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## Science-policy communication for improved water resources management: Contributions of the Nostrum-DSS project

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Nostrum-DSS Project**

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NRM – Natural Resources Management

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# Science-Policy Communication for Improved Water Resources Management: Contributions of the Nostrum-DSS Project

## Summary

The Nostrum-DSS EU funded Co-ordination Action (CA) aims 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 and through the development and dissemination of Best Practices Guidelines (BPGs) for the design and implementation of DSSs for IWRM in the Mediterranean Area. Decision Support Systems (DSS) have a great theoretical potential as tools for the identification of optimal water resource management regimes in the Mediterranean basin, thus helping policy makers (PMs) to bring the principles of Integrated Water Resources Management (IWRM) into practice. However, such tools are only episodically exploited outside the academia. This article presents the outcomes of project activities targeting the development of more effective communication strategies, in order to facilitate the development of research products with greater potential for been up taken by the expected end-users, i.e. the community of policy makers, and their staffs, advisors, consultants, etc., in the Mediterranean Region.

**Keywords:** Science-Policy Interface, Policy Making, Water Resources Management, Mediterranean Region

**JEL Classification:** Q2, H7, O2, R5

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# 1. Introduction

## 1.1 The EU Water Initiative and the efforts for bridging science-policy gaps

The EU Water Initiative - Water for Life (EUWI), officially launched at the 2002 Johannesburg Summit, was designed to contribute to the achievement of the Millennium Development Goals (MDGs) and to the targets of the World Summit on Sustainable Development (WSSD) for drinking water and sanitation, within the context of an integrated approach to water resources management (IWRM). Since then a great wealth of research projects has been financed by the European Commission in order to contribute to the aims of the WSSD and to the MDGs, in particular Goal 7 (Ensure environmental sustainability) and more specifically Target 10 (Halve by 2015 the proportion of people without sustainable access to safe drinking water and sanitation) and 9 (Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources).

Recently, a review of EU supported International Cooperation in the field of water research from FP4 to FP6<sup>1</sup> (Gyawali, D. et al. 2006) has shown that there is an increased role in raising awareness among societal actors of the challenges facing political leaders, policy-makers and water users, and that integration of science with policy priorities is being enhanced. Projects tend to place more emphasis on the impacts (environmental, societal and economic) of research. Furthermore, and thanks to the stronger interaction and cooperation between the EU and third countries research teams, new approaches in water policy and policy-relevant water science are emerging.

However, the uptake of research outcomes is still unsatisfactory for various reasons, including the inefficient communication between the science and policy spheres, which limits a wider exchange of information and experiences. As a result, research often does not respond to societal and policy-making concerns and needs. These themes were recently debated at a dedicated workshop at the 2007 Stockholm World Water Week<sup>2</sup> and a joint effort in this direction has been launched also by two Coordination Actions financed by the EC: Nostrum-DSS<sup>3</sup> (Network on governance, science and technology for sustainable water resource management in the Mediterranean. The role of DSS tools) and INECO<sup>4</sup> (Institutional and economic instruments for sustainable water management in the Mediterranean Region). These efforts culminated in the “Nostrum-DSS & INECO Joint Event” (25 Oct. 2007, Larnaca, Cyprus) specifically aimed at contributing to the EUWI through the identification of common strategies for strengthening the research impact on policies and society. The main issues discussed during the event in Cyprus are presented in the following paragraphs of this first section. The second chapter of the paper focuses on the strategy developed and implemented by the Nostrum-DSS project to enhance the communication between the science and policy spheres related to water management in the Mediterranean Area, and in particular through the design and adoption of improved dissemination strategies of the project final products.

## 1.2 State of the art at the science-policy interface for IWRM

During the Nostrum-DSS and INECO joint event, a large number of EU Project Coordinators and researchers, and Representatives International Institutions/Initiatives<sup>5</sup> including the European Com-

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<sup>1</sup> Gyawali, D. et al. (2006). “EU-INCO water research from FP4 to FP6 (1994-2006) - a critical review”. Luxembourg, Office for Official Publications of the European Communities.

<sup>2</sup> Networking and Twinning Initiatives to Improve the Uptake of Research Results at the Local Level – Consolidating the EUWI Research Component ([http://www.worldwaterweek.org/worldwaterweek/2007\\_list.asp](http://www.worldwaterweek.org/worldwaterweek/2007_list.asp)).

<sup>3</sup> See [www.nostrum-dss.eu](http://www.nostrum-dss.eu) for details.

