



INCO-CT-2004-509158

NOSTRUM-DSS

NETWORK ON GOVERNANCE, SCIENCE AND TECHNOLOGY

FOR SUSTAINABLE WATER RESOURCE MANAGEMENT IN THE MEDITERRANEAN.

THE ROLE OF DSS TOOLS

INSTRUMENT: Co-ordination Action

**THEMATIC PRIORITY: INCO-MPC, Specific measures in support of international
co-operation - Mediterranean Partner Countries (MPC)**

Publishable Final Activity Report

PERIOD COVERED: from 1st August 2004 to 31st January 2008	
DATE OF PREPARATION: 31th January 2008	
START DATE OF PROJECT: 1st August 2004	DURATION: 42 Months
PROJECT CO-ORDINATOR NAME: Prof. Carlo Giupponi	
PROJECT CO-ORDINATOR ORGANISATION NAME: Fondazione Eni Enrico Mattei	

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1. Project execution

Project objectives

The Nostrum-DSS Co-ordination Action (CA) aimed at contributing to the achievement of **improved governance and planning** in the field of sustainable water management within the Mediterranean Basin by establishing a network between the science, policy, and civil society spheres

Nostrum-DSS contributed to a more policy-oriented research community around the Mediterranean and to more informed policy and decision-making processes, through the fulfilment of four **main objectives**:

- to contribute to the improvement of scientific knowledge and applied methodologies in the field of IWRM;
- to promote the design and development of effective and suitable support tools for policy and decision makers of the Mediterranean Countries;
- to establish durable links between scientific institutions, governments, non governmental organisations, small and medium enterprises and other stakeholders in the Mediterranean countries;
- to improve public awareness on water management.

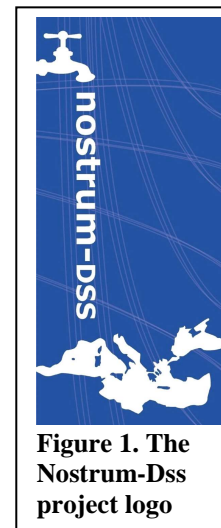


Figure 1. The Nostrum-Dss project logo

Contractors

In the table below the Nostrum Dss Consortium is presented.

Table 1. Partners list

No.	Name of the Institution	Acronym	Contact Person
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7	<i>National Technical University of Athens</i>	NTUA	Dionysios Assimacopoulos assim@chemeng.ntua.gr

No.	Name of the Institution	Acronym	Contact Person
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Work performed

Nostrum-DSS produced a series of products, made available through the project web site (www.nostrum-dss.eu) and disseminated at many events during three and half years. The products are of different kinds: databases, reports, publications, short dissemination and training materials (technical and policy leaflets), but the main scope of the project was the development and dissemination of the **Best Practices Guidelines for the design and implementation of DSS tools for Integrated Water Resources Management (IWRM)**, produced with the participation of scientists, policy makers, and key stakeholders, through the implementation of a structured sequence of actions aimed at favouring efficient exchanges of information, knowledge and experiences between them.

During the first year the consortium and a Steering Committee were set up, communication channels were put in place and a knowledge base for the project's future activities was built up, through the data collection activities and the delivery of a series of dossiers: the **Nostrum-DSS National Reports**. All the Nostrum-DSS partners were involved since the *Kick-off meeting*, which was held in Lisbon (Portugal) on 10-12 October 2004 and represented the official launch of the project with the following aims:

- to reach a common understanding among partners about the implementation of the Coordination Action;
- to organise and launch the various activities;
- to inform partners about management rules, reporting deadlines and so forth.

The Kick-Off meeting allowed to establish sound links among the partners and to highlight the important role that the connections with local actors had to play within the Nostrum-DSS project. Soon after this meeting, in fact, the Consortium started to build up links among the scientific institutions participating in the project and with the local decision-makers and stakeholders.

The *first meeting of the Steering Committee* was also held during the Kick-off. All the internal members and some of the external members of the Committee participated in this event. It provided the opportunity to agree on the role and duties of the Committee both from the scientific and managerial point of view.

