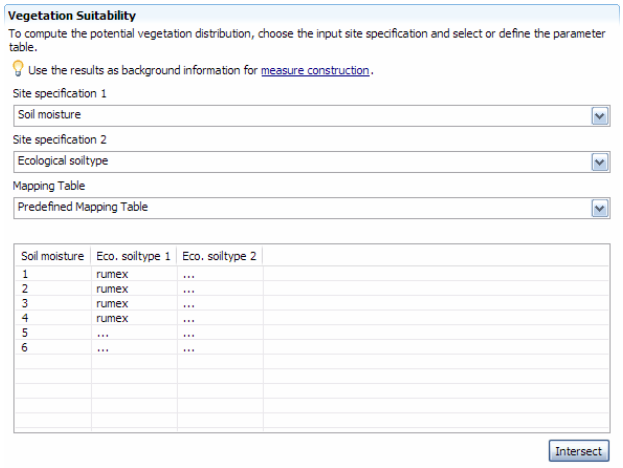


The second possibility is called ISAR-Application, which allows the user to analyse a full dataset of deficits records ('Bewertungsdaten' according to the German LAWA classification[4]).

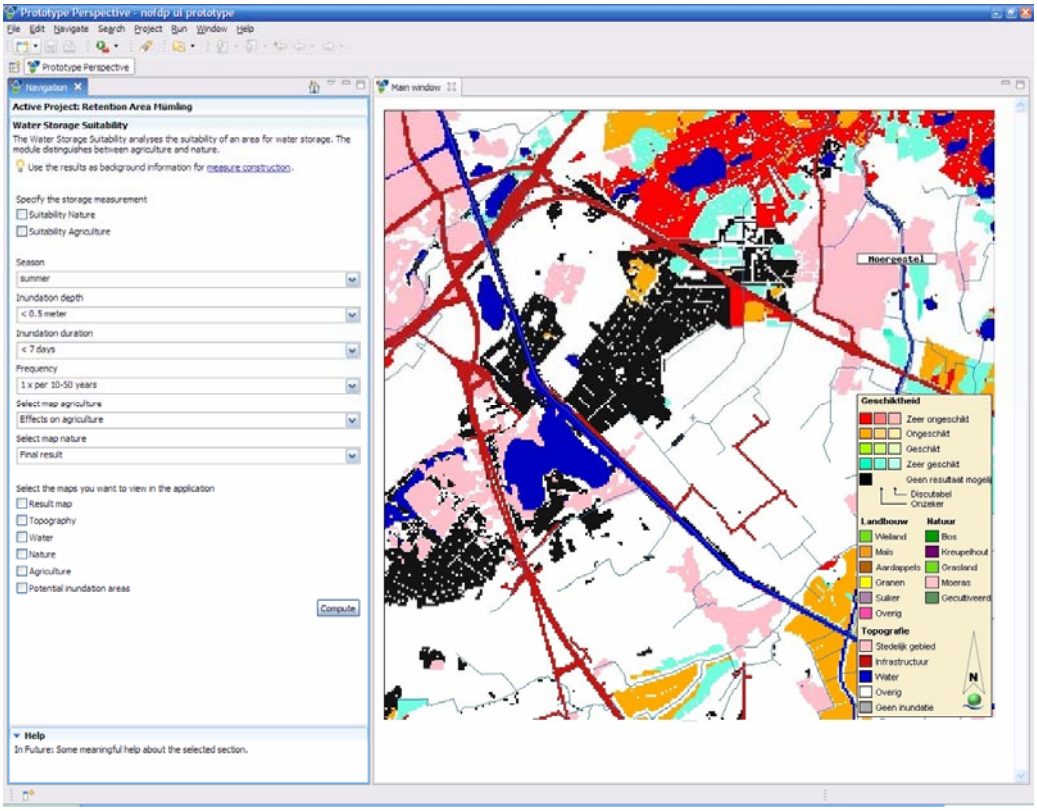
[3] http://www.designal.de/3_client/3_isar.html, based on Hillenbrand & Liebert, Kosten-Wirksamkeitsanalyse für Gewässerstrukturmaßnahmen in Hessen, Fraunhofer-Institut für Systemtechnik und Innovationsforschung (ISI), Karksruhe, 2001