<sup>4</sup> See <http://environ.chemeng.ntua.gr/ineco/> for details.

<sup>5</sup> MED-EUWI: Mediterranean component of the EU Water Initiative (<http://www.euwi.net/index.php?main=1&sub=1&id=127>), GWP-MED: Global Water Partnership Mediterranean (<http://www.gwpm.org/>), Cap-Net UNDP: Capacity Building Network for

mission, were invited in order to exchange scientific knowledge and project results on different topics in the domain of water resources management in the Mediterranean region. The event was oriented towards the discussion of problems and criteria for the coordination, dissemination and exploitation of EU-research outcomes relevant to the implementation of IWRM in the Mediterranean region. The discussions held allowed drawing some conclusions regarding the state of the art at the science and policy interface for IWRM. In fact, research efforts are commonly concentrated on very specific issues or areas, and are not eventually integrated to produce widely applicable outputs. Thus, despite the efforts undertaken in the recent endeavours of EU-funded research towards the development of a knowledge base on tangible water management problems, the implementation of the Euro-Mediterranean Partnership and the attempts to establish a two-way feedback and dissemination of experiences and research outputs, a number of problem areas still exist:

**1) Fragmentation in project activities:** there is a multitude of different programmes and projects operating with similar objectives, but a differential and uncoordinated time schedule of research activities, which limits the potential interaction between projects; moreover, there are no mechanisms facilitating continuity on the issues examined in previous research efforts and in terms of the partnerships established. **Difficult communication between projects:** exchange of information and collaboration between projects require first identifying other projects as potential collaborators. However, information regarding past, ongoing and future activities of projects is not systematically available. Internet remains the only effective means of accessing such information, but information is often rather incomplete, not easy to retrieve, and only partially updated and available.

**2) Limited effectiveness in the dissemination of research results, including:**

- limited stakeholder participation in project activities due to lack of interest or insufficient contact or resources;
- limited impact of the project results at grass-root level, due to the existence of various barriers: in particular linguistic and digital divides;
- difficulties in engaging into a sharing process with the local communities due to significant cultural differences among the involved parties;
- lack of financial resources for capacity building as a means to disseminate methodologies and know-how;
- lack of mechanisms to provide sufficient momentum for a significant impact of the projects to reach the general public after the completion of the work, through the networks of potential users established during the project.

**3) Limited exploitation of research results, mainly due to:**

- the short duration of activities, which can result in limited scope for the exploitation of project results;
- project-driven research, which does not integrate with societal and policy-making concerns especially at the local level;
- difficulties for stakeholders to select among the many available initiatives and approaches that are proposed by projects with similar objectives and case studies;
- difficulties in reaching the intended end-user: even if knowledge may be widely disseminated and may be readily available it is not necessarily taken into consideration by deci-

sion makers, who are especially hard to reach, if not through their own networks of advisors, consultants, etc.;

- resistances and slowness at the institutional level, when the adoption of research outputs requires implementation in official document, regulation or legislation, under the pressures from interest groups and political lobbying but also from international and national institutions.

### 1.3 Recommendations from the Nostrum-DSS-Ineco Joint Event

Coping with the three problem areas described above requires a series of coordinated efforts to be implemented in ongoing and future research activities. Even if not comprehensive and systematic, a series of recommendations developed within recent activities are described below.

1) Regarding the **fragmentation and communication problems of research activities**, the need emerges for supporting interactions and integration among different projects and of their respective results, in order to offer greater potential for the exploitation of complementarities and synergies. Such coordination efforts would create good opportunities for long-lasting actions, including case studies, while at the same time reducing the degree of overlap and duplication. Furthermore, a greater integration among projects would allow for a coordinated and integrated message for the local stakeholders and end-users who might otherwise receive a multitude of varying information from a number of sources, thus promoting the uptake of project recommendations and their translation into policy.

Potential measures towards coordination include:

- active promotion of the development of voluntary clusters among projects that are interested in common activities and outputs;
- organization of joint international events;
- development and enhancement of coordinated online resource centres for projects information and for specific thematic issues (e.g. IWRM and stakeholders involvement in the Mediterranean countries);
- strategic collaboration with different bodies (i.e. NGOs and other institutions and initiatives, such as the MED-EUWI<sup>6</sup>) involved in the implementation of the IWRM principles in the Mediterranean Region;
- setting up of follow-up activities (e.g. established permanent links among projects and funding arrangements) including the development of regional exchange networks to continue the transfer of know-how; in particular, the establishment of an integrated Mediterranean network that could constitute a first step towards better integration of research and concerted actions with the adequate multidisciplinary competences.