Another important activity carried out within the Nostrum-DSS project was the establishment of the **project website** which contributed to reinforce the connections within and outside the Consortium, allowing to share information and project related material among partners in the restricted area, and to disseminate project information to a wider audience in the public space. Another important means of dissemination was the first issue of the **Nostrum-DSS Electronic Newsletter** produced at the end of the first year. It was disseminated through the project website and the existing international newsletters and mailing lists on water-related issues. The first newsletter issue aimed to inform a wide audience about the project activities and the first results.

Since the beginning of the project, co-operation among Nostrum-DSS and other initiatives in the field of IWRM have been actively sought, in particular with other projects financed by the European Commission within the 6th Framework Programme, International Cooperation with Mediterranean Partner Counties (INCO-MPC). For example, Nostrum-DSS set up contacts with the OPTIMA (Optimisation for Sustainable Water Resources Management-INCO-CT2004-509091) and MEDITATE (Mediterranean Development of Innovative Technologies for Integrated Water Management-INCO-CT2004-509112) projects, in view of future coordinated activities, such as the organisation of joint events and dissemination activities.

The most relevant activity of the first year was the collection of the **Nostrum-DSS National Reports (NR)**, which represent the main knowledge base for subsequent work. A National Report was drafted for each Mediterranean Country involved in the project. All the Reports were collected by the NOSTRUM-DSS Co-ordinator at month 9, thus requiring a tremendous effort by all partners for the immediate activation of project activities, including the setting up of contacts with relevant actors and local networks. Each report is composed of two parts:

- Part I focuses on existing information about water availability and current management practices in the Mediterranean Area. All the main sectors and disciplines related to water management and use are taken into consideration;
- Part II presents either an ongoing local initiative or a representative example provided by partners' experience or the literature in the field of decision-making in the water management sector.

The compilation of the National Reports allowed to perform a review the main issues in the field of water resources management in Mediterranean Countries and what kind of approaches and tools are currently in use in the area to facilitate decision making – exploring pros and cons, similarities and differences. As mentioned above, National Reports represent the **Nostrum-DSS knowledge base (NDKB)** allowing the effective circulation information to understand how to improve the current knowledge on water management in the Mediterranean Basin and how to fill in the existing gaps, with specific reference to the potential role of Decision Support Systems. In this way Nostrum-DSS played a mediation role between policy makers and scientists, and between policy objectives and scientific knowledge, contributing to the creation of a common language, and of a shared forum where actors pertaining to different, and too often separated spheres of socio-economic and environmental sciences and governance could meaningfully interact.

A *second meeting of the Steering Committee* was held in Venice (Italy) on 25 June 2005, in order to inform members about the project's implementation status, as well as about the developments outside of, but connected with, the project and the Consortium. The meeting was specifically dedicated to the revision of the National Reports, which represented the main knowledge base developed *ad hoc* for the project's future activities. The Committee also offered its comments on the work previously done, as well as advice and suggestions as how to overcome possible difficulties, and to improve the project performance.

During the second year, the collaboration within the Co-ordination Action was very positive and the communication among the partners very lively, notwithstanding the fact that limited financial resources had to be mainly targeted to the acquisition of information for and development of the National Reports at the beginning of the project: more than 4000 e-mails were exchanged. Networking activities were thus mainly targeted to strengthen the links outside the project Consortium and, for example, information on the project activities and preliminary outcomes was circulated to **13 existing international mailing lists** on water-related issues, to **7 Institutions** working in the water field and to **29 selected EU funded projects** contributing to the EU Water Initiative.