[4] Länderabeitsgemeinschaft (LAWA), Herausgeber. Gewässerstrukturgütekartierung in der Bundesrepublik Deutschland – Verfahren für kleine und mittelgroße Fließgewässer. Kulturbuchverlag, 2000

Vegetation Suitability



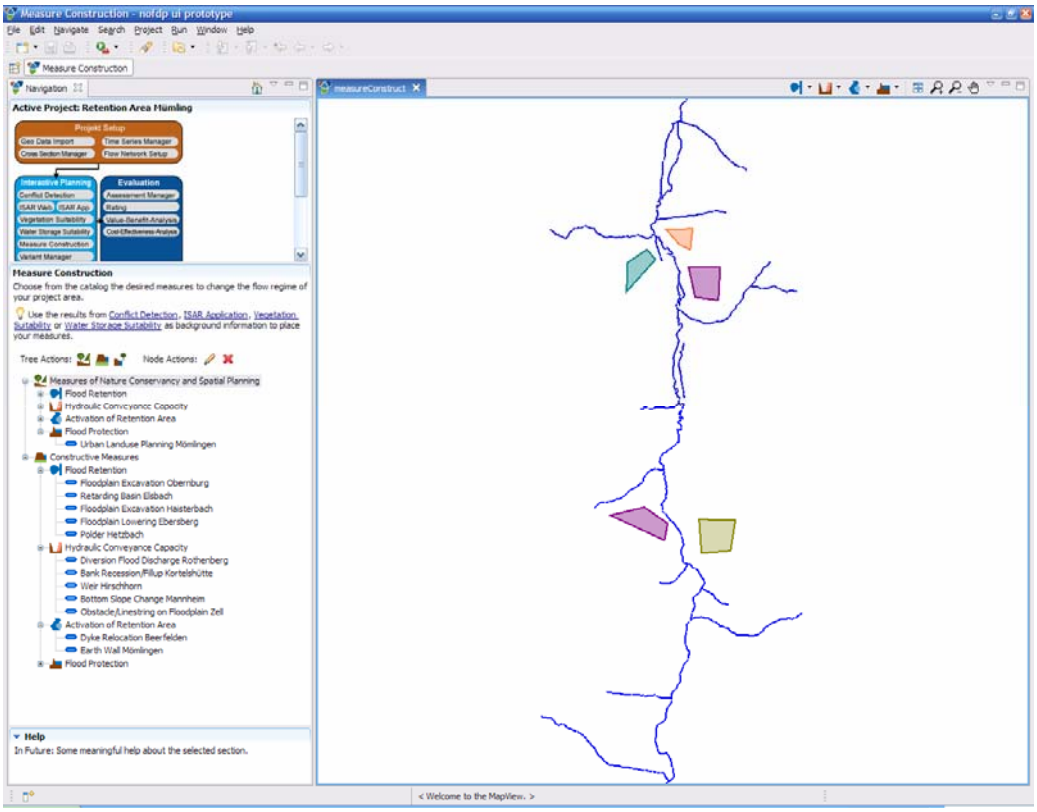
Water Storage Suitability



In addition to the 'ISAR tool' the modules 'Vegetation Suitability' and 'Water Storage Suitability' provide further functionality with an ecological background. These tools generate extra information that informs the planner working with the nofdp IDSS about restriction areas or recommended areas when searching for a location of measures of flood damage prevention. 'Vegetation Suitability' determines potential future vegetation patterns due to a change in the input data soil moisture and nutrients. Soil moisture,

nutrients and vegetation as a description of the reference situation are the required input data to the module. 'Water Storage Suitability' informs about the areas of restriction and recommended areas for measures aiming at the increase of water storage in the area. The module differentiates between areas used for nature and agriculture. 'Waterberging en natuur' developed by the Dutch STOWA Institute[5] is the underlying methodology of this module. Please notice that the applicability of the module 'Water Storage Suitability' is restricted to low-land areas like the Netherlands and is affected by limited data availability.