2) Regarding the **science-policy communication interface and dissemination of the projects products**, a crucial issue is the adaptation to the local contexts, taking into account the diversity of ethical and cultural issues in IWRM (e.g. religious beliefs). Continuous cooperation with the local stakeholders since the beginning of the project, and the establishment of an effective collaboration with the allocation of significant resources should be established also with the objective to build trust of people. At this regard it is important to:

- make clear what are the objectives of the projects products (e.g. clarifying the role of research vs. consultancy; clarify the role of the scientific community in the IWRM and public participation projects; or demonstrating their policy relevance);
- make clear who are the targets of the products and plan to have different formats for different audiences;

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<sup>6</sup> <http://www.minenv.gr/medeuwi/> .

- guide different users with different technical backgrounds to the available resources;
- develop best practices and good examples referred to national/regional/local targets;
- carefully consider the linguistic barriers: technical documents may be provided in English only, but materials targeting policy makers should be in the local language;
- consider the inclusion of training and demonstration as part of the products to be delivered, in order to facilitate the appropriate use;
- avoid duplications of previous efforts (i.e. previously published guidelines, toolboxes, manuals, etc.), preferring instead to build upon already existing materials, filtering the usable results of past projects and case studies;
- focus on activities that promote replicability of results.

More specifically regarding the **dissemination strategies**, there is the need to communicate in a targeted and specific manner, adopting alternative dissemination means for different audiences, and, in particular, developing more effective, simplified and comprehensive languages. The contribution of projects representatives at the Joint Event allowed identifying a number of enhanced dissemination activities and approaches:

- internet-based technologies are considered the most convenient and affordable means for dissemination of project results. However, their shortcomings and limitations should be bared in mind: language, digital, cultural divides and long term maintenance after completion of projects;
- policy briefs, national seminars with clear policy issues and proposals, the involvement of press, radio and TV staff in project relevant activities (e.g. regional meetings and field work) are relevant means to convey project results to decision and policy makers;
- links already established between the scientific institutions and the governmental and non-governmental organizations, small and medium enterprises and other stakeholders, during the project implementation should play a central role in the dissemination of projects outcomes and should possibly find an institutional setting for long-term perspectives;
- the dissemination of projects results should include the organisation of presentations at high level meetings in collaboration with national and international NGOs and competent authorities.

3) In most cases the **exploitation of the research results** introduced by projects needs follow up. Therefore, it is important to:

- use specific projects and follow up activities for supporting the exploitation of results at the regional and international level. New funding mechanisms should be designed in order to facilitate the establishment of long term networking activities and follow-ups;
- create regional exchange networks to continue know-how transfer;
- enforce much closer links between research and EU frameworks. For instance the MED-EUWI is a political initiative were many activities are carried out and represent an opportunity for EU research projects to convey political messages that may have an impact beyond the project life. Synergies with this programme should be sought; while the establishment of links with the EUWI-Eranet programme SPLASH<sup>7</sup> may facilitate the dissemination of the main achievement of the EUWI research component;
- strengthen the communication between the EU-projects and other organisations active in the Mediterranean Area such as the Coordinating Unit of the UNEP/MAP (MEDU) and some subordinate structures as BP/RAC (<http://www.planbleu.org/>) and INFO/RAC

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<sup>7</sup> See <http://www.splash-era.net/> for details.

(<http://www.inforac.org/>). Project and follow-on activities should be clearly in line with the Mediterranean Strategy on Sustainable development (MSDD) as prepared by the Mediterranean Commission for Sustainable Development (MCSD) (<http://www.unepmap.org/index.php?module=content2&catid=001017002>);

- identify measurable indicators of effective communication and develop a wide range of soft indicators to assess the communication impacts and have feedback from end users with effective means.

## 2. The Nostrum-DSS implementation strategies

### 2.1 The Nostrum-DSS project

The Nostrum-DSS three-year (2004-2007) Co-ordination Action (CA) involves eighteen partners from the North and South shores of the Mediterranean Basin.

The Mediterranean is strategically located between different sets of cultures, different development choices, often dividing them. However, in its historic role, the Mediterranean used to be a unifying element between those different, but intrinsically interconnected, worlds. Water resources are scarce in the Mediterranean area, and yet the current management regimes are at times neither efficient nor sustainable. The need to improve on the current system is paramount, if the objective of sustainable development and stability in the region are to be achieved and maintained, as declared in many official documents and international agreements.

