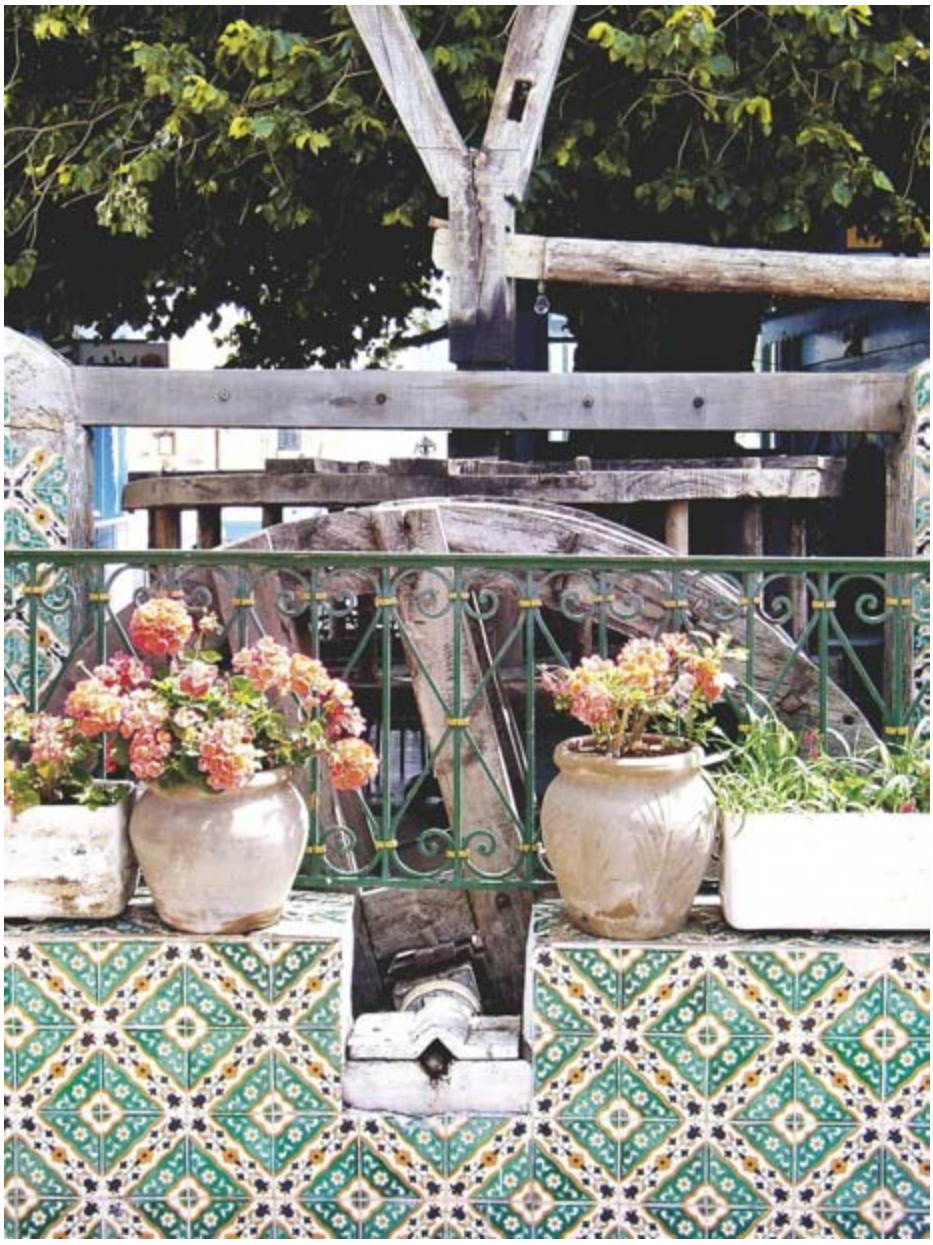
SUSTAINABLE WATER MANAGEMENT
2-2006
CONCEPTS TOWARDS A ZERO-OUTFLOW MUNICIPALITY
ZERO M

MEDA WATER PROGRAMME



Water is too valuable for us to declare it waste after having used it just once. Domestic sewage of one person contains all the nutrients necessary for the food production of that person. Therefore water has to be treated with respect and for reuse. That is what the MEDA Water programme is about, with a variety of approaches we want to present in this issue of Sustainable Water Management.

Whether it is better use of domestic water with demand management, source control, mobilisation of new resources, segregation of different fractions and proper treatment for reuse and pollution prevention, ...

... or whether it is a planning process really involving all stakeholders in order to satisfy the needs of the users and the society as a whole including its environment, ...

... or whether it is efficient management of irrigation water, where 80% of the water demand and the highest water savings potential lies, especially also during drought periods, all measures and innovations shall contribute to the MEDA Water goal to make more and better water available for all people.

AEE INTEC

This project is funded by the EUROPEAN UNION

EDITORIAL

This journal, **"Sustainable Water Management"**, is an initiative of the project "Sustainable Concepts towards a Zero Outflow Municipality (Zer0-M). The project is part of the Euro-Mediterranean Regional Programme For Local Water Management of the European Union (MEDA Water) and the countries bordering the Mediterranean Sea.

In the first two issues Zero-M aims and concepts have been presented by members of the project and by partners working at the same or complementary projects. The journal and the topics presented have had a very positive echo not only with the partners of Zero-M but beyond, in the MEDA Water programme.

This issue, therefore, is dedicated to all the partner projects in the MEDA Water programme. Each of the projects is presenting itself or particularly relevant activities and results. This hopefully leads to a good overview of the activities carried out in the MEDA Water programme. The projects all have their own approach, but all activities are aiming at increasing the sustainability of our handling of water, one of the key resources in the region. As parts of a programme the projects complement each other. Taken as a whole they represent quite a wide array of water related issues.

We hope that everyone finds interesting information for his own work and can make use of some of the matters presented. Hopefully the journal raises questions and leads to debate—there are quite some controversial subjects touched. We would be very glad to discuss these issues with you, at conferences organised within the programme—see the relative announcements in the journal and through our forum at www.zer0-m.org. You will find registration quite easy and it's open to everybody. Please raise any water issues there, which are interesting you. The more visitors, the more the discussion will be vivid.

If you look for a personal contact to somebody of the programme you should find a partner in your country as the projects are working in all MEDA countries. Find a list of the project homepages and of the information centre EMWIS/SEMIDE at the back of this journal. This should help you in locating the most appropriate contact for your purpose.

This journal aims at spreading the news about sustainable water management. If you find it interesting or useful we are happy about your feedback. In the case you have suggestions for improvements or topics you would like to see covered do not hesitate to contact me.

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ZERO-M APPROACH TO WATER AND WASTEWATER

By MARTIN REGELSBERGER*

Sustainable concepts towards a zero outflow municipality (Zer0-M) is a project financed by the MEDA programme of the European Union (EU). It started in September 2003 and will last for four years. Zer0-M is working in Egypt, Morocco, Turkey and Tunisia. Whereas two previous issues of this journal have mainly dealt with Zer0-M related topics only a short overview shall be given here.

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Zer0-M aims at concepts and technologies to achieve optimised, if possible close-loop, usage of all water flows in small municipalities or settlements (e. g. tourism facilities)—the Zero Outflow Municipality. The near or complete close-loop is considered one key to sustainable management of water.

FROM A DISPOSAL PROBLEM TO AN ASSET

The main idea in Zer0-M is to integrate water supply, wastewater treatment and reuse. Actually it is about abandoning the concept of "waste" water. Because on one hand there is no water to waste, and on the other disposal is a poor concept, which so far has proved very unsafe. From a disposal problem we shift to an asset, which has to be developed. We have to face the fact that in dry climates with a high pressure on water resources wastewater is reused anyhow if possible, whether it is allowed respectively treated to the necessary quality or not. Treatment normally only considers a narrow set of parameters, their negative impact having already been detected, whereas a wide range of other pollutants is released unattended. In the closed system of the globe there is always somebody on the receiving end. Some have thus replaced the term of disposal by unplanned reuse, as opposed to planned reuse, which Zer0-M is advocating together with other organisations working at the Ecosan concept. The far end of the process would be to design substance flow cycles which allow upcycling of water and nutrients, instead of downcycling the water until it cannot be further used.

USE OF WATER

In practice this paradigm change involves combining traditional, conventional and a new set of techniques and being flexible on the scale, i.e. combine solutions from a very local, small scale, so called decentralised systems, up to a very large scale or centralised systems, if they present an advantage. Systems shall be developed that minimise freshwater consumption but make best-quality freshwater available for high-grade use, e. g. for drinking. The first question to be asked when endeavouring to safe water is: What uses do we need water for? Thus we can possibly substitute techniques presently consuming water with others not needing any water at all. A classical example is replacing flushing toilets with modern composting toilets. On the other hand wastewater shall be treated specifically for the planned purpose of reuse. All resources that are found in the wastewater, namely water and nutrients, shall be reused. In order to best achieve this goal, it could be advantageous to collect different fractions of wastewater separately, something which is undisputed in solid waste collection. The aim is to introduce "low tech-high concept" solutions developed for small communities because planning, even if complex, is a lot less expensive than construction or operation.

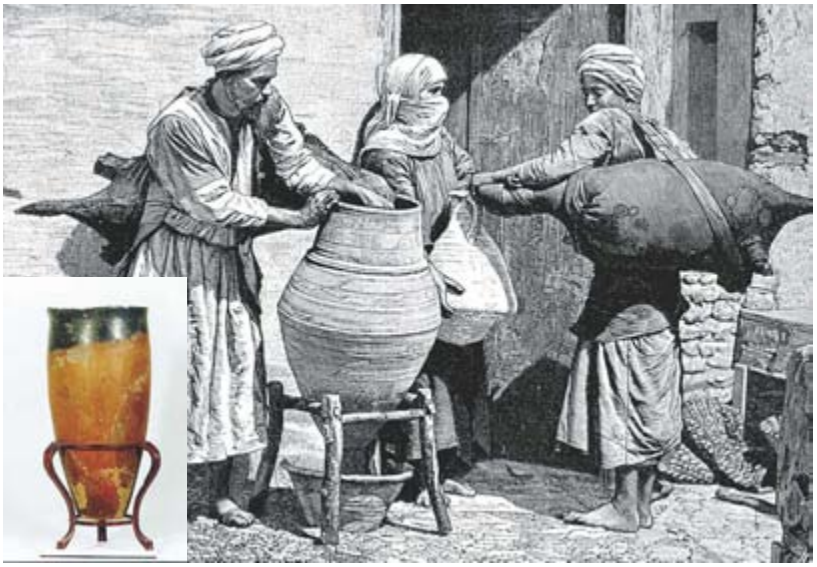

Fig. 1*:
AN UNBROKEN LINE OF A WATER STORAGE DEVICE IN THE NILE DELTA, A JAR COOLING WATER THROUGH SLOW EVAPORATION, 4000 AND 150 YEARS AGO AND NOW
(see cover picture of this article)

TRADITIONAL, CONVENTIONAL AND NEW TECHNIQUES

Zer0-M tries to transpose such techniques, which have been developed in countries like Germany, Sweden, Austria or Italy to the situation of the Southern and Eastern rim of the Mediterranean Sea, especially for rural and peri-urban applications. This involves adapting the existing techniques to the new conditions, e.g. drier and hotter climate, lower income but available work force. It also means development of new techniques, particularly adapted to the climatic and socio-cultural as well as economic situation of the countries and the target population. Most of all the local traditions, a century if not millenary old way of dealing with water, which in most of the area have been all but erased by "modernisation", have to be checked for their applicability in modern day life and if found appropriate, should be revived, not least as a strong link to a sustainable handling of water for the local population. Examples of such techniques are rainwater harvesting, dry toilets, water storage systems, xerogardening or complex irrigation schemes.

To this purpose Zer0-M is presently building demonstration centres in the four MEDA partner countries where a wide variety of techniques are installed for trial, demonstration and further development. Pilot plants are presently under design and will be realised in Egypt, Morocco and Tunisia, whereas the demonstration centre in Turkey is large enough to serve as a pilot plant itself.

The Zer0-M approach very well combines with or is complementary to the work of other projects of the MEDA Water program, e.g. Empowers. Whereas Empowers develops a way to optimise planning and implementation of water systems by involving all stakeholders, Zer0-M tries to work at solutions, which are optimised for the MEDA area. They can best be designed and implemented with the improved planning approach of Empowers. MEDAWARE has developed a system to design or rehabilitate conventional wastewater treatment plants in order to guarantee an effluent quality suitable for reuse. Thus the programme as a whole is covering a very wide range of the necessary spectrum of tasks. If something is still left open a next programme phase should deal with it.

Fig. 2:
A NEWLY INTRODUCED ELECTRIC WATER COOLER OUT OF OPERATION (NILE DELTA)

DISSEMINATION ACTIVITIES

In order to spread the results of the project and the idea in general Zer0-M uses several dissemination techniques, e.g. the project publishes a journal, organises conferences and seminars and writes textbooks and leaflets about the different topics. A further tool, meant especially for decision makers and end users, should be a DVD comprising a video about water in the countries involved, showing the existing situation and possible improvements for problems which the video should have identified.

Find more about Zer0-M at
www.zer0-m.org

*) Source of the greyscale picture:
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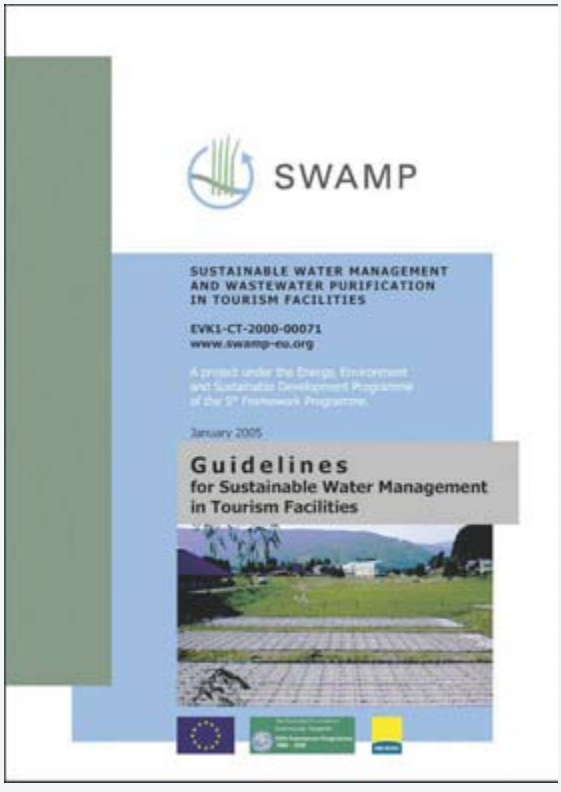
GUIDELINES FOR SUSTAINABLE WATER MANAGEMENT IN TOURISM FACILITIES

These guidelines are the joint result and work of the SWAMP project team (Sustainable Water Management and Wastewater Purification in Tourism Facilities). They include the experiences collected at the SWAMP demonstration sites and knowledge of all the project partners. The intention is to promote an integrated approach to water supply and wastewater treatment, targeted towards reuse of water and nutrients, in tourism facilities at remote locations. The guidelines describe the suggested sanitary techniques and give advise about best solutions, layout and operation. A decision tree helps to select the best choice of a scheme for a given situation.

These guidelines should help owners of tourism facilities to decide in favour of a sustainable water use and give engineers and technicians the know-how they may need in order to implement the most advantageous solutions.

SWAMP is a demonstration project under the 5th Framework Program. You find more about the project under www.swamp-eu.org.

The book can be purchased at www.aee.at/shop/shop_content.php?buch=154, for € 29,80 + pp, an electronic version can be downloaded here: www.swamp-eu.org/ENGLISH/news/index.php4



◀ A PHOTOVOLTAIC ARRAY FOR POWERING REVERSE OSMOSIS DESALINATION SYSTEM

ADIRA–AUTONOMOUS DESALINATION SYSTEM CONCEPTS

FOR SEAWATER AND BRACKISH WATER IN RURAL AREAS WITH RENEWABLE ENERGIES–POTENTIALS, TECHNOLOGIES, FIELD EXPERIENCE, SOCIO-TECHNICAL AND SOCIO-ECONOMIC IMPACTS

By ESSAM SH. MOHAMED, D. MANOLAKOS, and G. PAPADAKIS*

The sharp increase in water demand in the Middle East and Northern African (MENA) countries meets unfavourably with the arid climate that is expected to become even more water-scarce in the future due to the global climate change.

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The water increase results from growing population figures and from enhanced water demand per capita by the development of irrigation-intense agriculture and the implementation of higher living standards. Already today the gap between natural water sources and water demand leads to a severe overexploitation that is having a detrimental effect on the remaining resources and threatening the economic prosperity and social stability of the region in the near future. The signs of approaching water crises are obvious everywhere. From the Dead Sea water surface lowering by 60 cm each year, to the overexploitation of the Tunisian groundwater aquifers by 150% and the dramatic decline of groundwater by contamination and sea water intrusion – it is obvious that the current setting for the water supply has to be reformed drastically to make life liveable in this region in the future.