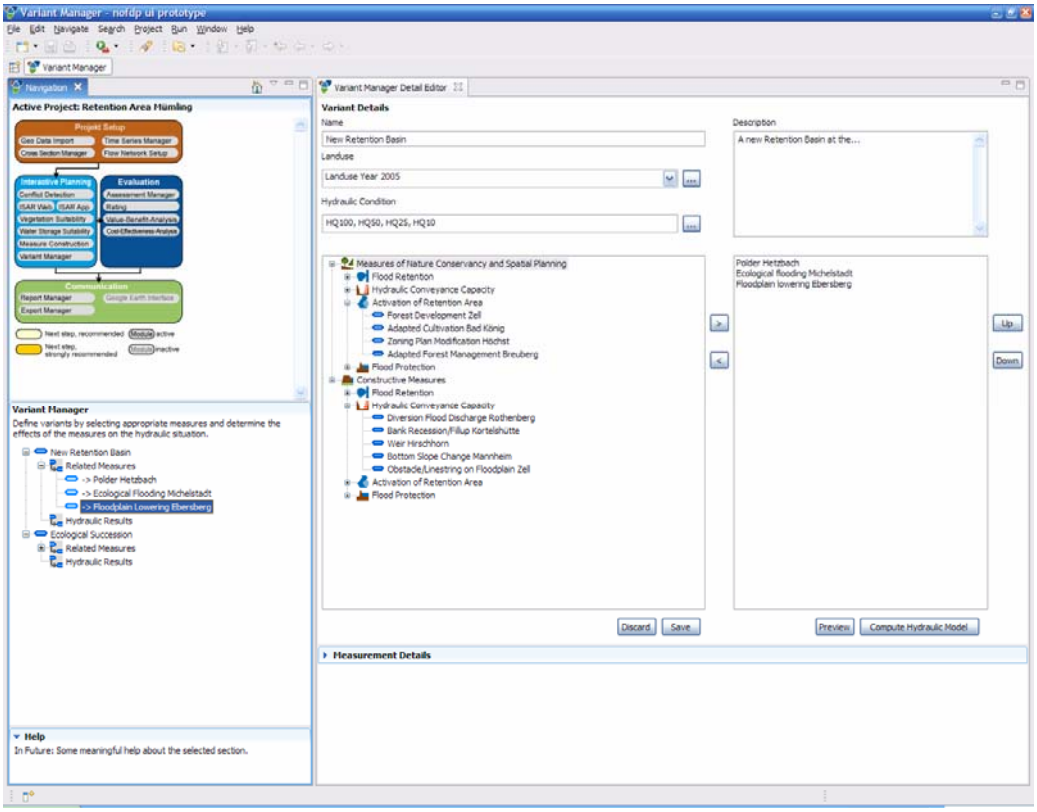
Measure Construction



The module 'Measure Construction' is one of the functionalities used for interactive-planning and communication. Embedded into a GIS environment the IDSS user is able to position different types of measures of nature development and flood damage prevention. Underlying maps support the user to recognise restriction areas as well as preferred areas during the planning exercise. An assistant will guide through the parameter settings needed for dimensioning the measures.

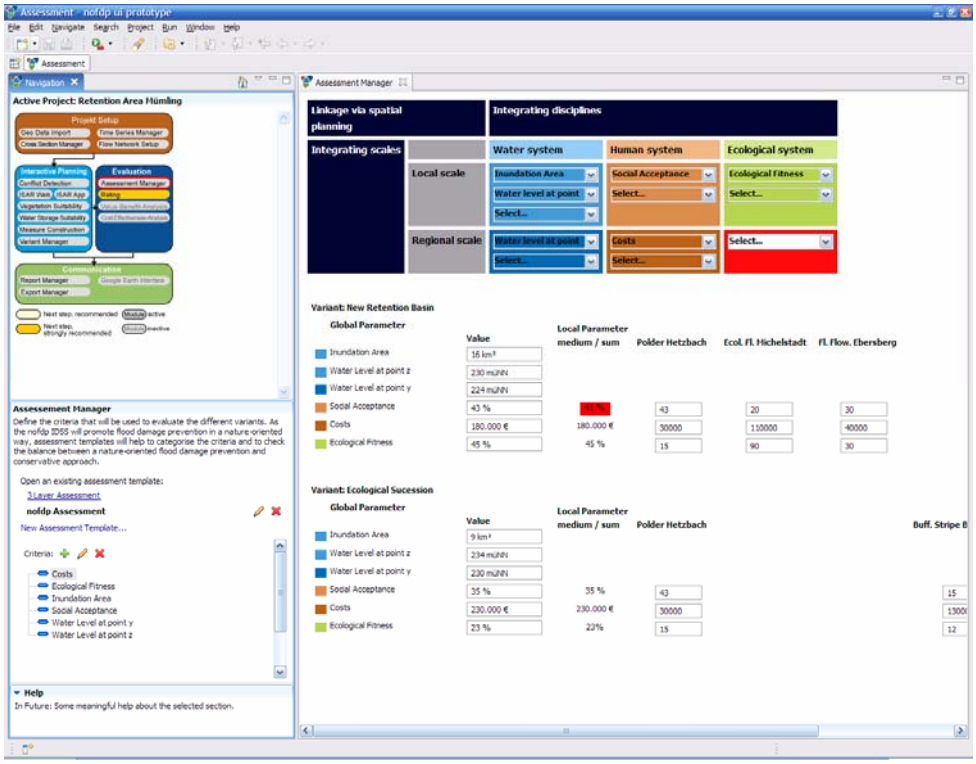
[5] Dutch Organisation for Applied Water Research