In order to exploit and disseminate the scientific knowledge related to IWRM, previously acquired through the NR's, the NOSTRUM-DSS Consortium (*WP2* and *WP3*) elaborated upon the NDKB, by developing a series of **meta-analysis** reports: **3 sectoral** and **1 cross-sectoral**, **3 disciplinary** and **1 cross-disciplinary** assessments of the materials acquired through the NRs. Each of these reports focuses on the **current water management practices** and **main challenges** faced by the Mediterranean Countries, pointing out commonalities and differences in the existing approaches, in order to facilitate the identification of the main needs of the policy makers' community and the opportunities for the future development of management approaches and decision support tools. Under *WP4* the activities went deeper into the issues of **data surveying** (both statistical and spatial) and **climate change scenarios** and the expected consequences on water resources. **The Nostrum-DSS Glossary** and **three thematic reports** were prepared and made available to the public on the project web-site.

The **stakeholders' involvement strategy**, designed by the Consortium in the early beginning of the CA, was improved and expanded in year two of the project. The research and policy communities had several opportunities to discuss when a DSS tool should be considered to effectively assist the decision process and how to design the Nostrum-DSS Best Practice Guidelines according to the real needs and expectations of the policy makers working in the water field. First, selected decision makers, already identified by the partners during year one, were contacted by e-mail to be involved in five **E-conferences**, launched from November 2005 to January 2006 through the Nostrum-Dss on-line forum. The e-conferences widely increased the impact of the Coordination Action as shown in the Figure 2 below.

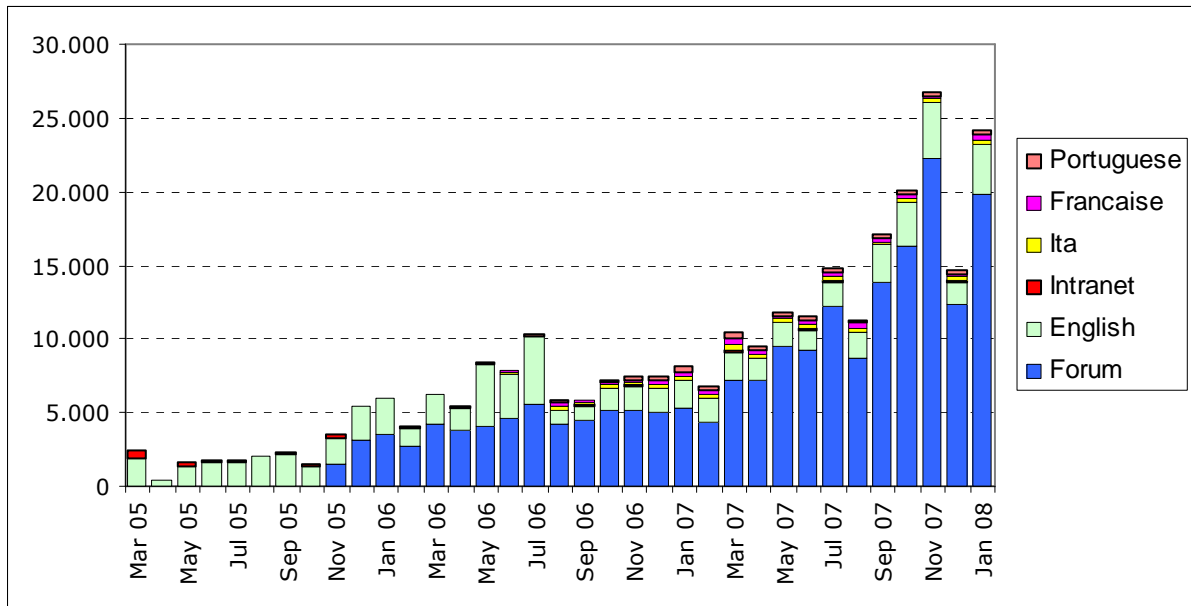


Figure 2: Page views per website area

Another important mean to actively engage with local actors, was the organisation of **face-to-face meetings** during the project events and, in particular the three thematic workshops which took place during the second year of the CA (see Fig. 3):

- the *First and Second Thematic Workshops* held in parallel on 9-11 February 2006 in Sousse (Tunisia) in order to discuss and finalise the sectoral and disciplinary analyses and meta-analyses under WP2 and WP3;
- the *Technical Workshop* held on 27-29 April 2006 in Aswan (Egypt) to discuss the potential applications of DSS tools, by experiencing the implementation CEDARE Environmental Impact Assessment Decision Support System (EIADSS) to the Toshka Irrigation Project.