Desalination is generally seen as a major tool to solve the current water crises in the MENA countries and create a sustainable water management. It is obvious that the water supply in this region has to largely exploit the unconventional water sources particularly brackish water and sea water, since those water sources are abandoned almost everywhere in the MENA countries.

Water desalination is a very energy-intense process particularly in decentralised units. Devices with a water supply of 10 - 15 m^3/day consume up to 20 kWh/m^3 [1]. The decentralised energy generation should be based on the renewable energy sources in the region, such as solar radiation, wind or biomass (RES based desalination). The supply of water by means of unconventional resources presents completely new challenges for the technical, social, organisational, economic and political framework conditions.

This paper presents an overview of the ADIRA project, that aims at the investigation and installation of optimum systems for fresh water supply in rural areas derived from salty water (sea water and brackish water). Units powered by autonomous, renewable energy supply systems with a fresh water output in the range of 0.1 - 10 m^3/day are the focus of this project. The major outcome will be master plans for the countries of Morocco, Egypt, Jordan and Turkey for a fresh water supply from autonomous desalination systems. The master plan will identify the regions where this technology is applicable and it will describe in detail the technical, social and socio-economic issues which need to be taken into consideration. A detailed actor analysis including an analysis of the financing sector will be performed for these countries as well. It is not intended to develop new desalination technologies but to adapt existing concepts from various suppliers for use with renewable energies.

PROJECT OBJECTIVES

The ADIRA project covers the development of solutions for the problem of managing scarce regional water resources. The development and implementation of small-scale, stand-alone desalination systems powered by renewable energy will contribute to solving these problems. Water desalination is one of the most important factors to help development in remote areas and in the desert [2].

ADIRA, therefore, aims to develop suitable concepts for providing fresh water supply in rural areas using salty water as a source. The project focuses on the installation of units powered by autonomous, renewable energy supply systems with fresh water output in the range of 100 L/day to 10 m³/day, see Fig. 1. Instead of developing new desalination technologies, existing concepts from various suppliers are adapted for the use with renewable energies. Various different field installations in the countries involved (Morocco, Egypt, Jordan, and Turkey) are planned. The experience and knowledge gained from the intensive monitoring of the implemented technologies and from the detailed evaluation of the potentials of the regions and countries allow that small scale desalination technology becomes a reliable solution for water provision in reality and not only as a demonstration installation.

The project follows an interdisciplinary and socio-technical approach, taking into account not just technical, but also legal, social, economic and organisational issues. This integrated, multidisciplinary and cross-boundary approach will improve the sustainability of water management projects. The methods used and the results gained will have an impact on all other countries with similar problems. In order to reach the project objectives, ADIRA is pursuing the following six lines of action (work packages, WP):

1. Identification and quantification of regions
2. Information on desalination systems available on the market
3. Planning, implementation and monitoring of pilot installations
4. Analysis of stakeholders and master plans
5. Preparation of handbook, database and decision-support tool (DST)
6. Dissemination and awareness raising

These can be adapted to any other country by stakeholders who plan to realise similar projects.

IDENTIFICATION AND QUANTIFICATION OF REGIONS, WP1

With limited resources, it is generally not possible to carry out the project for all the regions of a country. Therefore, it is important to obtain an overview of the regions in the countries before selecting the target area. A geographical analysis of demand is thus essential to select the most suitable region or village for the project. A good approach consists of mapping some particularly interesting, basic indicators as a first step.

Fig. 1: **SMALL REVERSE OSMOSIS DESALINATION UNIT 2.2 m³/DAY**

Areas that reflect the highest potential for ADS (Autonomous Desalination Systems) are identified in each country and then described in more detail according to specific pre-selected criteria (water, energy, infrastructure, socio-economics, environment, geographical location and others). At the same time, ten or a maximum of twelve suitable sites will be selected and described for the actual implementation of ADS within the ADIRA project.

The data collection process was carried out using a detailed and sophisticated data collection tool that was developed within WP5 of the project, see Fig. 2. It was used during field work [3] and was filled out by people who are familiar with the local situation. The data collected was then entered into a database. Reports from the countries involved were prepared and conclusions extracted. For regions in Egypt, Morocco, Turkey and Jordan, both the questionnaires and the results where made available to interested stakeholders.

Both the data collection tool and the database are already available providing a very useful tool for the identification and quantification of the targeted regions and sites. The deliverables of these objectives have been already prepared.

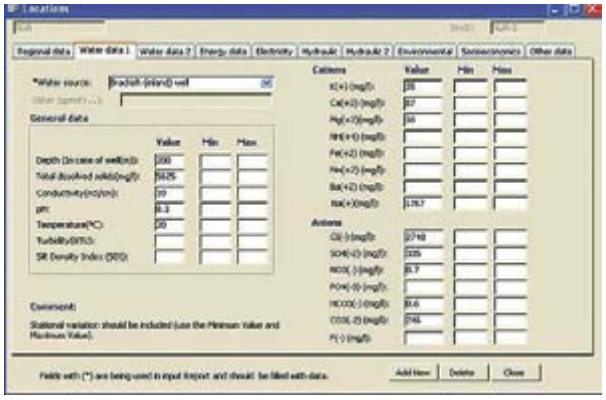


Fig. 2: THE DATA BASE SELECTION TOOL

INFORMATION ON DESALINATION SYSTEMS AVAILABLE ON THE MARKET, WP2

To provide persons or organisations (e.g. private users, water supplier, ministries) with a detailed summary of the current small scale desalination situation, an intensive survey of the market and the research area will be carried out.

One part of this survey will be a study of the technical equipment for decentralised autonomous desalination systems, focusing on the European and MENA markets. The following desalination technologies for supply will be included: MED (multi-effect distillation), MSF (multi-stage flash), MVC/TVC (mechanical and thermal vapour compression), solar stills, reverse osmosis (RO) and electrodialysis (ED). The data selected, available in a database, will give persons involved in implementation projects an overview of the important suppliers. Furthermore, it provides them with the data to easily contact the equipment suppliers identified.

As well as collecting information about equipment suppliers, information about desalination experts in Europe and MENA countries will also be collected. This data is available in the database, see Fig. 3, mentioned above in a more detailed database described later in this paper. The field of experts includes universities, research institutions, water suppliers and engineering companies. They are described with their scientific/technological field of interest, specific expertise in desalination, and type of services offered, geographical areas of activities and a short description of the work/projects in which they are involved in ADS.

Furthermore a summary of energy supply systems available on the market and appropriate for ADS will be prepared. These will include PV (see cover picture of this article), solar thermal, wind, geothermal, biomass and hybrid systems.

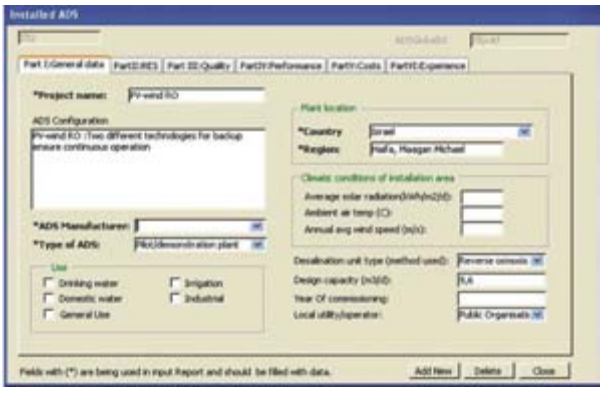


Fig. 3: DATA BASE OF INSTALLED

PLANNING AND IMPLEMENTATION MONITORING OF PILOT INSTALLATIONS, WP3

To verify the technical viability, socio-technical and socio-economic concerns of the elaborated systems and concepts, ten or a maximum of twelve pilot plants will be installed. As a first step, suitable installation sites are to be selected in which two main aspects are to be considered:

1. The sites must exhibit the necessary requirements for ADS identified within the scope of ADIRA. This includes not only the technical but also economic, social and environmental criteria.
2. The conditions of the selected sites should vary in order that as many different types of ADS as possible are installed. The following technologies for desalination/energy supply combinations are to be considered: RO/PV, RO/hybrid, NF/PV, RED/hybrid, solar stills, multi-effect solar stills, and membrane distillation.

Through social, economic and technical feasibility studies the regions identified in a previous step of the project are to be examined whereupon the suitable sites and the adapted desalination technologies will be selected.

As a result of further field studies, the social and socio-economic factors of each installation site will be analyzed in detail. The data gained from these extensive field studies will serve as the necessary prerequisites to develop an implementation concept. The concept will include: the adaptation of the ADS with regard to the users needs and social conditions, contribution abilities, infrastructure and organisational issues such as economic scenarios, implementing time schedule etc.

Special emphasis will be placed on a strategy to guarantee continued operation and maintenance as well as on the follow-up of the ADS units after the end of the project.

MONITORING

In addition to the implementation concept described above, a monitoring concept will be elaborated. The concept describes a list of data to be monitored, the data acquisition methodology as well as the communication infrastructure.

The maintenance and operation of the pilot installations involve different local actors such as users, maintenance companies, operation staff and spare part suppliers. In order to manifest a functional working relationship, specific contracts are essential. Since the number and content of the contracts depends on the relevant actors, a basic draft will first be drawn up. In the course of the project, this will be enhanced with increasing experience. After signing these contracts, the pilot installation will start. The pre-assigned imple-

mentation concept will be executed in this part. By setting up the maintenance and operation infrastructures in a first step, the base for an installation will be established. In a second step, the necessary training activities for water users, O&M and management staff as well as for service companies will be carried out. The actual installation and operation of the ADS units consists of two parts: (1) the necessary work before starting up including installation, commissioning, start-up and tuning and (2) system start up including O&M activities.

The planning, implementation and running of the pilot installations will be evaluated during the whole time of the project. During this period the social, technical and economic feasibility will be monitored. As a result, a detailed report on all technical, social and socio-economic concerns about the implementation, installation and operation of autonomous desalination plants will be created. The lessons learned will be integrated in a handbook and used as a decision support tool for planners, designers and operators of such systems.

ANALYSIS OF STAKEHOLDERS, WP4

Any individuals, groups, institutions or companies that are connected with the project are defined as actors or stakeholders. In order to maximise the social and institutional benefits of a project and to minimise its negative impacts, a stakeholder analysis identifies those likely to be affected (either positively or negatively) by the project and how they are affected. It is important that a stakeholder analysis takes place at an early stage during the identification and appraisal phase of a project.

The major aims are an analysis of the main actors, possible investors and the political framework in order to identify potentials and barriers and to promote the implementation of decentralised desalination units. In a first step, possible ADS operators have to be identified. They are defined as a person or entity which purchases an ADS plant, operates it and profits economically from the fresh water produced. A report on the stakeholders and their capacities in the target countries gives insight into the given situation in a country and helps identify whom to involve in future projects. Special emphasis is put on identifying the necessary economic and political framework. The technical, social and socio-economic concerns are identified and elaborated from the pilot installations realised in the ADIRA project. The most relevant socio-economic framework conditions for ADS implementation in all target regions are identified and evaluated. The conclusions will then focus on the market potential of ADS implementation of different ADS operators under the current framework conditions.

MASTER PLANS

The major outcome of this task will be detailed knowledge of the major actors, investors and their capacities. At the same time strategies for fostering ADS will be formulated and master plans will be set up for the countries involved. These master plans will address the legislative framework, the institutional set-up, the water pricing schemes, capacity building and awareness raising issues, the mobilisation of financial resources and the stakeholders involved. The master plans will pay attention to the particular interests and requirements of ADS operators. The formulation of an implementation and management plan at the business and user level will assist stakeholders with future applications.

WORK PACKAGE 5

Planning and realising an autonomous desalination system in remote rural areas is an ambitious task and must be adapted to geographic, economic and social conditions. In order to guarantee the sustainable operation of the system, it is necessary to gain information and knowledge about the technologies and the installation sites and to train the future users, operators, installers and project managers. Special emphasis must therefore be placed on the preparation and provision of quality information and training materials for all involved stakeholders. A major outcome of this action will be the development of supporting tools for the entities directly involved in the planning, designing, implementation and operation of autonomous desalination units in the field.

Practical assistance for this will be provided through different tools such as a handbook, a database system and a Decision Support Tool (DST):

THE HANDBOOK

The handbook for training and reference is addressed at researchers, analysts, planners, designers, installers and operators of ADS. It will assist and describe in detail the phases of *planning* and *implementing* as well as *operating* ADS on the basis of technical and economic issues. The experiences gained within the ADIRA project are summarised. It will be used for raising awareness, training and for practical purposes. The handbook should not only contain a theoretical description of ADS and RES, but also many examples and "how to do" sections in order to be of value and help for all those who are involved in the investigation and implementation of such systems. The handbook will be available both in a paper and an electronic version.

THE DATABASE SYSTEM

A database system incorporating the experiences, data and findings of the ADIRA project will be set up. It is an assisting tool with information that can be easily accessed by people through user-friendly screens.

The database will hold information on all topics necessary for planning and will incorporate numer-

ous links to related sources in the internet, such as ADS suppliers, institutions, associations, competitors, literature, magazines, etc. It will be possible to access the database information through the ADIRA web site.

DECISION SUPPORT TOOL

In addition, a decision support tool (DST) is under development (Desalination ++), see Fig. 4, to accompany the handbook. This will help to identify the most adequate solution under a given framework and site specific conditions. The DST will incorporate the methodology and application software for selecting any candidate, location, size and type of ADS and the associated renewable energy supply system (RES) that will support it. It will also include software (for both training and practical purposes). This software is based on economic theory and methodology for cost analysis and investment appraisal, necessary for planning the installation.

The DST will consist of the following two parts:

a) A Decision Support System that will lead the analyst through the necessary steps in order to select the best pair(s) of ADS and corresponding RES for the location under examination. This may include the best size of both systems for the given water demand in the region.

b) A Toolbox of Decision Support software will be developed in the form of individually packaged detailed economic tools. They will be for accounting and investment appraisal and are an inseparable part of any feasibility study or business plan.

All the tools described above are meant to be supporting tools for planning, installing and operating ADS systems successfully.

DISSEMINATION AND AWARENESS RAISING, WP6

Although several R&D projects on desalination and renewable energies have been realised, compiled market information is still lacking. Documentation on financial conditions and the business track record as well as on the technical characteristics and system quality are either missing or withheld.

The main goal of the dissemination activities is to increase the knowledge about ADS among relevant stakeholders: to inform a wide audience about the experiences, potentials and barriers for implementing ADS; and to offer tools and strategies to analyse a given situation pertaining to certain countries and regions. Therefore, the results of the ADIRA project should address a wide audience.

The planned dissemination strategies are intended to convince different target groups that ADS can successfully contribute to solving existing water problems in certain areas in this world. This involves more than conventional product and service information. It is an attempt to inform, persuade, influence and motivate. It is also an effort to gain acceptance for new technologies and to win over certain groups for implementing it.

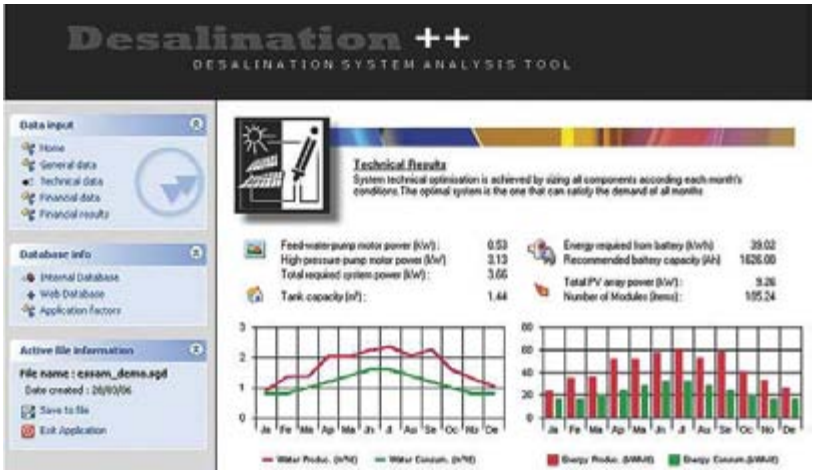
It is planned to utilise advanced communication technologies and marketing skills to generate discussions and promote information. The presentation of benefits, perceived or real consequences and barriers and the positive and negative influences of ADS are to be transmitted. By publishing experiences and lessons learned, future mistakes may be prevented. Different target groups will be addressed.

DISSEMINATION STRATEGIES

The different strategies and approaches for the dissemination of the project results will be used. The best method to get the message across to the target audience must be determined. For example, their media habits, living environment and the events they tend to attend give insight here. One can also make use of formal and informal networks and it is always good to choose a mix of communication methods and channels (e.g. face to face, group, mass media, community activities and mobilisation, conferences, workshops, the internet etc.) as well as influential people. After selecting certain channels, it is important to identify and develop materials such as publications, booklets, posters, brochures, etc. and to test if they really convey the message. The following questions should be asked: What is the message? Is it getting attention? Is it clearly formulated? Is it relevant? Is it persuasive? Is it credible? Is it generating the desired behaviours and actions?