Decision Support System (DSS) are instruments that have an enormous potential as tools for the identification of sustainable water resource management regimes in the Mediterranean basin, where water resource scarcity could prove a contributing factor to conflict and instability (Bettinger et al., 2001; Walker et al., 2001). DSS tools can help to design management strategies which are flexible enough to accommodate changing political and socio-economic situations as well as technological innovations, but, at the same time, strict enough to ensure the ecological sustainability of water uses (Huang et al., 2001; Bhaduri et al., 2000). In the whole Mediterranean region there is a significant lack of a clear effort towards the development and dissemination of information and knowledge on DSS for water management. The Nostrum-DSS report on the state-of-the-art of DSS tools has shown how there are no examples of operational decision support systems for IWRM in the Mediterranean Basin (Fedra, 2006). DSS' potentiality is too often not exploited because of a lack of interaction between policy makers and researchers: on the one hand, researchers are often not responsive to the needs of policy makers; on the other hand, policy makers have a tendency not to use scientific information for the formulation of water resources management policies.

The ultimate aim of the Nostrum-DSS project is therefore to bridge the gap between policy makers and researchers with respect to the use of DSS tools as instruments for improving governance for IWRM in the Mediterranean basin, in order to provide policy makers with a set of tools based on an integrated approach for solving different emerging national and transboundary problems in water management.

Nostrum-DSS CA is adopting a multi-sectoral and multi-disciplinary approach, by considering the possible applications of DSS tools in various sectors (agriculture, industry, tourism, urban areas) and the different aspects that a DSS should take into account for supporting IWRM (technological, environmental and socio-economic aspects).

The final outcome of the CA is a set of Best Practices Guidelines (BPGs) for the design, development and implementation of useful DSS tools for IWRM. The BPGs are being developed with the active involvement of the relevant decision makers (DMs) and stakeholders (SHs) in the different stages of the project. To this aim, PMs, DMs and SHs have been involved since the early beginning of the project by informing the scientific community of the Nostrum-DSS' Consortium with their knowledge and needs.

According to the EC report "European Research: a guide to successful communications", dissemination and communication strategies should ensure (European Commission, 2004b):

1. an effective flow of information about the objectives and final results of a project;



2. relevant contributions to European (Euro-Mediterranean) knowledge and scientific excellence;
3. valuable collaboration on a European (Euro-Mediterranean) scale;
4. benefits to the general public.

In order to ensure an effective exchange of information between researchers and policy makers, Nostrum-DSS developed a plan for the involvement of relevant stakeholders (SHs) and the dissemination of project results, revised and adapted throughout the project implementation period. The plan foresees a two-way communication approach:

1. the dissemination of the stakeholders' knowledge to the project Consortium; and
2. the dissemination of information from the Consortium to the stakeholders who potential users of project outcomes.

Regarding the first strategy, carried out in particular during the first year of the CA, relevant stakeholders have been identified and contacted in local case studies distributed around the Mediterranean basin. In total around 300 water management stakeholders at different levels and from 15 countries were involved through meetings, workshops, and on-line forums and their contributions were mainly collected through the compilation of questionnaires. Whereas, the strategy for the dissemination of the project outcomes was developed since the second year, consolidated through consultations with stakeholders and refined through the information gathered by means of ad-hoc questionnaires compiled by the Consortium members and policy makers invited at the Nostrum-DSS Science-Policy Conference (February 2007, Italy).

## **2.2 Communication from the stakeholders towards the project's consortium**

The involvement of local stakeholders allowed building awareness on the different needs and concerns of local actors regarding water management and planning in different environmental, socio-economic, and cultural contexts.