Variant Manager



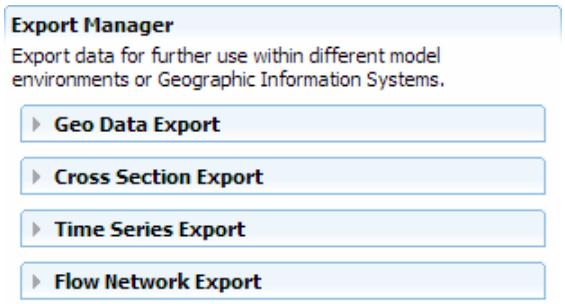
The module 'Variant Manager' enables to pool a number of measures to one variant. Again the user is able to check all parameters, which determine the design and size of the respective measure. This screen provides a complete overview of all measures and respective sets of parameters.

Assessment Manager



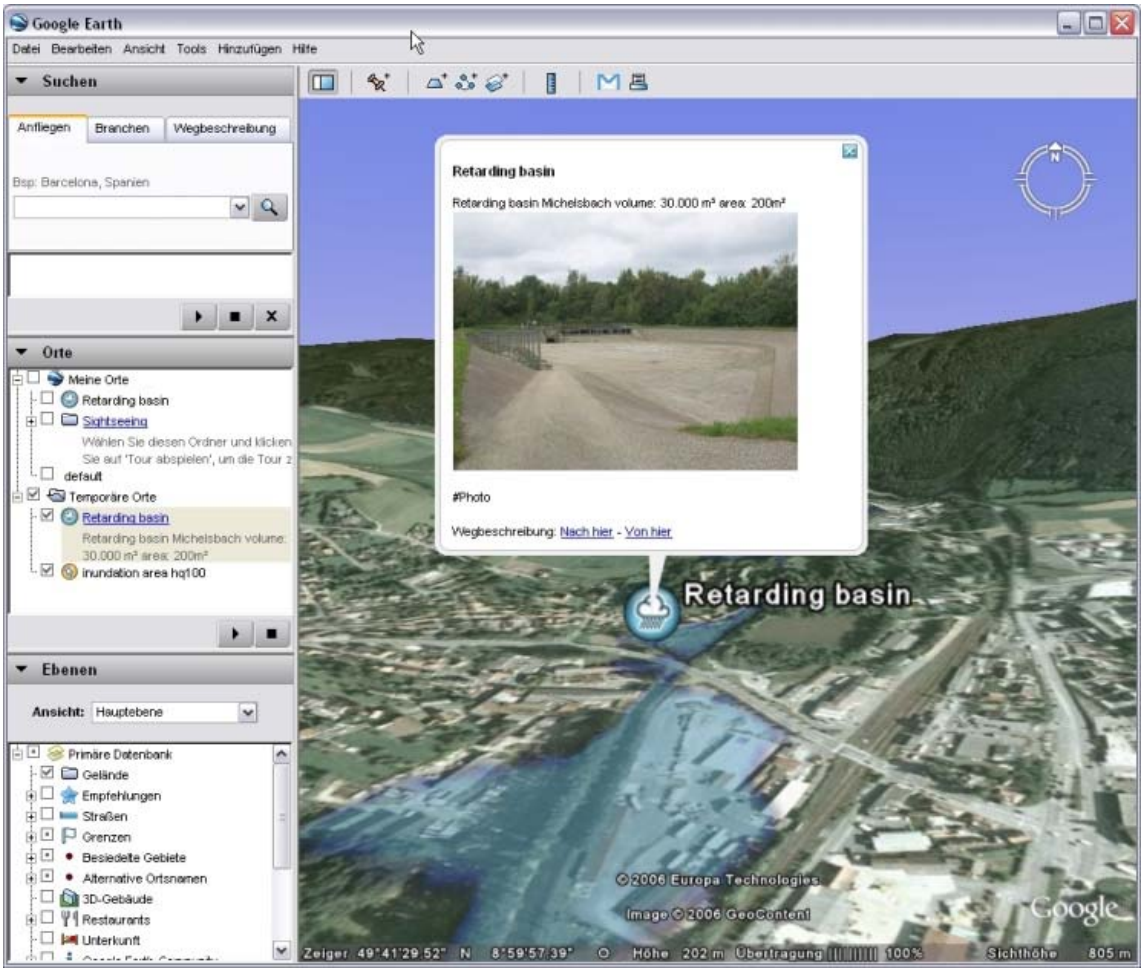
Evaluation is another key functionality of the nofdp IDSS. Because of the theoretically unlimited number of possible evaluation criteria for measures of nature development and flood damage prevention there is no fixed catalogue of criteria. The basic functionality of the 'Assessment Manager' is to implement criteria for evaluation and assign qualitative or quantitative values to these criteria (using calculated data or estimates by personal judgement). The nofdp IDSS will contain three methods for evaluation (rating, cost-benefit analysis and value-benefit analysis). In this prototype version none of these methods could have been implemented so far. But this will be realised in the coming prototype version to be released by the end of April 2007.