This description indicates clearly that this dissemination strategy involves more than general promotional activities. The ADIRA team will have to adjust their results, experiences and materials to make it easier for the target audience to understand and finally choose and accept the promoted technologies. And the team will have to "go where the traffic is", because it is easier to go to our audience than have the audience come to us.

Fig. 4:
DST FOR SIZING A PHOTOVOLTAIC REVERSE OSMOSIS SYSTEM



PROJECT OUTCOME

The major outcomes of this project will be the implementation of a large variety of different small-scale autonomous desalination (ADS) technologies powered by renewable energy with an integral approach. The following information will be available for each location in the survey areas:

- Optimum desalination technology (or combination of technologies)
- Energy supply concept for the desalination unit and, if appropriate, taking the energy supply of households into account
- Economic operation scheme (utility concept, operated by the residents, ...)
- Necessary actions for sustainable social integration and development in small communities
- Necessary actions for raising awareness of the existing technologies among the end users of water
- Necessary measures to build up an operation and maintenance infrastructure
- Necessary measures to build up the infrastructure for small desalination units, the design, selection, local participation in manufacturing, installation and staff training
- Proposal to the national and regional government on how to support the rural water supply infrastructure.

CONCLUSIONS

In order to gain a wide and profound knowledge of small-scale desalination units powered by renewable energies under real working conditions, it is essential to move out of the laboratories and to study the real projects in the field. All the crucial and important steps: the identification of suitable regions and sites, the preparation of the project design, the implementation and operation of the systems, the setting up of socio-technical monitoring and evaluation systems, and the necessary adaptations in the field must be performed. The summarised experiences gained at the local level, the conclusions and the lessons learned, the preferred frameworks at the national level, the formulated master plans and the developed methodologies will all be helpful to all countries and regions that depend on sea water or brackish water desalination to overcome water shortage problems in rural areas with ADS.

ACKNOWLEDGEMENT

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This document has been produced with the financial assistance of the European Community. The views expressed herein are those of the authors and can therefore in no way be taken to reflect the official opinion of the European Commission.

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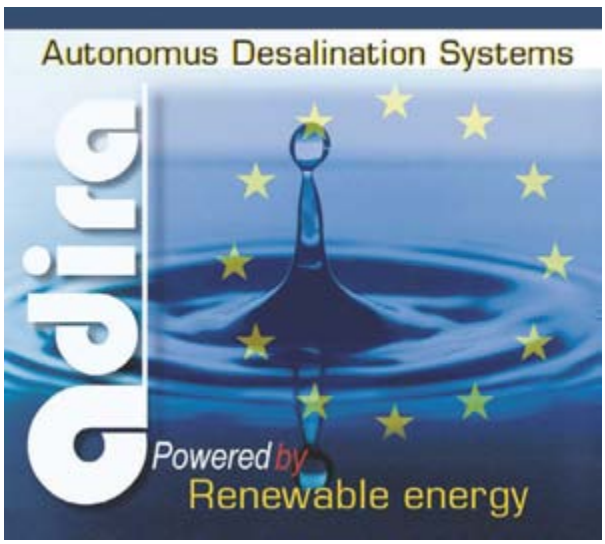

EMPOWERS BRINGING CHANGE

By MONA BARGHOUT*

The Euro-Mediterranean Regional Program for Local Water Management (EMPOWERS Partnership), is funded by the EC's MEDA Water Program and CARE International, and is implemented and facilitated in Egypt, Jordan and Palestine through a regional partnership of 15 different national and international partners [Box 1].

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EMPOWERS Partnership is developing practical participatory methodologies—with related tools and guidelines—that influence bottom up planning, and that lead to improved local water governance. These will focus on their practical application at the local level (that is governance at levels ranging from the community to district/governorate).

The principle long-term goal of EMPOWERS is to improve the development and management of water resources at the intermediate and local level by promoting increased participation and representation of stakeholders in planning and decision-making processes. EMPOWERS expects that its innovative participatory planning and stakeholder processes—actively involving end-users in local communities—will contribute to improved long-term access and rights to water by marginalized groups in the communities, as it works on building capacities and raising awareness to enhance the communities' negotiation and claim making power. While working at the same time, on creating an enabling environment that allows for the participation of the different stakeholders including the marginalized, to have collective acts (concerted actions) and make better decisions pertaining to water management.

EMPOWERS has also adopted the regional role of disseminating information via a website (www.empowers.info) and documenting its field experiences

BOX 1: EMPOWERS FACILITATING PARTNERS

In Jordan:
- Ministry of Agriculture, Dept. of Water
- Queen Zein Al-Sharaf Institute for Development (ZENID)
- CARE International—Jordan

In Palestine:
- Palestinian Hydrology Group (PHG)
- Union of Agricultural Work Committees (UAWC)
- CARE International—West Bank/Gaza

In Egypt:
- Development Research and Technological Planning Centre, at Cairo University (DRTPC)
- NWRC, National Water Research Center of the Ministry of Water Resources and Irrigation
- EWP, Egyptian Water Partnership
- Federation for Environment Protection and Improvement in Beni-Suef
- CARE International—Egypt

Regionally:
- International Water and Sanitation Center (IRC), in Delft, the Netherlands
- Inter-Islamic Network for Water Resource Development and Management (INWRDAM), Amman Jordan
- CARE International (UK, NL)

and lessons learnt on local water governance in working papers, guidelines, and tool kits. EMPOWERS will organize and participate in regional activities such as workshops, conferences and cross visits to further disseminate and exchange knowledge gained from the field. This four-year EC funded project is expected to end in April 2007.

EMPOWERS APPROACHES

Similar to what is taking place in other parts of the world, there are trends at national levels in Egypt, Jordan and Palestine to move towards IWRM planning and policy shifts towards decentralisation. Nevertheless, all these countries still face the fragmentation of responsibilities among many players and lack stakeholder involvement. Centralized management persists, leaving intermediate level government staff and end-users confronted with top-down implementation of instructions, little autonomy, intermittent communication, and an overemphasis on troubleshooting and complaint management. Furthermore, if water management is to be decentralized, the capacities for interaction, and tools to facilitate the processes (e.g., planning and end-user involvement) are lacking at intermediate (Governorate/District) and local levels. While on the stakeholder front, it is found that the rights and specific needs for drinking and irrigation water of marginalised groups in communities are largely ignored. Conversely, with the weak—if not absent—civil society, any attempt to involve end-users/community members in decision making processes would be a challenge in itself. This absence is felt more when women and marginalized groups in a community are considered.

With the above problems in mind, and the assumption that stakeholder involvement—particularly at intermediate and local levels—leads to more equitable, efficient, and sustainable water resources management, EMPOWERS has been strongly advocating, developing and testing since late 2003 a participatory water planning cycle for improved IWRM; a cycle that is firmly embedded in a Stakeholder Dialogue and Concerted Action approach (SDCA).

EMPOWERS PARTICIPATORY PLANNING CYCLE (PWPC) [1]

Planning cycles are increasingly being used in the implementation of programmes of IWRM. The EMPOWERS planning cycle, in common with other planning cycles, emphasises the need for decision-making that is based on good quality information and the active involvement of stakeholders or their representatives.

ITERATIVE APPLICATION WITH SUB-STEPS

The EMPOWERS cycle is designed to be used with both community (end-user) and district/governorate level staff, as well as other stakeholders, facilitators and/or the implementers of projects or programmes. The cycle expressly makes room for reflection on lessons learned as the basis for further work—supporting an adaptive and learning based approach. It also ensures that decision-making is both structured and based on a clear and logical sequence of steps.

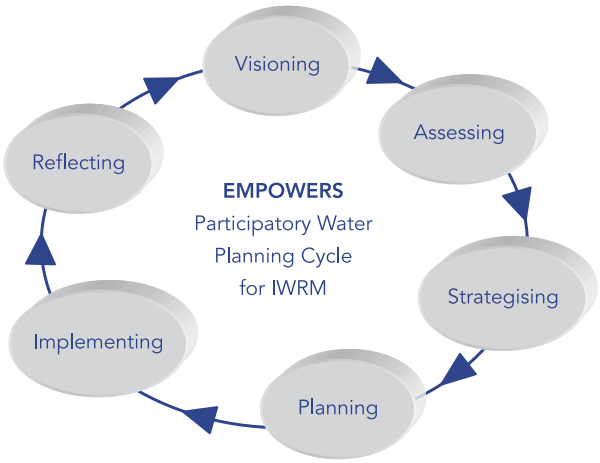
Fig. 1: **WOMEN MAKE THEIR VOICES HEARD, BENISUEF, EGYPT**

The EMPOWERS cycle (PWPC) consists of six principal steps (Fig. 3). Each step is further divided into substeps (Fig. 4) that include a series of activities and related tools and outputs. Several participatory and right-based tools have been developed or adapted to support the processes taking place within each step. The application of the PWPC is designed to be iterative in practice, with repetition of the steps more than once within the process.

The first four steps of the cycle are designed to guide a process of problem analysis and medium to long-term visioning, in turn leading to the development of strategies based on a thorough assessment of key trends and scenarios. Based on these strategies it then guides the development and implementation of concrete plans/interventions that will help to achieve the vision.

Fig. 2: **REPRESENTATIVES FROM UM AYYASH VILLAGE WORK ON DEVELOPING THEIR WATER RELATED PROBLEM TREE**

Fig. 3:
THE SIX PRINCIPAL STEPS OF EMPOWERS PWPC



MAIN OUTPUTS OF THE PLANNING PROCESS

In addition to village or governorate plans and activities based on a shared and agreed upon water resource and water service visions; and on strategies for achieving those visions, the process at village or governorate level leads typically to a number of outputs including:

- Improved understanding of water related issues
- Improved communication and understanding: horizontally between sectors and user-groups; and vertically between actors at different levels
- Actions or interventions that are better aligned to the needs and aspirations of stakeholders

Information on the PWPC, its sub-steps, and related tools are detailed in EMPOWERS Working papers series (papers 3, 4 and 5), and are available online for download [1].

IMPLEMENTING THE CYCLE AND FACILITATION

Implementing the cycle, in practice, calls for a flexible process supported by strong facilitation to create an enabling environment that makes possible the effective involvement of all relevant stakeholders—particularly the poor and marginalized—in the different phases/processes within the PWPC. There is much iteration between steps as problems are identified, initially in broad-brush terms, and then in increasing detail. Therefore, work at the village level requires constant consultation with the district/governorate, while work at governorate level calls for improved collaboration between different actors—particularly within government—and input from village level realities. Many obstacles exist in terms of capacity and resistance to change. Nevertheless, the experience of the EMPOWERS project has been largely positive, with actors at all levels finding themselves empowered through interaction with each other. In EMPOWERS, the role of the facilitator is taken up by the project's country field teams in each of the three countries (Box 1).

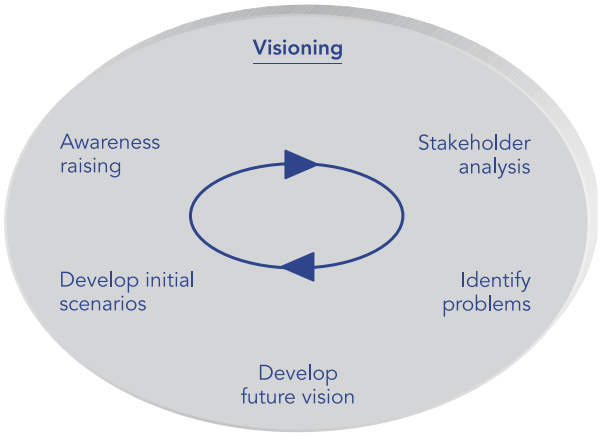


Fig. 4:
SUB-STEPS OF THE FIRST PRINCIPAL STEP–VISIONING

STAKEHOLDER DIALOGUE AND CONCERTED ACTION (SDCA)

As previously mentioned, the activities for this planning cycle are firmly embedded in the SDCA approach[1]. SDCA is an active and facilitated approach to bring different actors to strategic consensus on how to work together on specific issues of shared concern [1]. By making explicit the different opinions, preoccupations, perceptions, assumptions, and judgments among the actors involved—SDCA identifies opportunities to improve the exchange of information, social organization, and decision-making between stakeholders in order to create the proper conditions for innovations. SDCA enhances institutional and technological innovation through active networking, involving all the relevant actors including community members, governments, NGOs, academic institutions and the private sector. At the same time it contributes to creating awareness with respect to constraints and opportunities that affect the performance of the relevant actors.

Therefore, an important step in EMPOWERS operationalisation/implementation of the PWPC, is the establishment of stakeholder platforms for concerted action at three different levels (National, Governorate and Village level—Fig. 5). In each of the nine EMPOWERS pilot villages and in consultation with local government and NGO partners (Table 1) the village water platforms are used for capacity building and hands-on training for the involved community representatives as they go through the different steps of the Cycle, to formulate village-specific water development plans and a set of appropriate community actions (interventions). It is noteworthy that when EMPOWERS started out in the communities, it did not bring with it a set of predetermined interventions to be implemented in the target villages. But the decision to which water-related problem the community was to address first was a result of the deliberations taking place within the platforms. Therefore we find the interventions selected for implementation varied from ad-

1) A summary table that shows the linkages between the EMPOWERS PWPC and SDCA is available online in at http://www.empowers.info/page/2197

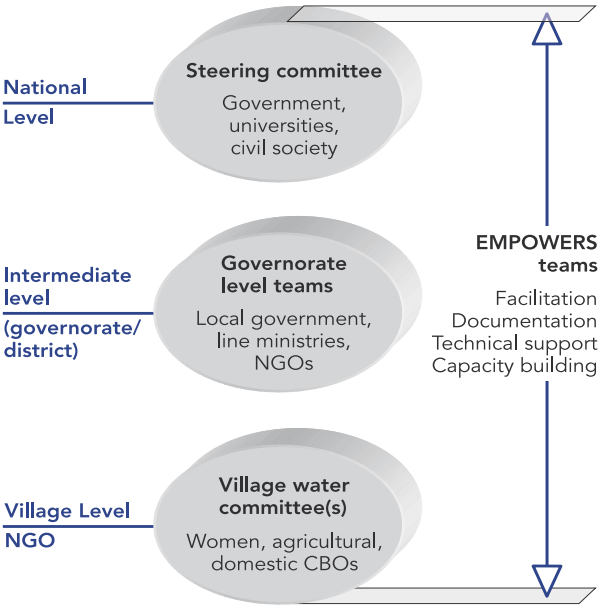


Fig. 5:
STAKEHOLDER PLATFORMS AND THE ROLE OF EMPOWERS AS A FACILITATOR

dressing problems related to drinking water, agricultural water and/or sanitation.

Furthermore, these village platforms are essential for the sustainability and follow up of the interventions implemented in their community [2 and 3]. Establishing these platforms at the different levels is also important in promoting bottom up planning, and ensuring that local activities are informed by and are related to national policies. Additionally, these platforms will become essential in the long-term hosting and scaling up of the participatory planning and information management approaches developed by EMPOWERS.

As a result of working with the village water platforms and local governorate staff, each target community currently has its own village water development plans including a shared vision, strategies, and a list of community water pilot projects that would best address their problems and lead to the realization of their vision. The village platforms worked twice through the planning cycle, each time culminating in the implementation of one or two of the proposed pilots. The first round of the cycle served to test and further develop EMPOWERS tools and approaches in the nine communities; and to build capacity, ownership, and commitment, and bring those involved towards a shared vision and a common understanding of IWRM and SDCA. The second round was used to refine the villages' strategies and plans, and to identify the second set of pilots to be implemented in their communities.

EXAMPLES FROM THE FIELD

After going over the different scenarios, strategies, and proposed interventions, representatives in Meithaloun's (Box 2) village water platforms decided on drilling an artificial recharge well to address the problems arising from the recurrent inundations of

Fig. 6:
A FACILITATED MEETING BETWEEN, VILLAGE REPRESENTATIVES AND LOCAL GOVERNMENT, BENISUEF, EGYPT

their agricultural land. Other interventions would have been deemed more appropriate (e.g., dam), if it were not for the problem fragmentation of land ownership, Furthermore, the well was considered as the most suitable solution since it will not only serve those living in Meithaloun, but also those in the other surrounding six villages. This pilot would also contribute to achieving Meithaloun's Vision (www.empowers.info/page/2121) in reclaiming land and increasing cultivated areas. In the process of securing funds for the implementation of this pilot (US $ 44,000), the community donated one dunum (1000 m²) of land for the construction of the well, and provided the labour for the site preparation.