The involvement was carried out through the forum on the project web-site, the annual electronic newsletters, e-conferences, workshops and meetings, mainly through the collection of questionnaires. In this way, stakeholders informed the Consortium about their needs and expectations. For instance, SHs participated in the First and Second Nostrum-DSS Thematic Workshops held in Sousse, Tunisia (February 2006) and in the Technical Workshop held in Aswan, Egypt (April 2006). The outcomes of these meetings provided recommendations and good practice examples which have been taken into account in the subsequent analyses focused on DSS potentials and requirements to better support the implementation of IWRM principles. The knowledge gathered during the first half of the project's duration allowed for the elaboration of the first draft of the Nostrum-DSS Best Practices Guidelines (BPGs) on the design, development and implementation of DSS for IWRM in the Mediterranean, which is the main output of the CA. In February 2007, a dedicated session at the Science and Policy Workshop held in Bari, Italy enabled a group of policy makers from the Mediterranean countries to review and to contribute to the final version of the Guidelines. In general, the actors involved in the surveys demonstrated quite different levels of knowledge and opinions about the role DSS tools can play in supporting improved IWRM and the degree of adoption of these tools widely varies from one country to another. Therefore, the strategy adopted was specifically aimed at ensuring that the products delivered would take into account the broad diversity of situations encountered.

The overall process demonstrated that stakeholders are definitely more effectively engaged during face-to-face meetings, which represented a fruitful opportunity to acquire knowledge about local decision-making practices and needs. Moreover, policy makers involved in surveys consider the different priorities and objectives between science and policy to be the most important hindrance towards fruitful interactions among the two spheres. SHs also pointed out that relevant limitations towards effective communication are mainly inherent to cultural and language barriers. These issues have been raised in many different contexts during the implementation of the Coordination Action. Nevertheless, SHs judged the activities carried out by the CA and its products as good opportunities which actively contributed to the promotion and increase of communication between the scientists and policy makers.

## **2.3 Survey on the dissemination strategies**

In total 31 anonymous questionnaires were collected. First, participants were asked to express their opinions about the effectiveness of five different dissemination strategies: conferences and scientific publications, summarised material<sup>8</sup>, traditional mass media<sup>9</sup>, the internet<sup>10</sup>, and local community-related activities<sup>11</sup>. The

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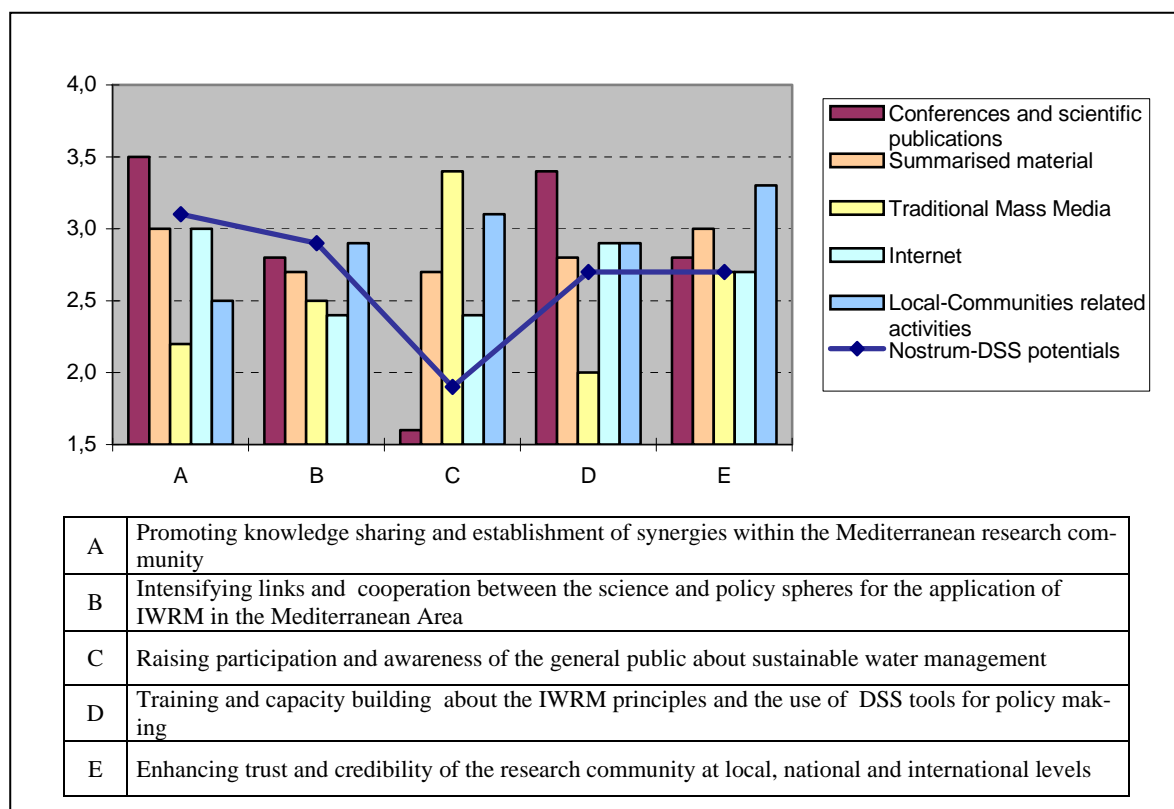
<sup>8</sup> Such as policy briefs, newsletters

alternative strategies were then confronted with the Nostrum-DSS general objectives (see A-E in legend in Fig.1), and with its expected main products<sup>12</sup>.