Export Manager



This module supports the export of geodata, cross-sections, time-series and the flow network to the Sobek hydraulic model.

3-D visualisation



The nofdp-IDSS contains an interface to export geodata for 3-D visualisation by means of Google Earth.

4. Predefined tasks for the participants to operate the prototype

Before the break-out groups predefined tasks were handed out to the participants. The participants were asked to test the prototype while performing the given tasks. By means of the small working groups we wanted the participants to have direct interaction with the prototype in order to stimulate extensive feedback.

No.	Task description
1	Check the module "Flow Network" and simulate the integration of a weir.
2	Create a new project, enter a project description, select a project aim and simulate the data import.
3	Visualise the cross-section at km 28.32, edit the profile elevation data via the table view.
4	Use ISAR Web to determine the recommended measure. Assume the following deficits in physical river quality: None-natural, straightened river course and bottom erosion
5	Detect conflicts between inundation and urban infrastructure.
6	Simulate a complete planning process for a retarding basin: ▪ simulate the construction of the measure ▪ simulate the creation of a variant ▪ compute the hydraulic model ▪ simulate the evaluation process ▪ simulate the report generation ▪ simulate the export of the results ▪ visualise the results in Google Earth

5. Feedback and main conclusions

While working on the tasks the participants were asked to put down their comments on coloured cards. Each colour represents one of the listed categories below.

- User guidance
- Content of the screen
- Layout of the screen
- Comprehensibility
- Miscellaneous

Cards were collected and in the final session of the workshop a first analysis of the feedback was presented and discussed with the participants. After the workshop the nofdp Project extended the analysis of the feedback. The feedback includes a large number of valuable hints and recommendation concerning the design and layout of screens and working steps. Find below our main conclusions derived from the feedback.

First conclusion: The nofdp IDSS will be available in English, Dutch and German. Therefore a clear definition of technical terms is required:

- e.g. scenario, variant, drivers etc.
- One participant commented that the thematic grouping of the measure was not clear

The two other main conclusions are rather a question raised by the participants than a conclusion:

Second conclusion: Is the nofdp IDSS an expert system or a planning tool with a focus on communication? At the moment it looks rather like an expert system with a strong focus set on modelling functionalities.

Third conclusion: The role of hydraulic modelling and the modules 'ISAR tool', 'Vegetation suitability', 'Water Storage Suitability' is not clear. One participants worries that the nofdp IDSS wants to become a five-headed monster.

We think that by means of these statements we can shortly summarise the essence of the participant's feedback:

- Make clear what is the technical or expert section of the nofdp IDSS!
- Make clear what is the communicational section of the nofdp IDSS!
- Clarify the role of the hydraulic model and the other modelling-oriented modules within the overall nofdp IDSS!
- Work on the communicational functionalities of the nofdp IDSS!