Pilot Communities	Key Stakeholders in EMPOWERS: Government–National and Governorate / District levels (without direct partners mentioned in Box 1)
In Egypt **Beni Suef District** • El Masharqa • Manshe't Kassab	• Ministry of Water Resources and Irrigation • Ministry of Agriculture • Potable Water Authority in Beni Suef Governorate • Governorate of Beni Suef • Ministry of Environmental Affairs
In Jordan **Balqa Governorate** • Subaihi • Rwaiha • Um Ayyash	• Ministry of Water and Irrigation • Ministry of Agriculture • Ministry of Social Development • Ministry of Interior in Balqa Governorate • Ministry of Planning • Member of Parliament – Environment Committee
In Palestine **Jenin Governorate** • Qabatya • Meithaloun • Jalboun	• Palestinian Water Authority (PWA) • Ministry of Agriculture • Ministry of Local Government • Ministry of Environment

Table 1:
GOVERNMENTAL AND NGO PARTNERS IN EMPOWERS VILLAGES

Fig. 7:
MARJ SANOUR INUNDATED. JENIN PALESTINE

KASSAB VILLAGE (BOX 3)

When the 1st round of pilots addressed domestic water supply, in the 2nd round, the Kassab village platform selected several pilots to comprehensively address the rising water table and sanitation-related problems.

1) Construction of collective and/or household level septic tanks for those houses that don't have any (Estimated pilot costs US $ 100,000)
2) Making use of the tractor provided earlier by EMPOWERS, to provide regular dislodging of the septic tank and at lower rates (Est. costs US$ 25,000)
3) In parallel to the above, conduct an awareness raising campaign on water conservation

As a result of working for the past two years in the nine communities, encouraging experiences have been noted. Villages and towns have now improved access to water; once inactive community-based organizations are now better connected to their constituencies, more accountable to marginalized segments in their society, and are able to implement village water projects; and marginalized groups are now better aware and engaged within their community. They are also able to prioritize water problems, negotiate with government, propose water plans and implement them.

BOX 3:

Mainly a farming community, Kassab and its five satellite villages have a population size of 5850, and are located 23 km² southwest of Beni Suef City, Egypt.

Sanitation in Kassab is provided by septic tanks that are cleaned using tractor pumps. Septic tanks do not cover all houses, neither in the village nor in the satellites. The conventional trenches and household cesspits are more widespread, as they are more affordable. But with more houses getting connected to the water network, these trenches are causing environmental and health problems as leakage is raising the water table under their houses, harmfully impacting public health and assets. Furthermore, about 34% of the houses in Kassab do not have any form of sanitation system.

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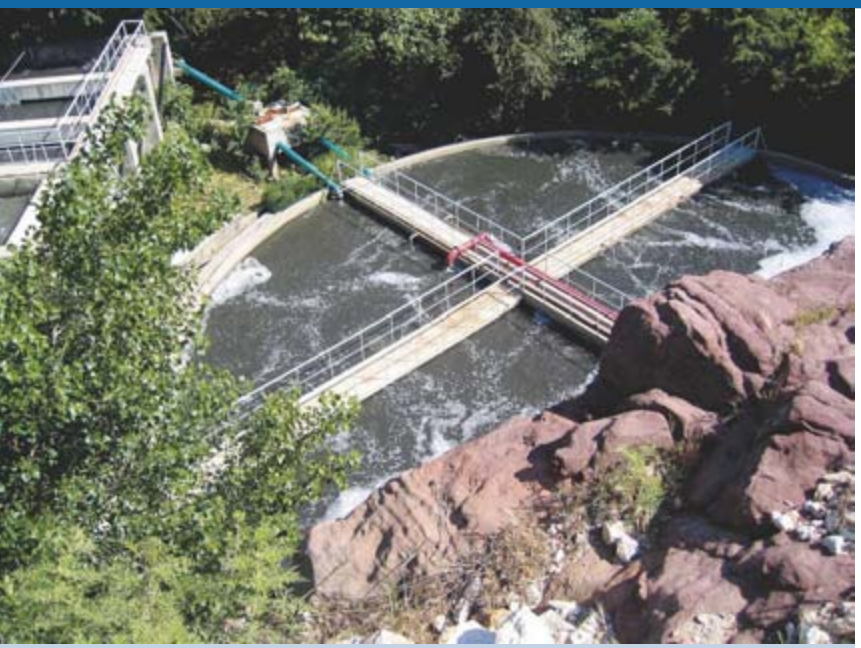
WP1. Overall Vision and Approach of EMPOWERS
WP3. The EMPOWERS Planning Cycle for IWRD& MWP4. Visions, Scenarios and Strategies for IWRD&M
WP6. Stakeholder Dialogue and Concerted Action
2) List of the community water projects implemented in 2005 (first round of pilot projects) Available at www.empowers.info/page/2200
3) The second round of pilots to be implemented in 2006. Community Water Projects for Sale. www.empowers.info/page/2084

BOX 2:

Meithaloun, 26 kilometers southwest of Jenin City, Palestine, is the center of the southern Jenin villages (total population ~25,000), and is bordered from its northern side by the plain of Marj Sanour; one of the most fertile areas within Jenin Governorate. More than two thirds of Marj Sanour is owned by Meithaloun inhabitants.

Only 20,000 dunums of Marj Sanour is cultivated mostly by rain-fed or irrigated vegetables, with one quarter of the area covered by tree orchards. Given its nature as a closed basin*, in certain years, Marj Sanour becomes inundated and forms a temporary lake. In the two years following a good rainy winter (e.g., 1991/1992) the inundation damaged 65% of the cultivated areas in the plain. In addition to limiting the agricultural activity, recurring inundations of Marj Sanour have caused a reduction in soil fertility due to leaching processes, and the spread of undesired grasses and insects. This in turn caused the extensive use of fertilizers and pesticides by farmers to counter soil infertility and the spread of undesired grass and insects.

*) The catchment area of Marj Sanour covers 60 km², with a sunken rectangular-shaped area, that extends over 20 km².



THE EMWATER PROJECT

By Dr. ISMAIL AL BAZ, ANDREAS BETHMANN, ANNIKA KRAMER, LUIGI PETTA, JULIKA POST and CLAUDIA WENDLAND*

In many MEDA countries, waste water is not always adequately treated, leading to the deterioration of the existing freshwater resources and the Mediterranean Sea. Different framework conditions in the countries call for different approaches to water and waste water management - but also allow for mutual learning. The EMWater partners aim to increase the awareness and exchange of experiences with regard to innovative solutions in the treatment and use of waste water treatment as well as to support the installation of new technologies. Experts from the field, decision-makers, interested citizens and civil organisations are involved, based on a sustainable approach to prevent water shortages and water deterioration in the Mediterranean region.

*) Dr. **Ismail Al Baz, Andreas Bethmann, Annika Kramer, Luigi Petta, Julika Post** and **Claudia Wendland** are project managers in the EMWater project from InWEnt, Adelphi Research, ENEA and Hamburg University of Technology (TUHH)

PROJECT GOAL

Improving the security and safety of the water supply in the Mediterranean countries is one of the most important factors for social, economic and political stability in the region and is, thus, the overall goal of the EMWater project. EMWater aims to contribute to this goal as a result of highlighting innovative solutions in waste water treatment and promoting the reuse of reclaimed water.

A more specific aim is to strengthen regional co-operation and capacities by creating networks among experts, encouraging cross-border knowledge transfer, implementing training programmes and developing draft regional policy guidelines for waste water treatment and reuse.

While the project, which started in 2003 and ends in 2007, is limited to 48 months, its measures are designed to create long-term, positive effects in the region. The primary result of the project will be an increase in the efficiency and effectiveness of waste water management, waste water treatment and reuse in the target countries of Turkey, Jordan, Lebanon and Palestine.

PARTNER'S NETWORK

The EMWater project consortium consists of four EU partners—InWEnt Capacity Building International [1], Germany, Hamburg University of Technology (TUHH) [2], Germany, Adelphi Research [3], Germany and the National Agency for New Technology, Energy & Environment (ENEA) [4], Italy—and five Mediterranean partners—YILDIZ Technical University [5], Turkey, University of Balamand [6] and Lebanese American University (LAU) [7], Lebanon, Al al Bayt University [8], Jordan and Birzeit University [9], Palestine.

All of the Mediterranean partners are established scientific institutions with experience in water-related issues. Their responsibilities include: the collection and evaluation of relevant data on water topics, dialogue with the local authorities and other stakeholders, and organising the implementation of planned measures and follow-up activities. The European partners assist the Mediterranean partner countries in all the steps of the implementation. Local and regional steering committees consisting of different stakeholder representatives advise the EMWater partners when it comes to project implementation.

COUNTRY STUDIES

As one of the first activities of EMWater, the current situation and future perspectives of the water and waste water sector in the target countries were assessed. The main findings can be summarized as follows:

While Jordan and Palestine are already seriously affected by water scarcity, Turkey and Lebanon are

Fig. 1:
NETWORKING OF THE PROJECT PARTNERS

likely to face water shortages within the next decades. It is not only the increasing demand but also the pollution of the water resources through the excessive use of fertilizers and the uncontrolled discharge of municipal sewage which are of great concern. While a considerable number of waste water treatment plants have been built (Jordan and Turkey) or are planned (Palestine and Lebanon), there are vast accumulated needs and the majority of the waste water is still inadequately managed and treated. In rural areas several decentralized, small-scale waste water treatment systems have been built in recent years. Most of them entail secondary treatment resulting in water that may be suitable for reuse. Such alternative water resources are needed, but reuse applications are still very limited (except for Jordan). Successful demonstration projects and public awareness programs are necessary to convince people of the benefits. To gain acceptance, effective treatment systems and quality standards are most important. Turkey and Jordan have adopted standards for wastewater treatment and reuse, but they are not fully enforced. Palestine and Lebanon are still waiting for the adoption of standards.

Fig. 2:
THE EMWATER PROJECT DEVELOPS GUIDELINES FOR WASTE WATER TREATMENT

EMWATER DRAFT POLICY GUIDELINES

In order to support political decision-making in waste water management and to assist in planning and implementing related projects in the MEDA region, the EMWater Project is developing draft guidelines for waste water treatment and reuse.

The main target group are officials at the municipal level, i.e. people who might not have a background in engineering or natural sciences. Therefore, the guidelines will not present detailed information on e.g. technological or biological aspects of waste water management. Rather, they intend to present the main criteria for decision making in a concise way—easy to understand and in a short form, using figures and tables as much as possible. The contents were selected based on a needs' survey conducted among stakeholders from the target countries. With the guidelines, decision-makers will be enabled to take into account all the relevant framework conditions, to consider all the relevant costs in respective projects, and to perform a preselection of appropriate technologies for waste water treatment and reuse.

The reader will be referred to existing literature for more detailed information, lists of references and other sources of information will be provided. The guidelines are, therefore, also useful for other stakeholders such as NGOs or consultants active in the field, or authorities at the national level.

CAPACITY BUILDING PROGRAM

Based on a training needs' assessment conducted in 2003, a capacity building program was developed and agreed with the stakeholders in the region:

Every year local and regional training courses of two to six weeks are aimed at professionals from the field. While the local trainings are designed to deepen the background knowledge, the regional trainings are train-the-trainer programs to promote a sustainable spread of knowledge and strengthen regional co-operation. The topics of the training courses focus on the design, construction, operation and maintenance of small-scale waste water treatment plants, the ecological sanitation, the reuse of reclaimed water, policy guidelines, cost calculations, public awareness and environmental impact assessment. Since 2004, more than 900 participants from the region participated in this training program and a third series will be implemented in 2006.

E-LEARNING

The EMWater e-learning platform offers advanced training for professional engineers. In 40 hours of online learning, participants can improve their knowledge in appropriate waste water treatment and reuse technologies, operation and maintenance, quality standards, and cost recovery planning. Online learning has proved to be very efficient for capacity building es-

pecially in this region where travelling often has high limitations. Participants can work at flexible times, independent of the location and exchange their know-how with international experts from the fields via forums and chats.

Around 60 participants actively attended the two training courses conducted in 2004 and 2005. Another three web-based training courses are planned for the years 2006 and 2007.

PILOT PLANTS

Five EMWater pilot plants have been designed to apply suitable low-cost technologies for waste water treatment and reuse in a local context, for both demonstration and training purposes. The plants have been designed for an average 10 m^3/d flow-rate. They will be realised on university campus or in existing full scale WWTPs areas, provided there is a connection to existing sewer networks. In such a way, real waste water feeding is allowed and the final disposal shall be made easier.

The treatment technologies of the pilot plants have been selected so as to allow compliance with local legislation on waste water reuse and to make the operation and maintenance easier. Accordingly, simple and well consolidated technologies will be applied, such as: two stage anaerobic and aerobic treatment (UASB + constructed wetlands or ABR + RBCs) respectively for Turkey and Palestine; aerobic treatments (extended aeration and contact-stabilisation) will be realised in Jordan and Lebanon. In all cases, tertiary treatment will be provided by filtration and disinfection (UV or chlorination). Different treatment schemes will be compared according to their results after a significant working period.

Four of the five pilot plants will be constructed by local companies. They are expected to start operation in August 2006.

PUBLIC AWARENESS

All project activities are accompanied by measures to raise public awareness of waste water management and reuse. Beside regular information in the media, a video will be produced to disseminate the results of the project and promote waste water reuse. Also, at the end of the project, a handbook presenting innovative solutions for waste water management in the MEDA countries will be published based on the overall results of the project. The development of human resources and water reuse aspects are a major part of the handbook.

EMWATER REGIONAL CONFERENCE

The EMWater regional conference "Efficient Management of Waste Water, its Treatment and Reuse in the Mediterranean Countries" will take place in Amman, Jordan, from 30 Oct. to 01 Nov. 2006. The conference is designed to foster the exchange of experience and present the state-of-the-art of issues such as low-cost technologies, the operation and management of waste water treatment, the decentralization of waste water treatment, ecological sanitation and waste water reuse.

Also see www.emwater-conference.org for registration and the submission of abstracts and papers for the EMWater regional conference.

Fig. 3:
FOR FURTHER INFORMATION AND TO DOWNLOAD THE PROJECT DELIVERABLES REFER TO www.emwater.org

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[8] http://www.aabu.edu.jo
[9] http://www.birzeit.edu

Fig. 4:
EMWATER CONFERENCE IN DEZEMBER 2003

THE IMPROVEMENT OF IRRIGATION WATER MANAGEMENT IN LEBANON AND JORDAN–IRWA

By MANUEL ANCILLOTTI*

The Improvement of Irrigation Water Management Project in Lebanon and Jordan (IrWa project) is a regional project designed to address the problems related to water management in agriculture in the two countries. The project covers two prominent agricultural areas in the Region, notably the Bekaa Valley in Lebanon and the Ghor (Jordan Valley) in Jordan.

*) **Manuel Ancillotti** is IRWA Senior Project Manager, icujord@go.com.jo, www.irwaproject.com

Fig. 1:
THE PROJECT AREAS

WHO WE ARE

IrWa is co-financed by the European Commission (Euro-Mediterranean & Regional Programme for Local Water Management) and implemented by the following consortium:

- ICU: Istituto per la Cooperazione Universitaria, Rome (Italy).
- AVSI: Associazione dei Volontari per il Servizio Internazionale, Milan (Italy).
- CESAL: Centro de Estudios y Solidaridad con America Latina, Madrid (Spain).
- LRA: Litani River Authority (Lebanon).
- NCARTT: National Center for Agricultural Research and Technology Transfer (Jordan).

IRWA OBJECTIVES

IrWa aims at achieving two specific water-related objectives namely: improving the irrigation efficiency in areas of the Central—Southern Jordan Valley and optimizing the agricultural exploitation of lands along the Litani River, between Lake Qaraoun and the village of Bar Elias. Positive effects on crop production and farmers' incomes are expected from this intervention.

MAJOR PROBLEMS IN JORDAN

The King Abdullah Canal (KAC) is the main source of water for irrigation in the Jordan Valley. Due to the presence of rural settlements along its path (over 100 km) and the watershed conditions, the water quality deteriorates progressively from North to South, especially after the confluence in the Canal of treated waste water (As-Samra treatment plant). The problem is particularly severe during the hot season, when blending water becomes compulsory to meet the increased water demand for irrigation. Algae and miscellaneous floating bodies (polystyrene, plastic materials, organic and inorganic waste) enter the water carriers and interfere with the hydraulic functionality of the irrigation networks.

In areas where the canal turn-outs are not equipped with a proper filtration system, the clogging and deterioration of the flow limiters and water meters, intensive maintenance needs along with the illegal opening or by-passing of the Farm Turn-out Assemblies (FTA), are being detected as the major effects of the poor physical water quality.

At farm level, the irrigation systems are usually designed on an empirical basis. The filtration requirements for the use of drip irrigation systems in general are not met, with negative effects on the irrigation uniformity/efficiency and the life-span of the dripping lines (drippers or G.R. are replaced every two years on average). Farms in the Jordan Valley are usually equipped with poorly designed horizontal sand filters, supplied by local manufacturers. Moreover the use of gravel as filtration media and the inadequate operation and maintenance of the filters (back-flushing, replacement of the media, regular removal of bacterial slime etc.) definitely make the filtration ineffective.