As shown by the line on the Fig. 1, in general the project is perceived to have higher potential for the promotion of knowledge sharing (A), as well as for intensifying cooperation in the Mediterranean Area (B), with good potentials also for objectives D and E, while limited expectations are for objective C, related to raising awareness of the general public.

When respondents were asked to define the expected effectiveness of the five possible dissemination strategies for the five objectives, a much diversified situation emerged (see histograms in Fig. 1). Traditional scientific dissemination means were suggested to be employed for promoting knowledge sharing (A) and for training and capacity-building purposes about IWRM principles and the use of DSS tools (D). On the other hand, raising participation and awareness - for which a low potential is expected from the CA - should be accomplished through traditional mass media. Interesting to note, the Internet was never valued as the most appropriate tool, but with a relatively high potential for scientific knowledge sharing (A) and capacity building (D); while, when asked specifically about the suitability of the various dissemination strategies for the Nostrum-DSS products, Internet was considered the most suitable means (see Fig. 2).

From the apparent contrast between the results of the general evaluations and those related to Nostrum-DSS, a comprehensive strategy was developed for the finalization and effective exploitation of the main final products. For the sake of brevity, the results of the revision of the Nostrum-DSS communication strategies are summarized in Table 1.

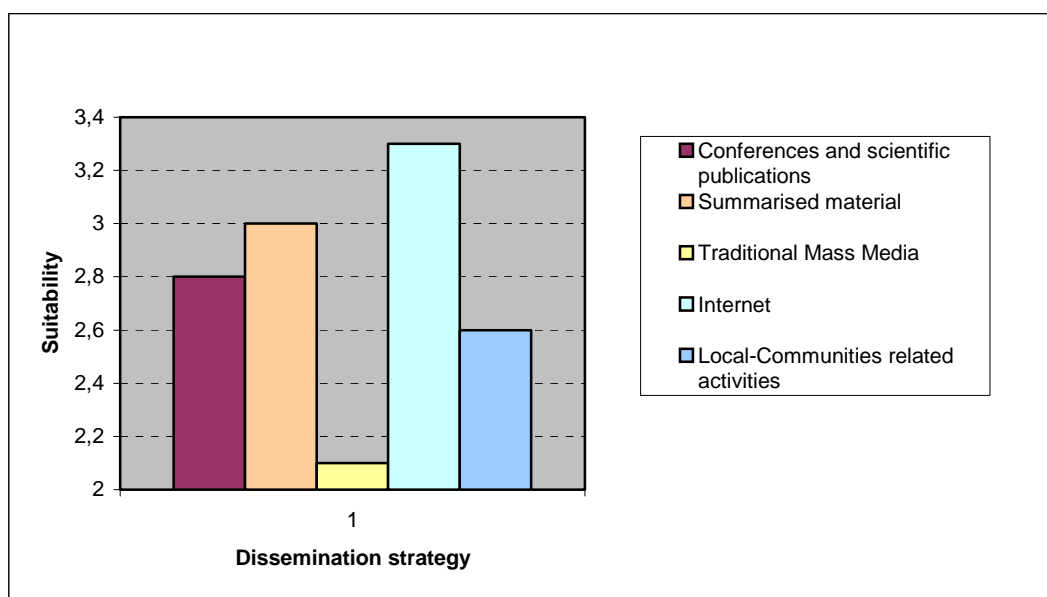


**Figure 1.** Results of the survey on the effectiveness of the dissemination strategies to achieve project objectives.

<sup>9</sup> TV, radio, press

<sup>10</sup> Web-site, forum, mailing list, CD-ROM.

<sup>11</sup> Local meetings and informative seminars.



**Figure 2.** Results of the survey on the suitability of various strategies to disseminate on average the Nostrum-DSS outcomes.