6. Lessons learned from the workshop

The feedback by the participants made clear that modifications of the prototype are necessary. By means of answering two questions we would like to outline the modifications planned:

Question 1: The nofdp IDSS: a communication or modelling tool?

Much of the feedback refers to the technical elements (models, analytical and data management tools) of nofdp IDSS prototype. There was a general feeling among the participants that these elements dominate the interactive-planning and communicational functionalities. There was confusion whether the prototype is designed to be operated by modelling experts or to be used as a tool for planning and communication by project managers.

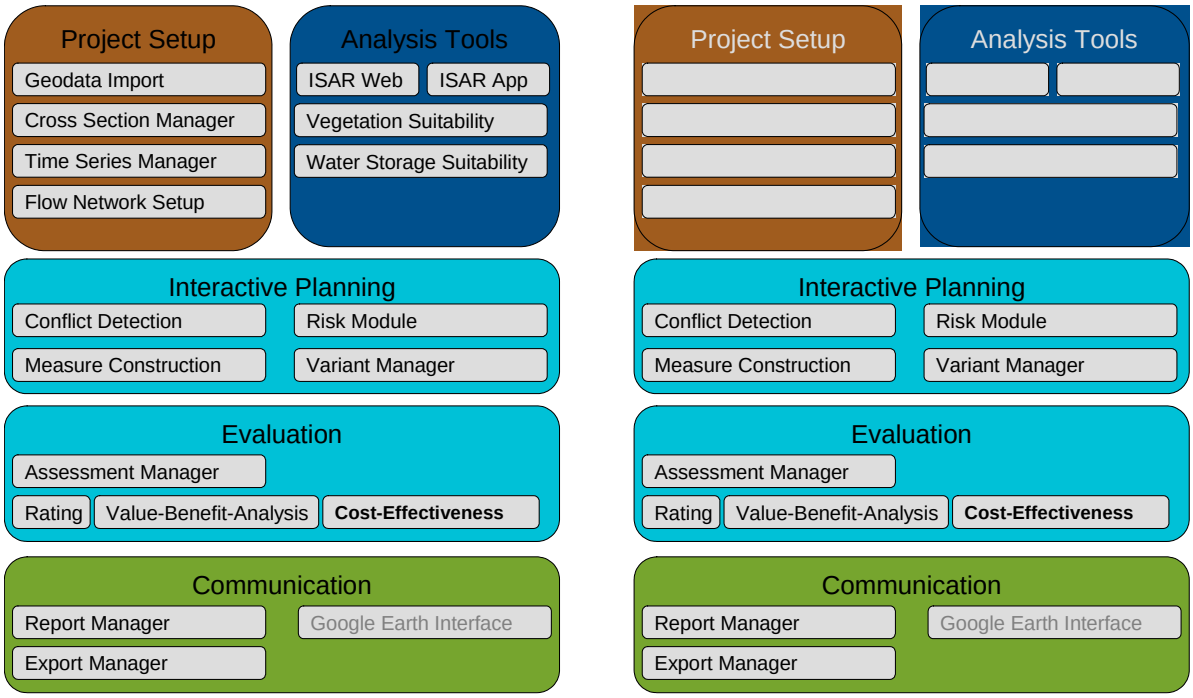
One reason for this felt dominance of technical elements might have been caused by the chronology of the development process. As this is the first prototype version much of the work was spent in basic system structure and the focus was set to implement modules for data management and data operation. In the coming development phase these elements constitute the necessary basis upon which the modules aiming at interactive planning and communication (Interactive measure construction, evaluation and communicating the results of the planning process will be implemented. Actually, in the present version of the prototype much of the planning and communicational functionality was just indicated as dummy because of the early stage of the software implementation.

The intended purpose of the nofdp IDSS is to enable better informed decision through interaction with relevant data and information. The second question will discuss the role of models and analytical tools included in the nofdp IDSS in more detail. Nevertheless, a first important message to us by the participants of the workshop was: **Find the right balance between technical demands and communicational needs**! Therefore, in the coming development phases we will mainly concentrate our

effort to the development of modules supporting tasks of evaluation and communication.

The second and certainly most important lesson learned from the feedback is that the underlying structure of the nofdp IDSS does not reflect the key objective of the software. That is to reach better decision through interaction with data and information. **Therefore, in future we will distinguish two separate modi in the nofdp IDSS: an expert modus and an interactive planning modus.** This revised concept is indicated by a modified navigation tree which is depicted below.