PROJECT APPROACH

The foregoing problems are being addressed on a pilot basis, at both Canal level and on-farm level. More specifically, the project will equip at least one turn-out of the King Abdullah Canal with a two-stage automated filtration system. Expected results are the prevention of the clogging phenomena and the deterioration of the FTA's, with minimal operational & maintenance costs.

Field activities will focus on the optimisation of the irrigation networks in selected pilot farms, accompanied by the promotion of proper filtration system and fertigation techniques.

PLANNED AND ONGOING ACTIVITIES

Over 350 ha of fertile arable lands in the Central Jordan Valley (D.A.[1] 30—Damieh) are in the process of benefiting from an upstream filtration that will be installed at turn-out 70 of the King Abdullah Canal. The system consists of two stages: a self-cleaning pre-filtering grid made of stainless steel bars, with automated trash removal, and a downstream primary filtration station comprising four automatic 10 mesh self-cleaning screen filters, with a total filtering capacity of 6,000 m³/hour.

At on-farm level the intervention consists of the following actions: selecting a number of pilot farms located at various Turn-outs in the Central-Southern Valley, assessing their irrigation systems, defining their needs in terms of pump performances, filtration capacity, and dripping lines, applying improved sand filters, training the contact farmers on water management and O&M, disseminating the know-how through extension activities.

The contact farmers will be selected amongst the members of water users' associations and producers' associations sponsored by other projects (MREA[2] and GTZ[3]), so as to provide indirect support to those associations, encourage the membership and ultimately ensure the sustainability of these actions.

1) Development Area
2) Mission Régionale Eau Agriculture – Ambassade de France en Jordanie
3) German Technical Cooperation – Water Resource Management in Irrigated Agriculture

◀◀ Fig. 2: DEVELOPMENT OF ALGAE IN THE KAC

◀ Fig. 3: FTA TAMPERED BY USERS

Fig. 4:
IMPROVED DOUBLE-TANK FILTER IN A PILOT FARM (MREA DESIGN)

The sand filters are those which best meet the filtration requirements in the farming conditions in the Jordan Valley since they are effective against both organic and inorganic pollutants. However their effectiveness is contingent on the filter design and capacity, as well as factors such as the type/quality of the media used and the adoption of correct operation and maintenance practices. IrWA in cooperation with MREA will promote the use of improved local-made vertical filters (single or double tank, flat bottom, adequate number/distribution of diffusers etc.), proper media (silica or 0.5 - 1.2 mm quartzite) and adequate operation practices (back-flushing should be activated whenever the in/out pressure differential reaches 0.5 bars). A prototype of the improved sand filter (designed by MREA) is ready to be adopted in pilot farms.

The IrWA activity plan also includes the application and dissemination of appropriate tools and fertigation techniques, so as to mitigate widespread, severe phenomena of over-dosage and soil accumulation of nutrients (especially N). To this end, pilot farms will be equipped with progressive fertiliser injectors and contact farmers trained on dose calibration, fractioning and distribution scheduling.

The project focus for 2006 - 2007 will be on the training and extension, associated with the collection and analysis of field data in view of the IrWa Project Regional Conference.

Fig. 5:
FIELD TRIALS AT NCARTT IN DEIR ALLA

PROGRESS TO-DATE

The two-stage filtering system at the turn-out 70 of the KAC will be installed during the second semester of this year (tendering is ongoing). Ten pilot farms were selected in cooperation with MREA amongst the members of a newly registered Association of Melon Producers, while six pilot farms were selected amongst the members of a GTZ-sponsored Water Users' Association.

The irrigation systems were assessed in all selected pilot farms in view of their optimisation. The procurement of the needed equipment (pump-engine assembly, sand filters, fertiliser injectors and pipes) is ongoing.

With the aim of enhancing the capacity of the local partner institution, IrWa/Jordan has renovated and

Fig. 6:
ASSESSMENT OF ON-FARM IRRIGATION

upgraded the Laboratory for soil and water analysis of the NCARTT Station at Deir Alla (Jordan Valley). The same station has hosted field trials about on-farm filtration techniques on different crops. Furthermore, NCARTT extension agents were provided with three training courses in the areas of "Communication management", "Design of irrigation networks" and "Fertigation".

THE PROJECT ADDED VALUE

IrWa project aims at strengthening the local partners capacity in terms of facilities and human resources. Through coordination between the local partners, provision of reciprocal support and also networking with other projects dealing with water management, IrWa will contribute to enhancing the cooperation on irrigation water issues at both national and regional level.

IRWA PROJECT PARTNERS:

The consortium of this project consists of two MEDA partners and three EU partners. ICU is an Italian NGO with a focused scope on development cooperation and is the leader of the implementing consortium.

MEDA PARTNERS ARE:

In Jordan: The National Centre For Agricultural Research & Technology Transfer (NCARTT); in Lebanon: The Litani River Authority (LRA).

The EU Partners Are: ICU—Istituto per la Cooperazione Universitaria, Rome (Italy), AVSI—Associazione Volontari per il Servizion Internazionale, Milan (Italy), CESAL—Centro de Estudios y Solidaridad con America Latina (Spain).

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Improvement of Irrigation Water Management in Lebanon & Jordan

◀ WATER USER ASSOCIATION MEETING IN FAYOUM (EGYPT 2003)

ISIIMM: INSTITUTIONAL AND SOCIAL INNOVATIONS IN IRRIGATION MEDITERRANEAN MANAGEMENT

By MICHEL SOULIÉ*

"Promoting an integrated and balanced management of water resources by reconciling respect for the environment with economically viable irrigated agriculture" is an objective of a local dialogue operation between farmers, development professionals and various stakeholders. This concept has served as a reference for the construction of the ISIIMM project led by Agropolis International (France).

*) Dr. **Michel Soulié** is Project Head, Water Officer at Agropolis International, Montpellier, France, soulie@agropolis.fr

GENERAL BACKGROUND

Isiimm is a Euro-Mediterranean regional project funded by the European Commission "eu-Meda Water Initiative" involving Egypt, France, Italy, Lebanon, Morocco and Spain. The aim of the Isiimm project is to share experiences, knowledge and build new perspectives for sustainable water management in Mediterranean agriculture. Its goal is to overcome current contradictions associated with local water management in Mediterranean catchment areas through innovative institutional solutions, based on a common understanding of six key mechanisms: social, institutional, historical, agricultural, territorial and hydrological/hydraulic.

Therefore, a comparative, progressive and participatory approach is driven between different actors coming from the selected case studies in Morocco, Egypt, Lebanon, Italy, France, and Spain where water is a central topic issue to social and economic life.

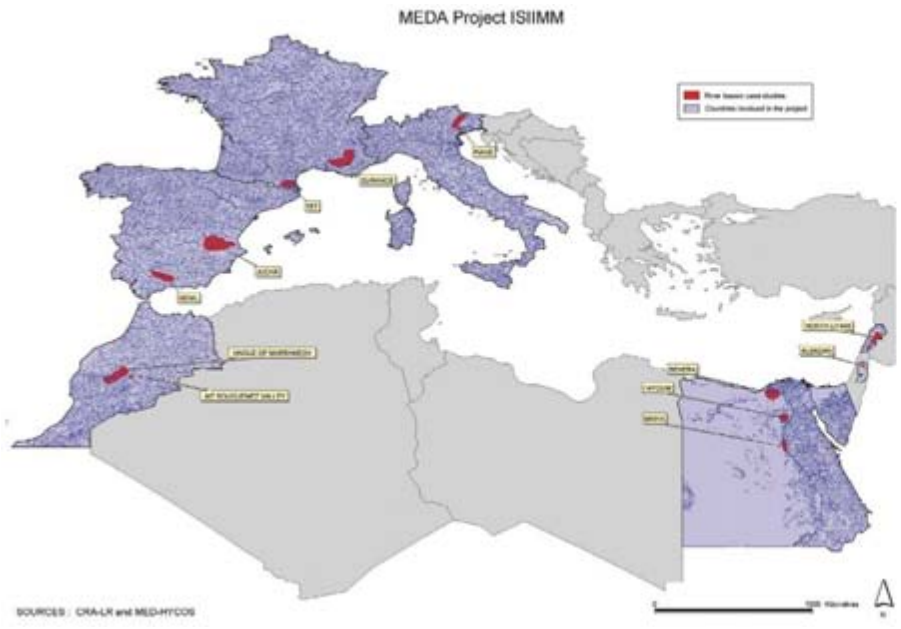
The ambitious and challenging purposes of the Isiimm project are built upon a framework of regional network co-operation systems, using five main languages: Arabic, English, French, Italian and Spanish. Many multi-national and multi-sectoral teams work together with the support and organisational efforts of project partners and under the overall co-ordination of Agropolis.

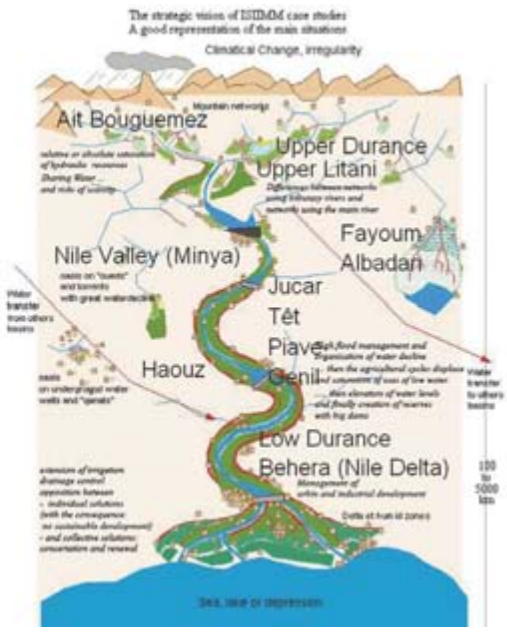
In order to capitalise and disseminate Isiimm results, an information system is at the centre of all of the project activities: Osiris (Organisation System for Information and Research on Irrigation and Societies). Comparative studies and comprehensive approaches to the diversity of co-ordination between institutions will be integrated within Osiris for future use in institutional innovations (www.isiimm.agropolis.fr).

WHAT DOES THE ISIIMM PROJECT WANT TO ACHIEVE?

We are working on 11 specific case studies inside the river basins of six Mediterranean countries (Fig.1).

Fig. 3: THEMATIC SEMINAR IN OCTOBER 2003 IN MARRAKECH (MOROCCO).





◀ Fig. 1: **ELEVEN ISIIMM CASE STUDIES IN SIX COUNTRIES**

▲ Fig. 2: **THEORETICAL MEDITERRANEAN WATERSHED**

In building visions and arrangements for the sustainable management of water resources, the project involves local partners, water users, development agents, researchers, NGOs, public services and administrations. With a primary objective to help local rural communities adapt to the emerging problems resulting from pressures on water resources, two priorities guide the project: a) working with local irrigation organisations; and b) working with the development professionals.

ISIIMM PROJECT ORGANISATION

The project consortium comprises five MEDA partners and seven EU partners. Agropolis in France is the leading member of the consortium and assures all administrative and coordination duties through a Coordination Unit.

In each country there is a National Coordinator in charge of implementing the project in his country and a Facilitator for each case study. A Scientific Council and a Coherence Group give advice to guarantee the efficiency of the project. A total of 25 persons are working on the project.

The ISIIMM consortium is comprised of twelve partners including NGOs or Associations for local development and scientific institutes.

THE MEDA PARTNERS ARE:

In Egypt: Center for Rural Development Researches and Studies (CRDRS), Egyptian Association for Sustainable Rural Development (EARSUD)
In Lebanon: Chambre de Commerce, d'Industrie et d'Agriculture de Zahle et de la Bekaa (CCIAZ)
In Morocco: University Cadi ayyad (UCAM), Association Al Majal

THE EU PARTNERS ARE:

In France: Agropolis, Chambre Régionale d'Agriculture du Languedoc-Roussillon (CRALR), VER-Seau Développment
In Italy: Autorità di Bacino dei fiumi Isonzo, Tagliamento, Livenza, Piave, Brenta-Bacchiglione (ABAA), Fondazione Eni Enrico Mattei (FEEM)
In Spain: Universidad Politecnica de Valencia (UPV), Unidad Sindical de Usuarios del Júcar (USUJ)

HOW DOES THE ISIIMM PROJECT WORK?

Three main activities are being developed with the participation of the target groups.

1) Diagnostics for action in each of the 11 river basins are leading to new water-sharing behaviour and institutional innovations.
2) A wide series of training workshops and seminars are enabling the target groups to gain a wider vision of the problems in Mediterranean irrigation management and more references to solve them in more suitable ways.
3) An extensive information system called OSIRIS is already enabling target groups to access information about the ISIIMM case studies and compare this with their own situations.

Together this forms the basis for an "apprentissage" of all the dimensions associated with the issues of collective water management. In addition, a concerted effort is being coordinated to distribute this information through books, films, newsletters, guides and other media.

IMPLEMENTATION AND FIRST RESULTS

The project is implemented through three main phases: 1) case studies statements; 2) thematic and exchange seminars and 3) dissemination and final outputs.

The first phase has been devoted to national and local case studies, drawing up a statement of conditions and aims for each river basin and country using a participatory approach and based on existing documentation plus the scientific assessment of the ISIIMM ex-

Fig. 4:
EXCHANGE SEMINAR BETWEEN ITALIAN AND LEBANESE WATER USERS IN LEBANON (2006)

perts. The approach also assesses institutional organisation and practices. During this first phase, numerous meetings were held at local and national levels with water users and institutional stakeholders.

International thematic meetings and exchange seminars and workshops were the main activity during the second phase. The most important were: Implementation of the EU Framework Directive (Spain), Communication Strategy and Tools Workshop (Spain), Comprehensive Assessment of Water Management in Agriculture (in collaboration with IWMI in France), Mediterranean Irrigator Communities Meeting, Institutional aspects of IWRM in arid, semi-arid and irrigated rural areas (in collaboration with RMSU, EMPOWERS, IRWA, MEDWA in Lebanon), Mountain Irrigation in Morocco. Exchange seminars were intensively developed between water users of all the countries involved in the project.

In total, 18 international workshops and seminars and around 35 local and national meetings and seminars were organised with the participation of more than 1500 persons.

During 2005 - 2006 a demonstration technical micro-project is developed. This project called "SWaMMA" (Solid Waste Management in Mostafa Agha) is implemented by the farmers in an Egyptian village of the Nile Delta. The objective is to increase the water quality in the irrigation canals by collecting and reusing domestic and agricultural solid wastes in a rural community (www.isiimm.agropolis.fr/swamma).

WHAT IS THE ADDED VALUE OF THE ISIIMM PROJECT?

ISIIMM is building common knowledge and a comprehension of the social and institutional aspects of irrigation management in the Mediterranean and creating adapted institutional tools. It is enabling and creating new perspectives for irrigation development policies and for innovation at the local level through guidelines and the documentation of the 11 ISIIMM case study river-basins. It contributes to mutual learning and knowledge transfer at local, national and regional level.

GENERAL INFORMATION

Project's cost: 5.7 Million Euros
Duration: 48 months
Estimated end: April 2007

INSTITUTIONAL AND SOCIAL INNOVATIONS IN IRRIGATION MEDITERRANEAN MANAGEMENT

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THE MEDAWARE PROJECT

DEVELOPMENT OF TOOLS AND GUIDELINES FOR THE PROMOTION OF THE SUSTAINABLE URBAN WASTEWATER TREATMENT AND REUSE IN THE AGRICULTURAL PRODUCTION IN THE MEDITERRANEAN COUNTRIES

By SIMOS MALAMIS, KONSTANTINOS MOUSTAKAS and MARIA LOIZIDOU*

The MEDAWARE project promotes sustainable strategies for the treatment and reuse of waste water. This is achieved through a series of activities including the identification of the existing situation in the participating Mediterranean countries, the development of appropriate guidelines and specifications, the development of a database and a software tool that will guide the efficient treatment and reuse of waste water and the organization of a series of dissemination activities aiming at the diffusion of know-how, at awareness raising and at training.