**Table 1.** Summary of the result of the survey on dissemination strategy.

	Objective	Expected potential of the CA to attain the objectives	Best strategies to be adopted (see also Fig.1)	Feasibility of the strategy	Approach to overcome obstacles and facilitate communication
<b>A</b>	Promoting knowledge sharing and establishment of synergies within the Mediterranean research community	High	Conferences and scientific publications ; summarised material; Internet	Good	No need to revise dissemination plans
<b>B</b>	Intensifying links and cooperation between the science and policy spheres for the application of IWRM in the Mediterranean Area	Good	Local communities related activities; Conferences and scientific publications	Intermediate (lack of funds)	Make multilingual summaries for policy makers' available through the web-site
<b>C</b>	Raising participation and awareness of the general public about sustainable water management	Low	Traditional Mass Media, Local communities related activities	None	Not suitable for the CA
<b>D</b>	Training and capacity building about the IWRM principles and the use of DSS tools for policy making	Good	Conferences and scientific publications; Internet; Local communities related activities	Intermediate (requires follow-up, or joining other efforts)	Identify new sources of specific funds or existing activities
<b>E</b>	Enhancing trust and credibility of the research community at local, national and international levels	Good	Local communities related activities; summarised material	Low (lack of funds)	Make multilingual summaries for stakeholders' available through the web-site

The following concluding remarks should be added to the contents of Table 1:

1. the two-way communication strategy between the stakeholders and the Consortium established during the project implementation, involved a relatively high number of people, but will not provide sufficient momentum for a significant impact of the CA to reach the general public after the completion of the work;

<sup>12</sup> Best practices examples, meta-database, glossary of IWRM terminology, training material for policy makers, meta-guidelines, and best practices guidelines.

2. in order to overcome the cultural, linguistic and digital divides to effectively and broadly reach the intended end-users and allow for an easy uptake of the project's outcomes, significant resources and follow-up activities are needed;
3. besides the usual dissemination channels of the scientific community (papers, conferences, etc.) the internet seems to be the only practicable strategy for a wider impact of the CA, first of all for its limited costs. This is in accordance with the report "EU-INCO water research from FP4 to FP6 (1994-2006) - a critical review" (Gyawali, D., et al., 2006), showing how almost all the Consortia of EU-INCO water research projects prefer to disseminate information through the web. But this has also great limitations briefly mentioned above;
4. the adoption of appropriate modes of communication to facilitate a wider access to information is limited by the current EU funding scheme and, in particular, by the lack of specific means for supporting the maintenance and upgrading of the final project products after the completion of the research period.

## **2.4 Implementation of the selected dissemination strategies in the Nostrum-DSS project**

In the Nostrum-DSS CA implementation, workshops and conferences demonstrated to be successful in the exchange of knowledge between stakeholders and the project Consortium, but it is not an adequate and feasible option to adopt for the dissemination of project results. The budget allocated for the Coordination Action does not foresee these activities beyond the project completion. However, broader spatial and temporal impact is expected by Nostrum-DSS outcomes, which cannot be provided by activities and events involving relative small group of people. In addition, after the project completion contacts within the net of stakeholders and researchers established are not easily and systematically maintained.

In this frame the Internet seems to be the strategy to ensure a wider impact of the Coordination Action. However, as previously mentioned, certain limitations also incur in the use of the Internet for disseminating project's outcomes as, for instance, it is not the most appropriate means to reach all the different audiences targeted by the Nostrum-DSS project.

The difference in speed of uptake of digital technologies is referred to as "Digital Divide" JANUS (2004), which contributes to the widening the gap existing between countries of the north and the south shores of the Mediterranean. Therefore, good scientific quality and the potential support provided by new technologies are not enough to provide effective communication (Gyawali, D., et al., 2006). According to the "UNESCO science report 2005", in the Arab Region "the lack of computers and limited internet penetration are serious obstacle to on-line learning and to gain access to information and knowledge databases in the vast array of scientific research networks, universities, libraries and learning resources through the world" (El Tayeb, M. & S. Schneegans 2005). Moreover, according to the distribution of data exchange on the Internet correspond to 60 % for trade, 27 % for research and 9 % for administration and less than 5 % for education and training UNESCO (1999). It is, therefore, needed to strengthen the networks reserved for education, training and culture (UNESCO, 1999) and to reinforce the role and the impact of Internet as an equitable and widely adopted means for the dissemination of research results. Considerable progress in the penetration of the Internet has been made in the Arab countries but access to knowledge through networks is hampered by customs barriers and political protection (El Tayeb, M. & S. Schneegans 2005). In general, in the Mediterranean region active search of information through the internet are rapidly increasing Scoullou, M. and B. Tomassini (2003), therefore, the potential of ICT should keep increasing in the near future, for globally disseminating knowledge and for local uptake and use and for overcoming geographic and cultural barriers. This will mainly depend on the research and development policies adopted by government to boost ICT in the information society (Bouwman H., 2003).