Expert Modus (left figure) and Interactive Planning Modus (right figure)[6]



In the **expert modus** access is possible to all modules and complete functionality is available. The user must switch to this modus in order to set up the data and information base required for the use of the planning modus. Furthermore, here the user processes the outcome and results of each working session in the planning modus (e.g. fit the newly developed variants into a hydraulic model). In that way the expert

[6] The navigation scheme shown in both figure refer to the re-organised workflow. This modification is the main conclusion derived from the discussion of the second question! See page 20!

modus enables communication between project manager and the technical department or consultant.

In the **interactive-planning modus** only the functionalities and modules are accessible which have interactive-planning and communication activities in their focus.

Question 2: What is the specific role of the hydraulic module and the technical modules, e.g. 'Vegetation suitability' or 'ISAR tool' which are implemented in the nofdp IDSS.

This question is directly related to the previous one. Among nofdp partners, we agree that a decision support system used for the purpose of planning and communication does not primarily have the function of a simulation model. But as results obtained by simulation models and other analytical tools provide key information for decision making in the field of flood damage prevention and nature development there must be any kind of linkage between the nofdp IDSS and these tools. This linkage has to be defined. **For the nofdp IDSS this linkage has been defined as follows:**

The nofdp IDSS itself contains a hydraulic model, several analytical tools and is equipped with the OpenMI interface. This interface enables the user to couple the hydraulic model to externally driven models which must also be equipped with the OpenMI interface. Furthermore, the nofdp IDSS will be delivered together with a free version of the Sobek model (1-D instationary, limited to 500 calculation knots). The Sobek software will be installed separately, but is connected to the nofdp IDSS via the Published Interface (PI).

By means of the integration of technical functionality it is not our intention to turn the nofdp IDSS into something like a five-headed monster, which addresses the entire catalogue of problems one could encounter in integrated river basin management. It is a basic principle of our concept that none of these models or tools are necessary to run the nofdp IDSS. These modules provide optional functionality covering nature development and quantitative water management. Alternatively, the user is free to

generate this information externally and upload it to the nofdp IDSS. However, in particular the 'ecological-oriented' tools are innovative products.
In contrast to most Dutch water boards a considerable number of German water boards do not operate own hydraulic models within their organisation[7]. All calculations are done by external consultants. Some of these water boards formulated the need for a hydraulic model that is freeware. The nofdp IDSS offers two freeware options: Floodrouting (non-limited number of calculation knots, open-source) and Sobek (1-D instationary, limited freeware licence including 500 calculation knots, not open-source). The free Sobek licence was the prefered offer because most technical departments of Dutch water boards already work with Sobek software. In addition, the OpenMI interface enables a simple coupling to Sobek models. By means of this system architecture, we will reach better user friendliness. It supports data management and therefore improves communication between project manager and technical department or consultant.