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PROJECT PARTNERS

The MEDAWARE project is funded by the European Commission Euro-Mediterranean Regional Program for Local Water Management. It commenced its activities in May 2003 and is planned to finish in October 2007. Nine partners from eight different countries participate in the project:

- The National Technical University of Athens from Greece (coordinator)
- The Automation, Robotics, Manufacture and Information Technology Centre from Spain
- The Agricultural Research Institute of Cyprus
- The Jordan University of Sciences and Technology
- The American University of Beirut from Lebanon
- The University of Chouaib Doukkali from Morocco
- The Istanbul Technical University from Turkey
- The Middle East Technical University from Turkey
- The Ministry of Environmental Affairs from Palestine

OBJECTIVES

The main objectives of the project are [1]:

- To identify the existing situation prevailing in the participating countries with respect to water and waste water management policies, the operation of urban waste water treatment plants (UWWTPS), the applied effluent disposal methods and practices, the potential negative impacts caused by the non-sustainable operation of the waste water treatment and disposal methods with emphasis placed upon waste water reuse in agriculture
- To develop specifications for the urban waste water treatment technologies and systems
- To develop specifications for the waste water agricultural reuse methods
- To develop appropriate tools and a database for the effective control and monitoring of the operation of UWWTPS
- To develop a multi-criteria, user friendly software that will guide the responsible authorities towards the efficient operation of waste water treatment plants and towards the most effective solutions in terms of health and safety for the agricultural reuse of the produced effluent
- To organize a series of training workshops, conferences, pilot studies and farmer education days aiming at capacity building, information and know-how transfer and the raising of awareness
- To establish a network between the authorities of the Mediterranean Countries for the exchange of information and the intra-regional transfer of experience

PROJECT PROGRESS

The existing situation in each participating country has been identified and described. More specifically, the following information was collected for the coun-

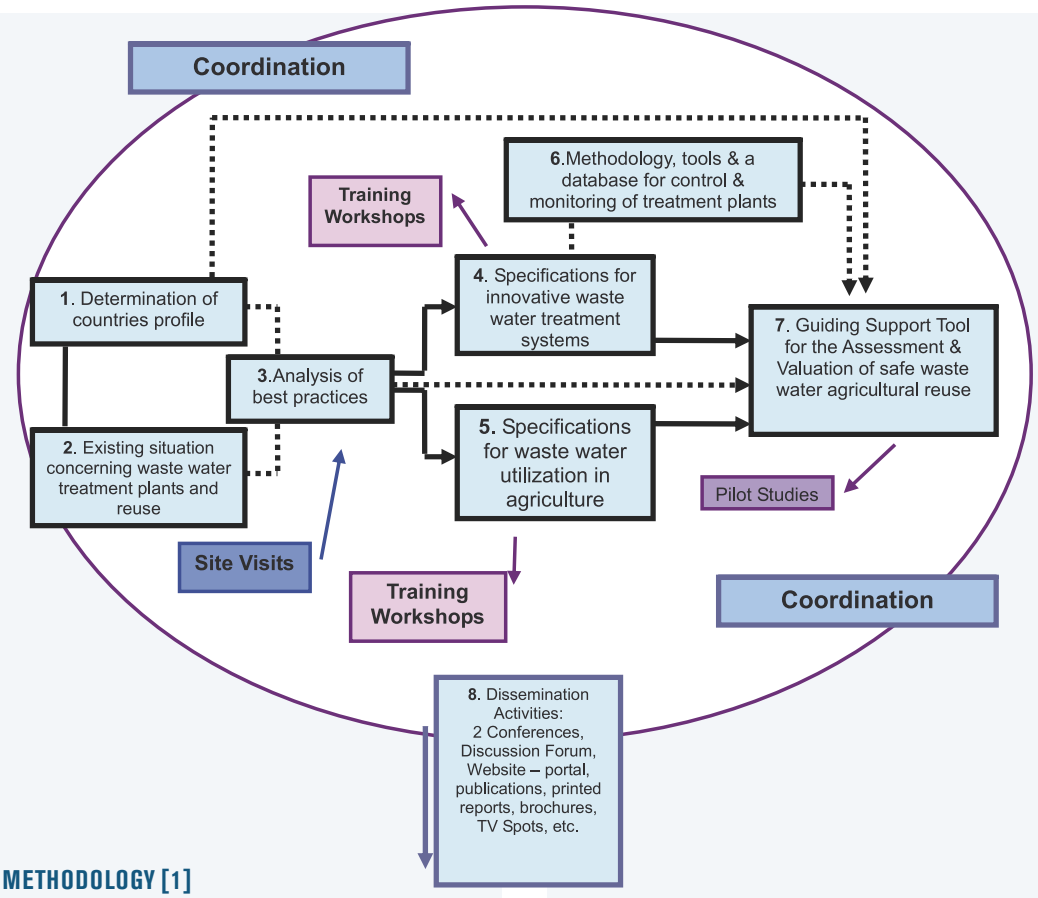

Fig. 1:
PROJECT METHODOLOGY [1]

tries of Turkey, Cyprus, Morocco, Jordan, Palestine and Lebanon [2]:

- Climate, population and economic growth
- Volume of surface water, groundwater, water demand (agricultural, industrial, domestic), water supply network and coverage (urban and rural), origin of irrigation water
- Agricultural areas, cultivable areas and types of crops cultivated
- Number, location, capacity and population served by existing waste water treatment plants
- Presentation of the technology adopted in each waste water treatment plant (WWTP) and presentation of data on the effluent quality and on the removal efficiency of selected WWTPs
- Impacts caused by the operation of the WWTP
- Determination of current effluent disposal practices
- Identification of the relevant institutional framework, relevant policies, legislative framework and actors involved

Fig. 2:
ELECTRODIALYSIS PLANT IN TENERIFE OF SPAIN [2]

SUCCESS STORIES

Several best practices and success stories were analyzed concerning wastewater treatment and reuse focusing on irrigation. The success stories were chosen from a variety of countries including the participating countries, other Mediterranean countries (Israel and Tunisia), EU Member States (Italy, Greece, Spain, France) and other countries based on their relevance to the Mediterranean context (USA-Florida-California, Australia, Kuwait, Mexico, Saudi Arabia). Furthermore, site visits took place to the islands of Tenerife to the UWWTP of Santa Cruz, to the water reservoirs of San Isidro, El Saltadero and San Loren, to tertiary and desalination treatment units in San Lorenzo and to reuse schemes. In addition, site visits took place to the tertiary waste water treatment and reuse systems in the city of Vitoria-Gasteiz in Spain (Figures 2 & 3).

Within the framework of MEDAWARE all waste water treatment and reuse technologies, processes and systems which can be adapted to the Mediterranean regional context were analyzed in terms of the technology, operational efficiency, energy consumption, social impacts, cost, safety and health aspects. All the effluent treatment standards currently in place in the participating countries were reviewed with respect to

the end use of the treated waste water. Fact sheets were developed for different processes including coarse solids reduction, grit removal, primary sedimentation, flotation, activated sludge, trickling filters, rotating biological contractors, lagoons, anaerobic biological processes, biological nitrogen removal, phosphorus removal, disinfection, membrane filtration processes, activated carbon adsorption. The Fact Sheets include the process description, the comparison of available technologies, the important design criteria and parameters, typical effluent characteristics and cost figures. In addition, the prominent regulations and guidelines (WHO Guidelines, California Regulations, US EPA Guidelines) and the reuse standards in the participating countries and in other Mediterranean countries (Italy, Spain, Israel) were reviewed.

The presence of specific pathogens and their impact on human health were investigated, the groups of population which are at risk were determined and the restrictions on the types of crops irrigated with waste water were analyzed [2].

GUIDELINES

The MEDAWARE project has developed tools and guidelines (1) for the dynamic control and monitoring of UWWTP, (2) for setting and reviewing internal targets or programs for the ongoing environmental improvement of the operation of UWWTPs and (3) for quality control methods, used as trouble-shooters when an existing treatment process is not properly controlled. Furthermore, specific guidelines have been developed for sampling and chemical measurements and analyses. This allowed the subsequent development of standard protocols for sampling and for analyses in order to enable the proper storing of data.

DEVELOPMENT OF A DATABASE

Within the framework of the project a suitable database has been developed in order to control and monitor the operation of UWWTPs. The database consists of tables (sampling, measurement and plant data tables), data forms for introducing new data into database tables, operation forms for summarizing unit data and illustrating operation, report data sheet with data and statistical analysis and reports for the submission of data to the appropriate authorities. Currently, the working team of the project is developing a software tool that will apply a scoring system in order to rank alternative waste water treatment processes based on the potential of the safe reuse of the final effluent. This tool will guide the responsible authorities in the efficient development and operation of waste water treatment plants aiming at the safe reuse of waste water. The evaluation criteria that will be considered by the software tool in order to rank the alternative waste water treatment options have been under discussion among the partners. The partners have provided considerable feedback in terms of the criteria they consider important to be included in the software tool. Upon the completion of the software tool, all partners will be trained to use it through suitable pilot studies that will take place in each MEDA country. The philosophy of the software tool is shown in Figure 4.

Fig. 3: **TREATED WASTE-WATER REUSE IN VITORIA-GASTEIZ OF SPAIN [2]**

DISSEMINATION ACTIVITIES

MEDAWARE involves a wide range of dissemination activities. More than 30 publications and presentations have been made in Journals and Conferences. Furthermore, press announcements have been made and a live TV program has been shown. The electronic format of the publications can be found at the project website www.uest.gr/medaware. Furthermore, a two day training workshop took place in each one of the six MEDA participants (six training workshops in total) focusing on waste water treatment technologies and systems (day one) and on reuse technologies and systems (day two). In these workshops, relevant actors were invited to participate. All six seminars were well attended. An International Conference was organized in Nicosia, Cyprus on the 15th - 16th of September 2005 with approximately 200 participants from various countries. Another International Conference took place in Marrakech, Morocco on the 8th - 10th of June 2006 (www.uest.gr/medaware/meda_conference/index.htm).

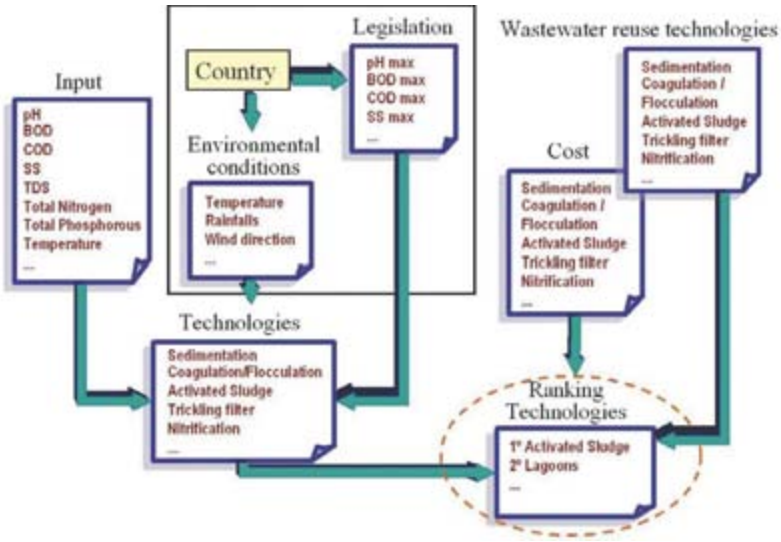

Fig. 4: **PHILOSOPHY OF THE SOFTWARE TOOL**

This Conference (International Conference on Sustainable Water Management, Rational Water Use, Waste Water Treatment and Reuse) has been organized in collaboration with Zer0-M, which is also a MEDA Water Project. Furthermore, all partners have distributed leaflets and/or brochures to relevant authorities.

CONCLUSIONS

The expected results of the project are the intra-regional transfer of knowledge, the increase of the awareness of relevant problems and opportunities, the reinforcement of capacity-building to promote the active involvement of actors involved in water planning and waste water management, the dissemination of information on the role and the effectiveness of training in spreading awareness with respect to opportunities for waste water reuse, the sustainable operation of waste water treatment plants and the training of all project target groups e.g. farmers, operators and competent authorities on the waste water sustainable management and safe reuse. The developed guidelines, specifications and the operational software tool will promote the sustainable operation and control of UWWTPS and the efficient and safe reuse of waste water in agriculture.

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[2] www.uest.gr/medaware/

REGIONAL EMWATER PROJECT CONFERENCE 2006

EFFICIENT MANAGEMENT OF WASTEWATER TREATMENT AND REUSE IN THE MEDITERRANEAN COUNTRIES

AMMAN, JORDAN FROM 30. 10 TO 01. 11. 2006

Wastewater reuse management is one of the challenges all MEDA countries will have to deal with in the coming decades. All MEDA countries are currently facing serious problems regarding the supply of sufficient water resources to cover their increasing water demands. In the year 2025, countries like Jordan, Israel and Palestine will have less than 150 cubic meters per capita and year. Other countries like Syria and Lebanon, at present classified as ''water rich'', will also face similar water stress problems during the next two decades. Therefore, these countries need water strategies that have to take into account alternative measures to cope with this situation. Wastewater reuse is one of the essential options MEDA countries have to consider for the development of their national water policies and strategies.

MAIN CONFERENCE THEMES ARE:

- Appropriate and non-conventional wastewater treatment technologies
- Operation and maintenance of wastewater treatment systems
- Health and environmental aspects of WWT
- Wastewater treatment
- Socioeconomic aspects of wastewater treatment and reuse.
- Policy guidelines, regulations and standards of wastewater treatment and reuse
- Sustainable urban drainage systems (SUDS)
- Capacity building

A WHO Workshop on the WHO Guidelines for Safe Wastewater Reuse in Agriculture and Aquaculture is going to be held under the organization of the WHO Regional Centre for Environmental Health Activities (WHO/CEHA).

The conference is organized in cooperation with MWI/WAJ Jordan, NCARTT Jordan and IWA-MED.

This conference is organized in the framework of EMWater Project, funded by the European Union under the MEDA Water Program Initiative and implemented by InWEnt in cooperation with all EMWater Project partners:

FOR MORE INFORMATION AND REGISTRATION PLEASE CONTACT THE ORGANIZERS:

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MEDROPLAN: MEDITERRANEAN DROUGHT PREPAREDNESS AND MITIGATION PLANNING

By MARTA MONEO and DORUK SARACOGLU*

The project MEDROPLAN joins collective, systematic and scientific efforts and proposes methodological and operational Guidelines for drought mitigation management plans. The Guidelines are designed to be coherent with current water resources management plans and economic environmental and social policies. The work developed in MEDROPLAN responds to the fact that data, know-how, technology, and experience on drought and drought mitigation measures in the Mediterranean region are scattered and sometimes inadequate.

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WHAT IS MEDROPLAN?

Medroplan is a Project funded by the European Commission within the framework of the Euro-Mediterranean Regional Programme for Local Water Management with the objectives of providing Guidelines for Drought Preparedness Plans and the setting up of a Drought Preparedness Network for the Mediterranean countries (Nemedca). The Project is coordinated by the Mediterranean Agronomic Institute (Ciheam/Iamz) and the Universidad Politécnica de Madrid (Upm) in Spain.

THE CHALLENGE OF DROUGHT IN THE MEDITERRANEAN

Water resources in the Mediterranean region are limited, scarce, and difficult to predict from year to year. The average in the region for annual water availability per capita is 2700 m^3 compared to 7000 m^3 worldwide [1] with more than 28% of the available water resources developed compared with 8% worldwide [2]. With limited and scarce water resources and demand rising due to population growth and the improvement in the standard of living, water management problems are tremendous even without incidents of drought, due to the imbalance between availability and demand. The area, mainly occupied by agriculture, has a high water demand and its economy is increasingly dependent on the rapid increase in tourism. Drought is a normal recurrent feature of every climate that combined with water scarcity has dramatic effects on the economy and the environment in the Mediterranean countries, on the people themselves and the population's well being. Drought events affect rain-fed agriculture as well as water supplies for irrigation and domestic water and delay economic development in addition to environmental and socially adverse impacts.

The Mediterranean region has suffered from frequent incidents of drought following 1970 (figure 1) and societies have been shown to react to this phenomenon when it is upon them, by responding to immediate needs and by providing what are often costly emergency measures to balance competing interests [3]. In many cases, this may not be an adequate response in the long-term nor may it indeed contribute to lessening the impact of future droughts. There is a need to understand drought management consequences in order to improve on the existing policies.

MAIN GOALS

Medroplan has two main objectives that aim at the prevention and mitigation of the negative effects of drought and the equitable management of water resources:

- The development of Guidelines for the elaboration of Drought Preparedness Plans, providing an integrated water management approach to minimize

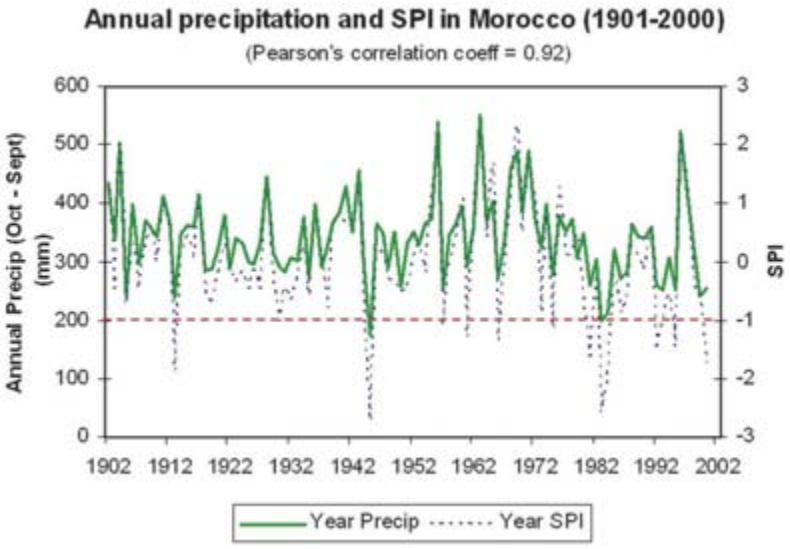

Fig. 1:
HISTORICAL DROUGHT EPISODES IN MOROCCO

the impacts of drought and to change the way of facing droughts from crisis to risk management. The Guidelines respond to the physical and socio-economic environment of Mediterranean countries within catchment areas and promote the participation of institutional and civil stakeholders in order to maximize an adequate understanding and implementation.