As a result of the evidences acquired, the final Nostrum-DSS web-site has been designed as a repository of the knowledge gathered during the implementation of the CA and the final products. The materials are thus available to be further developed and adapted (e.g. translated into the local language) and locally disseminated through and beyond the net of relationships established during the project implementation. Different categories of products have been designed for the various categories of users. In particular a series of leaflets, the Nostrum-DSS policy, technical and case studies leaflets series) has been designed with guiding and training material for policy makers, which summarize the main information gathered in the project implementation. The Brief materials has been preliminary circulated to the CA partners to be translated into the main languages spoken in the various countries so as to cope with the recurrent language divide.

Moreover, the concept of “meta-guidelines” was developed by the Nostrum-DSS CA. The “meta” prefix identifies the emphasis placed on providing information about pre-existing knowledge and avoiding duplications of previous efforts (i.e. previously published guidelines, toolboxes, manuals, etc.), preferring instead to facilitate a guided access to available resources. The Nostrum-DSS meta-guidelines are designed as a 3D online structure, where data are organized, stored and made available through a user friendly interface at increasing level of – technical – detail. Going deeply through the various layers the user can move from brief summaries for policy makers, for instance, down to the whole set of final products and other pre-existing resources (i.e. papers, guidelines, reports, projects’ deliverables). The interface of the meta-guidelines is designed as a demand and supply matrix in which the row (supply of knowledge) correspond to different categories of documents and tools specifically developed to cope with the various domains of IWRM, which are instead listed in the columns (demand of knowledge), for example water quality, or water allocation.

### 3. Conclusions

The analysis carried out in this paper allowed drawing a picture of state of the art of the communication, dissemination and exploitation of research results for IWRM in the Mediterranean Area and identifying recommendations and common strategies for strengthening the research impact on policies and society. In particular, communication activities and research efforts should be improved at different levels: between projects and International Organisations, between different projects and at the project scale itself. In fact, despite the efforts undertaken in a number of problems have been can be identified. The Nostrum-DSS and INECO Joint Event held at the Lordos Beach Hotel in Larnaca, Cyprus, on the 25<sup>th</sup> of October 2007 was an excellent occasion to strengthen the communication and the interaction between European funded projects active in water management in the Mediterranean area, as well as between projects and relevant International Institutions and Initiatives (e.g. EWI-MED, GWP-MED. Cap-Net UNDP). The organization of joint international events are important to overcome the fragmentation of research activities and enhance coordination efforts to create good opportunities for long term activities, and reducing the degree of overlap between research efforts. In addition, during the joint event, it was pointed out that a greater integration among projects would allow for a coordinated and integrated message for the local stakeholders and end-users thus promoting the uptake of project recommendations and their translation into policy.

The exploitation of research outcomes would be facilitated by creating much closer links between research and EU frameworks and initiatives (e.g. MED-EUWI, EUWI-Eranet programme SPLASH and strengthening the communication between the EU-projects and other organisations active in the Mediterranean Area (such as UNEP/MAP MEDU, BP/RAC, INFO/RAC) and in line with the Mediterranean Strategy on Sustainable development (MSDD).

At the project level, improved dissemination of research outcomes should be attained through appropriate means of communication adapted at the local context. 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. According to Gyawali, D., et al. (2006) limited funds are the main obstacle for appropriate dissemination of project outcomes for most of the EU-INCO projects financed under FP4-FP6. 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. In this context the Internet seems to be the most practicable means for dissemination. However, especially around the Mediterranean the different speed in the uptake of digital technologies (also digital divide), is a serious obstacle to on-line access to information and knowledge databases.

The Nostrum-DSS CA implemented a participatory strategy to ensure that the final outputs take into account stakeholders’ needs to produce tailored and accountable products. Links already established between the scientific institutions and the governmental and non-governmental organizations, small and medium enterprises and other stakeholders, during the project implementation should certainly play a central role in the dissemination of projects outcomes but will be hardly systematically maintained. Therefore, the project’s approach relegates to the Internet the function of repository of information and products. After project conclusion, summarized materials and meta-data will be made available for further adaptation, translation and diffusion at the local level through the web-site.

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