Figure 3: Face-to-face meetings with stakeholders in Tunisia and Egypt

At the Tunisian and Egyptian Workshops, besides the Nostrum-DSS partners responsible for the activities at hand, representatives from the **Local, Regional and National** authorities and agencies working in the water field (e.g. Tunisian Ministry of Agriculture, Tunisian National Public Water Supply Utility, Tunisian Regional Offices of Agriculture Development; Egyptian Ministry of Water Resources and Irrigation, Egyptian Environmental Affairs Agency, High Dam Authority of Aswan) participated in the discussion. These decision makers and stakeholders, provided their opinion about the effective applicability

to the local context of the main IWRM concepts (e.g. the Dublin Principles for IWRM, the goals of the World Summit on Sustainable Development, the concepts under the European Water Initiative and the Water Framework Directive) reporting their experiences about decision-making processes in the water field and expressing their needs concerning both the application of DSS for water planning and the expected results of the CA. The collection of direct insights from the policy world at the local workshops was supported by the compilation of an **ad-hoc questionnaire** which was conceived on purpose to improve the participation of the local communities in the CA and effectively circulate their views.

The analysis of the questionnaires collected allowed to have a **first structured feedback from the local decision-makers and stakeholders** involved in the Nostrum-DSS. Indeed, it clearly emerged that the co-operation between the local actors and the Nostrum-DSS Consortium as well as the outputs of the Co-ordination Action were judged important to increase the collaboration between science and policy spheres.

During the second year, due to the critical situation in the Middle East, some activities had to slow down and the work plan revised, including the scheduling of the Nostrum-DSS events. In fact, the project events have been postponed due to the critical political situation in Middle East. In particular, the networking activities devoted to contact and invite local stakeholders at the Science and Policy Workshop in Lebanon had to be interrupted and the Consortium agreed on proposing a six-months extension of the Nostrum-DSS CA, later authorised by the EC.

A preliminary structure of the Nostrum-DSS guidelines was worked out in the second year project and the idea emerged to produce not only a publishable report, but also the “**Meta-Guidelines**”, i.e. a **3D web-based tool** able to assist the policy makers, by providing step-by-step responses to their needs, in their attempts to put in practice the principles of IWRM in local planning and management process. The “meta” prefix identifies the emphasis placed on avoiding duplications of previous efforts (i.e. previously published guidelines, toolboxes, manuals, etc.), preferring instead to build upon already existing materials and facilitating a guided access to available resources with increasing levels of details, starting with very concise documents, such as technical briefs, summaries for policy makers, and so on.

The third year was slightly less rich of activities, mainly due to the 2006 Middle East crisis. It was mainly dedicated to the **consolidation** of the work previously undertaken, and to the elaboration of the Nostrum-DSS final products, also thanks to the contributions collected within the ongoing e-conferences and during two important events, as described here below.

The *Third NOSTRUM-DSS Thematic Workshop* was held at FEEM’s venue in Milan, on December 20-21 2006, in parallel to the *OPTIMA 4th Management Board Meeting*. The event was the occasion for a preliminary discussion within the members of the projects’ consortia on how to improve the features of the final CA products and on how to disseminate their use.

Having finally discarded the possibility of holding the *Science and Policy Workshop* in parallel to the WATMED3 conference in Lebanon because of the persisting instability of the region, the Consortium identified another **important international event** focused on the Mediterranean area to jointly organise the Nostrum-DSS meeting. In February 2007 the *NOSTRUM-DSS Science and Policy Workshop* was thus organised in parallel to the Final Conference of the WASAMED thematic network, coordinated by CIHEAM-IAMB, partner also of Nostrum-DSS (Fig. 4). The event was very successful and was a good occasion to further disseminate information about the activities of the CA. It also allowed collecting important **feedback from several researchers and policy makers** on the Nostrum-DSS products drafted till then. The event was split into 3 sessions: the first targeting scientific issues, the second dedicated to the policy sphere and the last session with the participation of representatives from both the science and policy spheres. During the meeting, the Nostrum-DSS partners presented the main preliminary outcomes of the CA

to the audience of scientists and policy makers from all around the Mediterranean area, in order to collect feedbacks for the finalisation of the products and, in particular of the Guidelines.