- Set up the framework for a Drought Preparedness Network for the Mediterranean countries as an instrument for experience and knowledge exchange within the region.

The project contributes to the overall objectives of the MEDAWATER PROGRAMME initiative by enhancing regional co-operation in the areas of sustainable and integrated management of water resources and also to other horizontal themes by strengthening institutional capacities and training, promoting the exchange and transfer of information, know-how and technology and also raising the awareness, mobilisation and promotion of the commitment of the population.

THE TECHNICAL APPROACH

The approach adopted for the development of the project has been designed as a continuous and retroactive structure that ensures the permanent enhancement of results. In the practical development of the work, there are three differentiated components: the organizational component, the methodological component and the operational component.

ORGANIZATIONAL COMPONENT

The first component comprises the establishment of a multidisciplinary team that includes representatives of stakeholders concerned about drought mitigation issues, such as researchers, water managers, water users or NGOS. This component also aims to analyze and understand the institutional organization of the partner countries.

METHODOLOGICAL COMPONENT

The methodological component defines the technical approach and the type of studies to be carried out in order to establish the link between the drought phenomena and the management actions. This includes: drought characterisation, risk analysis, data, models and tools. The methods define the steps to be taken for the evaluation and definition of drought and the analysis of risk.

OPERATIONAL COMPONENT

The operational component identifies both the long and short-term activities and actions that can be implemented to prevent and mitigate drought impacts responding to the results of the organizational component. The activities and actions are essential for the creation of specific drought planning and response efforts

The operational component includes three aspects:

- Preparedness and early warning (permanent measures)
- Thresholds defined by drought indices and indicators (physical and social)
- Actions

Monitoring and preparedness planning is the essential first step for moving from disaster to risk management in response to drought, and can be viewed as the permanent measures for a drought management plan.

THE REVISION PROCESS

The most important aspect of this approach is the continuous feedback that relates the different components of the project and that is permanently active for the enhancement and adaptation of the results to the changing process of societies and the environment. Figure 2 represents the structure of the technical approach and the constant interaction between the different components of the work.

Fig. 2:
MEDROPLAN TECHNICAL APPROACH

PARTNERS

The partners involved in MEDROPLAN represent the variety of environmental and socio-economic situations in the Mediterranean region (Figure 3) and also a range of stakeholders with an interest in drought management. MEDROPLAN also promotes the development of the NEMEDCA Drought Preparedness Network that involves the participation of the Mediterranean, near East and Central Asia. The coordinators of the project are the Mediterranean Agronomic Institute of Zaragoza (IAMZ) and the Universidad Politécnica de Madrid (UPM), both of whom are Spanish institutions. The other partner institutions are listed below:

- University of Cyprus, Cyprus
- National Technical University of Athens, Greece
- Institut Agronomique et Vétérinaire Hasan II, Morocco
- Confederación Hidrográfica del Tajo, Spain
- Canal de Isabel II, Spain
- Fundación Ecología y Desarrollo, Spain
- University of Catania, Italy
- Direction Générale des Barrages et des Grands Travaux Hydrauliques, Ministère de lAgriculture, Tunisia

RESULTS AND CURRENT SITUATION

The goal of the MEDROPLAN Guidelines is to reach the full range of stakeholders related to drought in the Mediterranean, and especially oriented to the support of policy making, understanding that drought management plans must make information available to the largest possible audience.

In order to achieve this goal, the Guidelines are written with the user in mind in the main six languages of the Mediterranean partners and try to avoid the use of very specific scientific or technical language that may be difficult to understand by a non-specialist.

The Guidelines are designed to appeal to a broad audience. Each component of the Guidelines includes information that can be understood by a non-technical user. The methodological component also includes more in-depth academic information and scientific developments in drought characterization and risk analysis. The Guidelines link academic and technical issues with operational aspects therefore linking scientific and policy communities.

Throughout the duration of the project, several workshops have joined together stakeholders from the different countries and sectors to support the development of the Guidelines giving opinions and suggestions that have been incorporated in the process.

MEDROPLAN WEBSITE

Communication is the priority area of work during the second phase of the project, after having completed most of the academic tasks. Actual work is focused on the development of new tools for the visibility of the project.

The MEDROPLAN Guidelines are being adapted and incorporated in the website of the project as an interactive tool to be used by interested stakeholders. The structure of this tool is similar to the printed Guidelines, but some additional components are included:

- Executive Summary: A comprehensive introduction to the utility and application of the Guidelines
- Examples of the application of the planning framework and implementation of drought preparedness guidelines in the partner Mediterranean Countries that might serve as examples for other cases.
- Tutorial: A help document that can assist the user in the application of the guidelines and can be consulted throughout the implementation process.

Figure 4 shows the structure of the Guidelines included in the website with all the integrating components. The colour code represents the language availability for each of the components.

CURRENT SITUATION

The project partners are currently testing the draft Guidelines elaborated during the last two years, apply-

Fig. 3:
PARTNER COUNTRIES

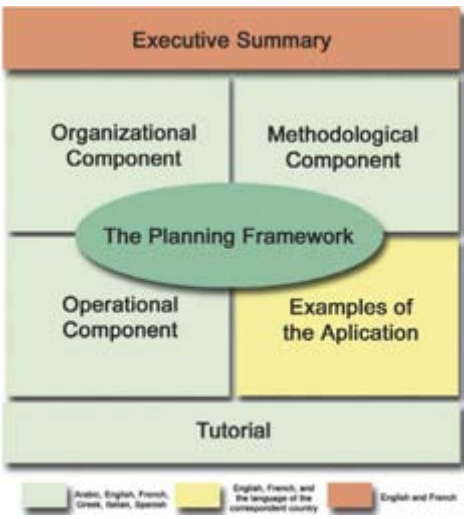

Fig. 4:
STRUCTURE OF THE GUIDELINES

ing them in their own countries and selected river basins or water projects as the final step before publishing the Guidelines. The results of the testing have been presented in the Coordination Meeting that was held in Zaragoza during 4th and 5th April 2006. During the meeting, the results have been used to validate the methods proposed in the Guidelines for the applications in a wide range of situations.

As the project develops there is also an important effort involved in supporting the creation of the drought preparedness network through the holding of periodical meetings with representatives of the six sub-regions and representatives of ICARDA, FAO and CIHEAM, that will form the Executive Committee. NEMEDCA will request support from governments, funding agencies, individuals, national, regional or international organizations, development banks, and others.

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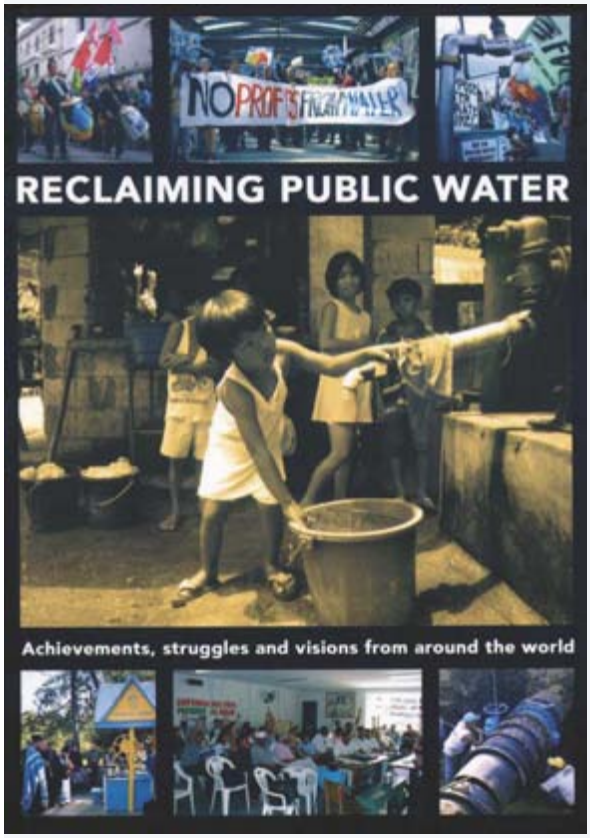
RECLAIMING PUBLIC WATER

ACHIEVEMENTS, STRUGGLES AND VISIONS FROM AROUND THE WORLD

Edited by Belén Balanyá, Brid Brennan, Olivier Hoedeman, Satoko Kishimoto and Philipp Terhorst

Transnational Institute and Corporate Europe Observatory, January 2005 (1st edition), March 2005 (2nd edition), 286 pages

ISBN: 90-71007-10-3



Ninty percent of water services worldwide are delivered by public service organisations. Although there is room for improvements and some public organisations deserve outright critic the majority of these organisations carry out a demanding job to the satisfaction of their clients. Nevertheless since the 90s it has become a rule for donors, led by the WB and the EU funds, to demand for privatisation of water services in connection with loans and grants.

The present book challanges the assumption that the private sector is better in delivering services to the public than publicly operated utilities with examples of such privatisation tentatives. Concrete testimonies highlight how new models of co-operation between public water operators and trade unions, community groups and NGOs take the meaning of publicness beyond public ownership. The concept of Public Utility Partnership, or PUP, is presented and opposed to what has been branded as Public Private Partnerships.

A book with interesting information and ideas for all those who are concerned with sustainable water and wastewater systems for a maximum of beneficiaries.

The book costs € 10 (12 US dollar) per copy + pp. For ordering more than 5 copies the price is € 7.5 per copy. Send an email with your name and postal address to Satoko Kishimito (satoko@tni.org).

It can also be downloaded as a pdf file from www.tni.org/books/publicwater.htm in English, Spanish, Italien and Indonesian

STAKEHOLDER PARTICIPATORY SUSTAINABLE WATER MANAGEMENT AT FARM LEVEL

MEDA–CO-OPERATION WITH JORDAN AND PALESTINE

By MARKUS LECHNER*

Irrigation water management in Jordan and Palestine is presently characterised by problems which are a result of socio-economic and technological weaknesses, mainly caused by the inefficient and ineffective management of the limited water resources available as well as an old and/or inefficient technical infrastructure.

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The relationship between various stakeholders at community and village level together with a concerted technical effort to support the development of the required level of water management therefore play a decisive role in regional development in Jordan and Palestine.

Due to different interests between various stakeholders, e.g. irrigation water suppliers and farmers, and various groups of demand, e.g. drinking water and water for irrigation, an actual need for intervention has been perceived to regulate the relations and mediate the communication processes.

The MEDWA project therefore combines socio-economic as well as technical approaches to the multi-level problems of the Jordan and Palestine water sectors, aiming at a holistic approach to regional development. The project started two years ago with the definition and systematic involvement of local, regional and national stakeholder groups. As a next step, the definition of a know-how and technology base for further implementation in the technical and non-technical training, demonstration and pilot activities followed. Subsequent to the provision of access to available state-of-the-art national and international Know-How, the knowledge base of stakeholders and end-users is being enhanced by professional training in eight different fields of sustainable water resource management. This knowledge and awareness base is decisive for the core activities of the proposed project. These core activities are divided into two main groups, the implementation of efficient technical water supply management activities and the creation of organisational structures with an institutional policy interface. These structures will not only serve as fora for the exchange of views, experiences and good practice at a micro-level, but will also strengthen stakeholder and community capacities. Emphasis is put on women playing a decisive role in these organisations.

EXPECTED RESULTS

This complementarity of technical "Hardware" and socio-economic "Software" is a direct response to the complexity of a situation, where not only insufficient water supply and water demand management constitute a vital problem for regional development, but also the lack of suitable fora for dialog and experience exchange.

The expected results of the project can be summarised as

- An increase in the visibility of MEDA and the socio-economic benefits of regional co-operation
- The sharing of know-how on sustainable irrigation water management in the four countries
- An increase in public awareness of the problems and opportunities in the water sector.
- The reaslisation of cooperative pilot and demonstration projects for reducing demand for and increasing the quantity of water for irrigation purposes and

Fig. 1:
TRAINING SESSION IN PALESTINE

- The establishment and support of water associations and well cooperatives with special emphasis on women empowerment

and are being realised along the following horizontal themes of

- institutional capacity strengthening and training
- exchange of information and know-how,
- transfer of know-how and technology, and
- awareness raising, mobilisation and promotion of the commitment of the population.

FIRST STEPS

During the first phase, the project focused mainly on capacity building and training, as well as awareness raising and mobilisation (compare Fig. 1), currently followed by the concentration on the implementation of technical pilot and demonstration projects on improved water supply and demand management. Together with the implementation of these pilot and demonstration units, another major group of activities is being started which is related to the establishment and support of water associations and well cooperatives. Three baseline surveys have been implemented on the present state and possible future role of such entities in Jordan and Palestine (separate for Westbank and Gaza). In total a number of six water associations and well cooperatives shall be founded as a result of this project. These organisations shall be officially recognized by the governments of the respective countries. Emphasis will be laid on a functioning policy interface, i.e. a good connection to local, regional and national authorities. This will enable and stimulate further follow-up activities.

The newly founded water associations and well cooperatives will be trained in all aspects of organisational management and capacity building.

Currently the preparation of training courses for institutional capacity building is in progress, implementation shall start during the second half of this year.

Two of the various different pilot activities which are being implemented in the areas of

- water production
  - rehabilitation of production wells
  - establishment and improvement of water sources, distribution channels and springs
- water storage
  - construction of individual and common metallic reservoir
  - construction and renovation of communal water cisterns (4)
- waste water treatment and reuse and
  - individual household waste water treatment and re-use
  - collective waste water treatment and reuse
- efficient water use
- establishment of permaculture home gardens (45)
- improvement of irrigation networks
- modern irrigation water techniques

shall be described in the following in greater detail.

Fig. 2:
TRAINING COURSE ON PERMACULTURE

ESTABLISHMENT OF PERMACULTURE HOME GARDENS

Contrary to the activities described below, the establishment and promotion of permaculture home gardens in Jordan addresses the problem of water shortage for agricultural production from the demand side. While obviously the application of the principles of permaculture has a wider impact on agricultural production, for the sake of this project the main effect lies in the reduced water demand which is caused by improved base conditions—improved soil structure and therefore improved water holding capacity, reduced evapotranspiration and higher productivity per area which allows for the better utilisation of water.

Currently, following the implementation of training courses on permaculture (compare Fig. 2) for potential beneficiaries in Madaba and Sheikh Hussein and the identification of beneficiaries, the establishment of 45 permaculture home gardens is ongoing. Due to the nature of permaculture, effects may not be visible in the short-run, nevertheless certain quantitative results are expected to be obtained before the end of the project.

DEMONSTRATION OF WASTE WATER TREATMENT FOR REUSE

The main purpose of this activity is to demonstrate the potential which lies in treating and reusing waste

water for agricultural production. The benefits are twofold—the provision of services to households by treating their waste water safely and in an environmentally-friendly way and making water of sufficient quantity and quality available for secondary agricultural purposes.

In total the construction of six demonstration plants is planned, four shall be constructed in Palestine and two in Jordan, the first phase, comprising three units in Palestine and one in Jordan, is currently being implemented. For this first phase the originally planned designs are being applied unchanged. A combination of anaerobic and aerobic treatment steps in series was already applied in a comparable form earlier in Palestine. These plants are currently in construction in

- Gaza, Khanyounes, Khoza'a Village (South Gaza Governorate)
- West Bank, Qalqilya, Seer Village
- West Bank, Tulkarim, Ateel City.

For Jordan an activated sludge system with plastic filling material to increase the concentration of microorganisms in the system was chosen.

CONSTRUCTED WETLANDS

For the second phase a more innovative approach has been taken into consideration in both countries. Subsurface flow constructed wetland systems have been selected, mainly because of their advantages with regard to investment and o&m cost as well as their purification efficiency. Fig. 3 shows the plan view of the planned unit for Palestine (to be implemented in Bidya/Salfeet Governorate).

For Jordan the design will include a UASB reactor as an anaerobic pre-treatment step, since the waste water to be treated is collected from septic tanks by tankers. This results in highly concentrated waste water which makes a highly efficient anaerobic first step sensible. No adverse effects of the anaerobic pre-treatment on the secondary aerobic biological treatment in constructed wetland systems are known, contrary to conventional activated sludge systems as applied in the first phase.