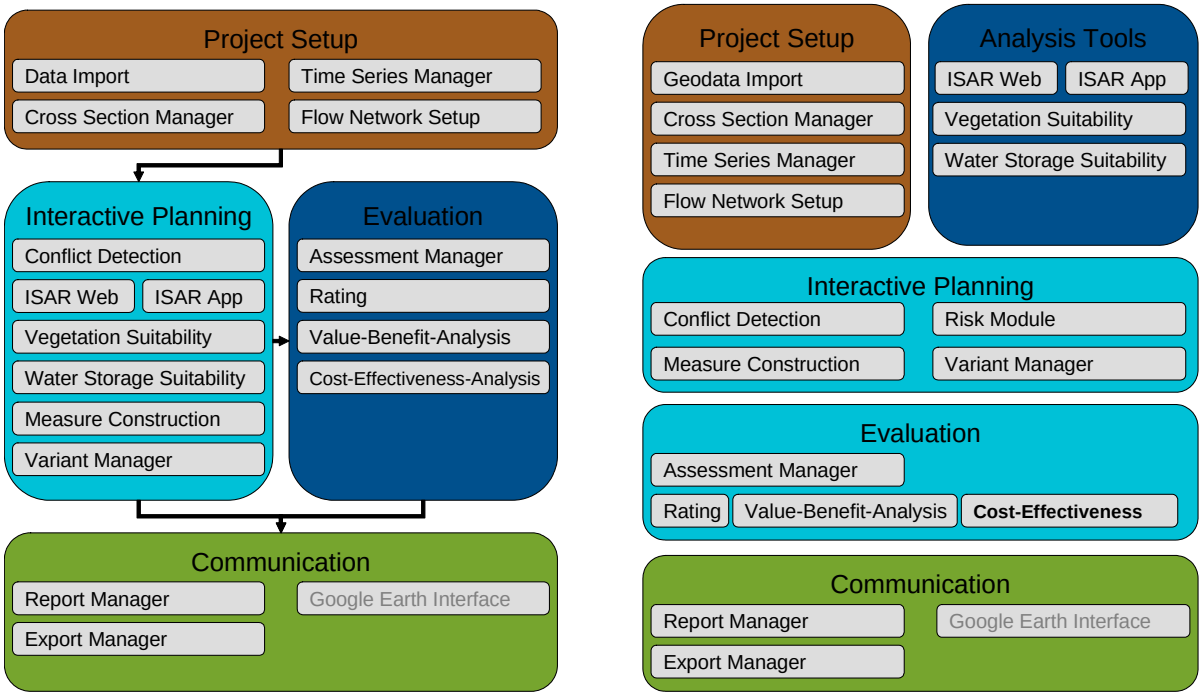
Most of the analytical tools have an ecological background. Their main purpose is to provide information about restriction areas and areas where it is recommend to place measures of flood damage prevention and nature development. By means of these tools we would like to provide the user with our scientific knowledge in this field which is one of the key objectives of the nofdp project. The use of these tools is optional, it provides a more comprehensive information base for the later interactive planning phase. The non-use of these modules does not limit any functionality provided in the interactive planning and communication modus.

It was clear from the participants' feedback that the current prototype structure and design partly fails in communicating the nofdp IDSS concept as being described above. Modelling appeared as the main objective of the nofdp IDSS. This might be because the so-called 'Interactive planning' box of the prototype version presented during the workshop contained most technical-oriented modules. These technical modules have distracted the user from carrying out the actual tasks within this box: an interactive planning exercise.

[7] See the final report of the nofdp Questionnaire, available as download from www.nofdp.net

What is the consequence of this feedback for the coming development process? **We will merge the entire set of analytical tools from the 'interactive planning' box to a new box called 'Analysis tools'. All these modules will be operational in the expert modus only.** We believe that this modification will better emphasise the actual role of models and tools in the nofdp IDSS: enlarging the information base about restricted and preferred areas to locate measures of nature development and flood damage prevention.

Navigation scheme presented in the workshop (left figure) and modified navigation scheme according to the feedback received (right figure)



7. Summary

First, we would like to thank all participants for their valuable contributions during the workshop. On our part we have enjoyed this very fruitful and interesting day and believe that this workshop will significantly contribute to the coming development process of the nofdp IDSS. We wrote this workshop report because of these two major aims:

- we indented to document and analyse the feedback received.

- by means of this report we would like to communicate to the participants the lessons we have learned and to show the effect of their feedback on the coming development of the nofdp IDSS.

Among a considerable number of smaller hints and comments concerning workflow and layout we concluded two major changes in the nofdp concept as a direct outcome of this workshop.

- Firstly, we will distinguish two modi in the nofdp IDSS: an **'expert modus'** and an **'interactive planning modus'**. We hope that this revised concept will put more emphasis on planning and communicational-oriented functionality.
- Secondly, the workflow will be expanded by an additional box, called 'analysis tools'. This box will contain all models and analytical tools. On the other hand all technical tools will be removed from the 'interactive planning' box.

The feedback clearly indicated that in the coming development phase our resources must be used rather for the development of the planning and communicational modules than for the improvement of existing and fully functional technical modules.

Furthermore, a recent decision made by our project steering committee supports us in our efforts to develop a software tool that will assist project mangers and planners in their efforts to implement and develop strategies that are in line with the nature-oriented principles. The nofdp steering committee decided to contract Björnsen Consulting Engineers to realise this list of additional modules, which will considerably expand the functionality included in the nofdp IDSS:

- 3D visualisation in Google Earth
- Multilanguage: Beside the English version there will be a Dutch and German version of the nofdp IDSS
- Implementation of a risk modul to assess expected flood damage

8. List of participants

Participants from nofdp Project partner organisations

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