Figure 4: The NOSTRUM-DSS Science and Policy Workshop

During the subsequent months the contributions and the comments received during the *Third Thematic Workshop* and the *Science and Policy Workshop* were integrated in the project products, including a specific *Consensus Document*. This document reports the feedback collected from scientists and policy makers, and other interested stakeholders of different countries throughout the CA implementation, it outlines the recommendations on future developments of applied research in the field of DSS tools, and it defines possible follow-up activities. Worth to mention was the shared idea about the potential usefulness of a persistent network based on the Nostrum-DSS community for facilitating broader collaborations and for developing improved material for capacity-building and training.

The final definition of all the NOSTRUM-DSS products also benefited from the experiences shared during the e-conferences held during the 3 years. The last e-conference launched on January 2007 reached nearly 300 researchers from 57 INCO-projects and was an opportunity to continue the discussion started during the *IWRM Science Communication for Impact Workshop* organised by the European Commission in Brussels on 20-22 June 2006. This channel also gave great emphasis to the project, as demonstrated by the significant increase of the number of visits to the Nostrum-DSS web-site.

End results

The end results of the CA have been presented during the Nostrum-DSS Final Dissemination Conference held in Larnaca, Cyprus on 25-27 October 2007. Following the successful collaborative strategy implemented by the Consortium for the organisation of all the Nostrum-DSS local workshops and meetings, also this conference was organised in association with another important international event: the *Cyprus INECO stakeholders' workshop*. Therefore the first day of the Conference (25 Oct.) was held as a **NOSTRUM-DSS and INECO Joint Event** (Fig. 5) and involved representatives from international institutions active in the Mediterranean area (Cap-Net UNDP, CEDARE, MED EUWI, GWP-Med, DG EuropeAid, ICS-UNIDO, DFID)¹ and representatives of the European Commission to discuss problems and criteria for the coordination, dissemination and exploitation of EU-research outcomes related to IWRM in the Mediterranean region. The event was an excellent opportunity for strengthening synergies between EU

¹ Cap-Net (Capacity Building for Integrated Water Resources Management) UNDP; Centre for Environment & Development for the Arab Region & Europe (CEDARE); International Centre for Science and High Technology (ICS-UNIDO); Department for International Development (DFID); Mediterranean Component of the European Water Initiative (Med-EUWI); European Commission, DG EuropeAid; Global Water Partnership - Mediterranean (GWP-Med)

research projects. In fact, 7 EU funded projects also participated in the joint event to present their experiences with respect to the coordination, dissemination and exploitation strategies implemented in the projects, in the morning session. The participating projects were: GEWAMED, WASAMED, MEDROPLAN, MEDITATE, MELIA, ISIIMM and DIMAS.



Figure 5. Photo of the participants in the NOSTRUM-DSS and INECO Joint Event, Larnaca, Cyprus, 25th October 2008

The discussions about the coordination, dissemination and exploitation of EU-research outcomes related to IWRM in the Mediterranean region lead to the development of a summary report and an extended report available on the Nostrum-DSS and INECO web-sites². Overall, the Joint Meeting was a very good occasion for exchanging information that was relevant to most participants and provided opportunities to explore synergies among projects.

During the second day of the Final Conference the final outcomes and products of the project have been presented the participants from the Nostrum-DSS consortium, the local stakeholders invited and other interested participants. Copies of a preliminary release of the Nostrum-DSS Leaflet Series described below - which summarise the main CA outputs - have been distributed in the meeting. In fact the CA products have been formatted as short, user-friendly versions to facilitate their exploitation by non-expert users. Their main aim is supporting the design, development and promotion of the effective use of DSSs tools for sustainable water management in the Mediterranean area.

The series of **Nostrum-DSS leaflets** summarises and presents the contents of the relevant outcomes produced during the project lifespan:

- the **Nostrum-DSS case studies leaflets** are based on the 15 National Reports and summarise the context and the main features of the water management processes investigated in NOSTRUM-DSS case studies, pointing out common best practices and pitfalls;

² NOSTRUM-DSS: http://www.feem-web.it/nostrum/downloads_ineco.php
INECO: <http://environ.chemeng.ntua.gr/ineco/Default.aspx?t=409>

- the **Policy leaflets** are based on selected project Deliverables and provide insights into multi-sectoral and multi-disciplinary work carried out in support to a broader implementation of DSS for water management in the Mediterranean Area;
- the **Technical leaflets** include both tutorials for facilitating the access of the on-line resources developed during the CA and the main contents of the project deliverables focusing on technical topics.

The series is available **on line** from the Nostrum-DSS website under section “Final Products”³ (see figure 6 below), where **multilingual versions of the leaflets** are downloadable to assure a wider dissemination and stronger impact of these products and to reach the higher number of stakeholders and potential users of the project products.



Figure 6. Screenshot of the Nostrum-Dss web-site page where to download the multilingual Nostrum-Dss Leaflets series

The main tangible and original product of the project, the **Nostrum-DSS Guidelines**, were designed to contribute to the achievement of improved water governance in the Mediterranean area, by assisting practitioners as well as policy and decision makers in the development of water policies and management plans through enhanced support tools. There, the main outcomes of the CA activities have been synthesised and phrased in the form of concise recommendations, which could be useful for both the scientists and the policy makers’ communities, with a short introduction, specifically targeted to policy makers and the lay public, providing the information required to bridge the main knowledge gaps about the features and functions of DSSs tools. The Guidelines thus provide:

- basic concepts and features of decision support systems technology for water management;
- reference to the multiple potential roles DSS technologies have in supporting decision making;

³ http://www.feem-web.it/nostrum/final_index.php

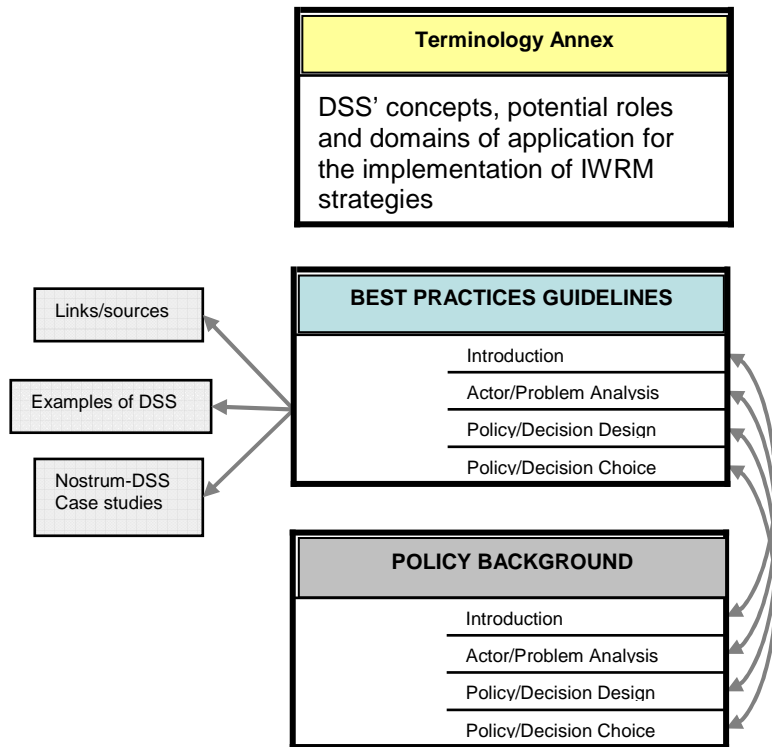


Figure 7. The Nostrum-DSS Guidelines

- recommendations for the collaborative and participatory development of DSS tools for water management
- water policy background.

The document is structured in different sections, as shown in Figure 7. The second section contains “**Best Practices Guidelines (BPGs)**” for DSS design and implementation.

As mentioned above, it is designed as a set of practical checklists, providing good practice recommendations stressing the issues related to the improvement of decision support tools’ development and use in the field of water management. It responds in detail to perceived inadequacies concerning

the development and the support offered by DSS for the accomplishment of a particular management task.

As previously stated, the Nostrum-DSS Guidelines represent the most important component of a concept of “Meta-Guidelines”, envisaged as the entry door to the products of the whole CA, but also to a much broader resource environment available through the **Meta-Guidelines** from the Nostrum-DSS web site⁴. The 3D web-based tool was developed upon a series of layers in which products are displayed and made available according to an increasing degree of detail and technical content as shown in Figure 8.

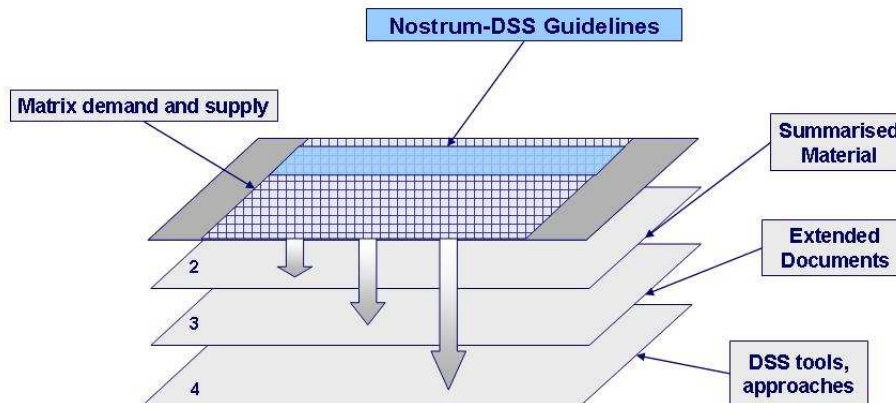


Figure 8. The Nostrum-DSS Meta-Guidelines Structure

Other important products of the Nostrum-DSS Coordination Action are the IWRM glossary⁵ and the Meta-database. According to the meta-guideline concept, the **Nostrum-DSS Glossary of IWRM**

⁴ <http://www.feem-web.it/nostrum/matrix.php>

⁵ <http://www.feem-web.it/nostrum/glossary.html>

Terminology it is the result of a survey on a set of 45 glossaries freely available on the World Wide Web where the definitions for 65 terms - plus 45 sub-terms - pertinent to Integrated Water Resource Management (IWRM) were retrieved. The glossaries surveyed were developed by international institutions (e.g. FAO, UNEP, WB) or within EU funded Projects (e.g. Harmoni-CA, WaterStrategyMan), here formatted as a web page⁶ with a user-feedback form. The Glossary aspires to provide the experts coming from different background with a common language, giving a chance to assess the different interpretation of IWRM key terminology. The **nostrum-DSS Meta-database** is the repository of a set of geographical and statistical data and sources available for the Mediterranean area and of relevance to water resource management. The Meta-database is accessible via the Internet through the main page of Nostrum-DSS final products⁷

The preliminary analysis of the impacts of the Coordination Action have been summarised in the **Impact Assessment study**. Overall the study showed that improved dissemination of research outcomes should be attained through appropriate means of communication. However, the adoption of modes of communication other than the traditional scientific publications, workshops and training is hindered by the limited availability of dedicated financial resources. Other important limitations derive from the discontinuity of research streams induced but the limited time span of projects (usually 3 years) and the lack of specific funding mechanisms for facilitating follow-up of successful stories.

⁶ <http://www.feem-web.it/nostrum/glossary.php>

⁷ http://www.feem-web.it/nostrum/final_tech.php#3