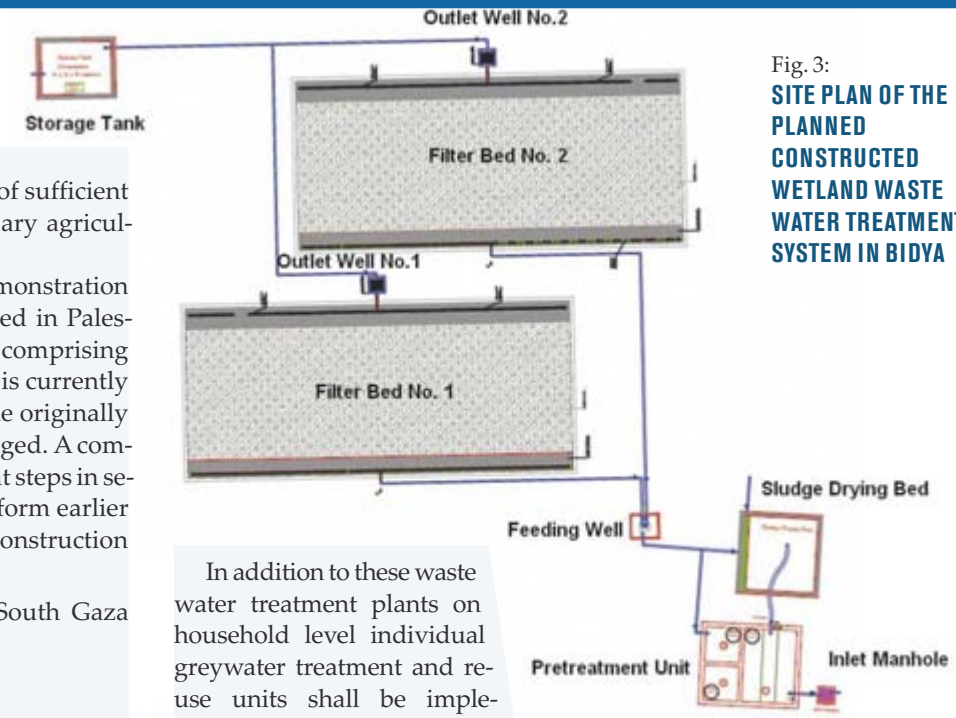


Fig. 3:
SITE PLAN OF THE PLANNED CONSTRUCTED WETLAND WASTE WATER TREATMENT SYSTEM IN BIDYA

In addition to these waste water treatment plants on household level individual greywater treatment and reuse units shall be implemented (compare Fig. 4).

Currently the detailed technical design for all Phase-2-activities is being completed and construction expected to commence in August 2006.

PROJECT CONSORTIUM

The MEDWA project is implemented by a consortium comprising two European, one Palestinian and one Jordanian partner. Hilfswerk Austria is the lead agency of the consortium, a non-governmental humanitarian organization with its headquarters in Vienna, responsible for overall project management and coordination at the country level in Jordan jointly with the "The Jordanian Hashemite Fund for Human Development" (Johud). Johud is the organisation responsible for all project activities in Jordan. The "Fundación Promoción Social de la Cultura", a private non-profit organisation with its headquarters in Madrid provides the coordination of project activities in Palestine together with the local implementing organisation, the "Palestinian Agricultural Relief Committee".

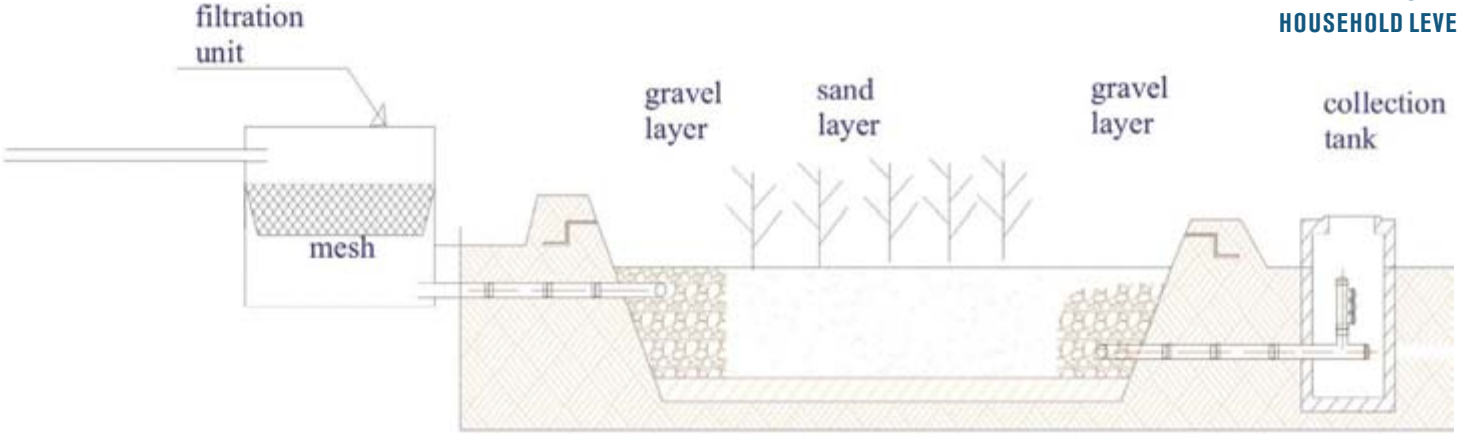
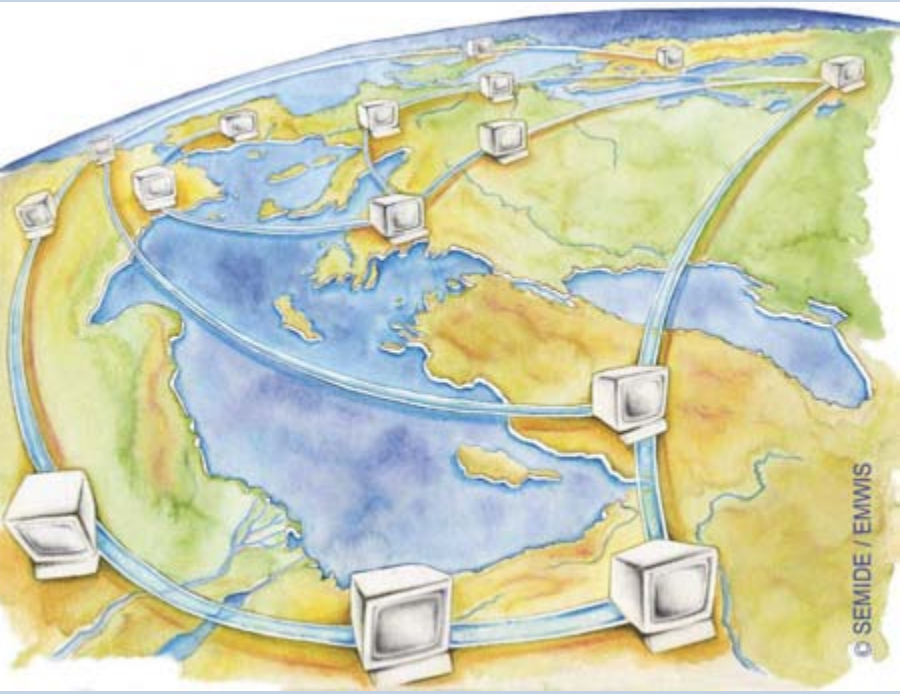


Fig. 4:
CROSS SECTION OF HORIZONTAL SUB-SURFACE FLOW CONSTRUCTED WETLAND SYSTEMS FOR GREYWATER TREATMENT ON HOUSEHOLD LEVEL



EMWIS/SEMIDE: THE EURO-MEDITERRANEAN INFORMATION SYSTEM ON KNOW-HOW IN THE WATER SECTOR

By JAUAD EL KHARRAZ and ERIC MINO

EMWIS is a tool for co-operation between the Euro-Mediterranean countries in the water sector. It aims to facilitate access to the information existing on know-how in the water sector, while prioritising the five following topics: institutions involved in the water sector and their representatives, documentation on water, training opportunities, research and development programmes and finally data administration. Further it aims to develop the sharing of useful information and to prepare common outputs and promote the necessary co-operation programmes.

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A TOOL NECESSARY FOR THE EURO-MED WATER COOPERATION

In most cases, the information is only available at either international or national level in a fragmented, dispersed and heterogeneous way. Therefore it is necessary to make an effort to rationalize and make this information readable, easily accessible and available. To tackle this issue and to strengthen the Euro-Mediterranean dialogue, the EMWIS (Euro-Mediterranean Information System on Know-How in the Water Sector) was initiated during the Marseilles Euro-Mediterranean Ministerial Conference on Water Management (November 1996).

At the Euro-Mediterranean Conference on Local Water Management in Turin (October 1999), the Ministers emphasized the EMWIS role in the exchange of information and knowledge for the implementation of the Action Plan adopted [1]. This role was institutionalized within the regional MEDA programme on local water management (so-called "MEDA-Water"), within which the financed projects should disseminate their results via EMWIS.

EMWIS was the first operational initiative of the Euro-Med partnership in the water sector at regional level. In spite of the many difficulties encountered, the Mediterranean Partner Countries have all expressed their will to make EMWIS progress as the main tool for regional co-operation in the water sector (Madrid 2001 [2], Rome 2005 [3]). When new regional water initiatives were launched, they enlarged the users'/producers' community and expressed specific needs and requirements.

A DISTRIBUTED ARCHITECTURE & MANAGEMENT

EMWIS is concerned with the information available in the 25 member states of the European Union (EU) and the 10 Mediterranean Partner Countries.

The information is made available by "a National Focal Point" (NFP) in each country and by a central "Technical Unit" acting as an International Focal Point (see Fig. 1). EMWIS existence thus implies participation, to which all partner countries committed themselves.

The National Focal Points (NFPs) are nominated by the Ministries in charge of water. They are small teams working in a public or semi-public organisation responsible for water-related documentation and information. Their tasks consist in creating and developing a national water portal, organising communication processes and access to vetted information, ensuring information availability in the country language plus in the chosen 'international' languages (English or French), developing access to the information and maintaining relations with the users in their country.

EMWIS NFPs have already been created in each Mediterranean Partner Country plus in ten countries of the EU.

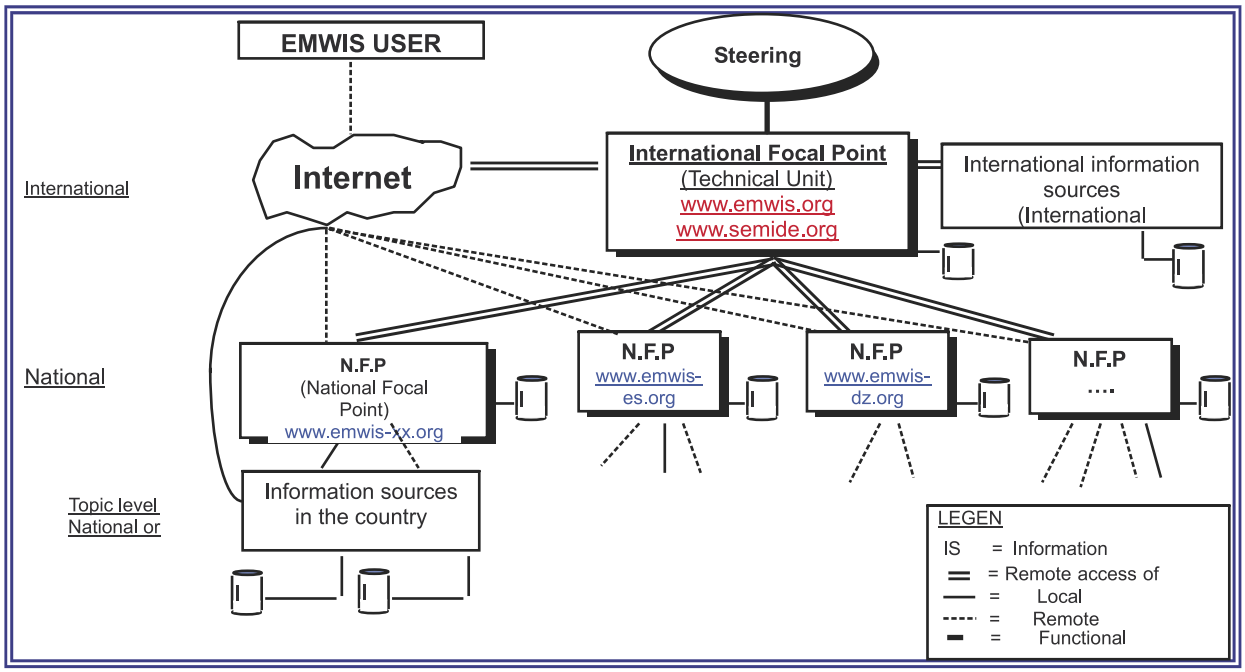


Fig. 1
EMWIS ORGANISATION

ACTIVITIES & SERVICES PROVIDED

The first phase of Emwis implementation (1999 - 2002) enabled the establishment of a strong basis for the system, with political support at the highest level, the development of a Partnership spirit in the national water authorities, the validation of the technical and organisational frameworks, the creation and training of the National Focal Points' teams on website development and management, the better awareness of the Mediterranean Partner Countries (Mpcs) regarding the need for sharing information and for adapting the Emwis to the national needs.

The Emwis second phase (2003 - 2006) aims at consolidating the first results and at enhancing the System, especially at national level. The main activities are outlined below.

The co-ordination with political structures: yearly meetings of the Steering Committee involving the water directors of 13 countries (Algeria, Cyprus, Egypt, France, Israel, Italy, Jordan, Lebanon, Malta, Morocco, Spain, Turkey and the Palestinian Authority) under the French Presidency and Vice-Presidencies assumed by Lebanon and Morocco. Euro-Mediterranean conferences of the water directors (35 countries) are also organised to review the progress of water activities at the regional level.

The Nfps are supported with training sessions on advanced techniques for knowledge management, the improvement of their information and communication infrastructure, the organization of national information seminars, the production of promotion material, the translation for online publishing and analysis of user needs. Thus the political representatives in charge of water in the countries involve themselves in the promotion of the System during national information seminars held in Turkey (Figure 2, [4]), Cyprus (Figure 3, [5]), Lebanon [6] and Morocco [7].

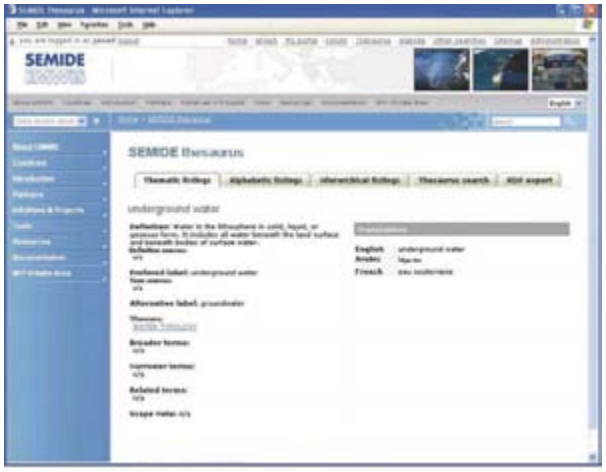
EMWIS WEB PORTAL

The Emwis, as the regional water information portal, offers monthly trilingual (Arabic, English and French) electronic news flashes (more than 8000 subscribers), a thematic directory (i.e. "yellow pages"), a clearing house on regional programmes and initiatives (Meda-Water, European Water Initiative, etc.), electronic forums, a calendar of events and international and national water legislation. Thanks to the continuous work of the Emwis teams, its web portal is among the top ten sites referenced by web search engines for water in the Mediterranean area. More and more organizations call upon Emwis to disseminate information on their works (advertisements of publications, of events, etc.) or to contribute to Emwis with the management of a dedicated web section (e.g. ground water working group of the Joint Process [8]).

One of the main challenges of the current phase was to set-up a more ambitious technical architecture based on standardised but flexible formats of information (using the eXtensible Markup Language to define them) in conformity with the concept of web-based services rather than on recommendations of specific tech-

Fig. 2:
EMWIS PROMOTION SEMINAR: "WATER INFORMATION SYSTEMS OF TURKEY AND EMWIS", ANKARA (TURKEY), 15/12/2005

Fig. 4:
EMWIS MULTI-LINGUAL WATER THESAURUS



nological solutions. Such architecture is necessary to improve co-operation within and among different national water information systems and to ensure an efficient exchange of versatile information as intended by a specific country. Thus a new web portal was launched in April 2006 based on:

- A common set of metadata agreed among the EMWIS NFP to share information on news, events, documentation, projects, text of laws (based on existing international standards). The approach used allows the syndication or the harvesting of content published on different web servers.
- A multi-lingual water thesaurus and glossary (Arabic, English, French and Spanish) to index the content of the EMWIS website and to search for information. This tool (see Figure 4) was built after an analysis of the existing specialized thesaurus and glossaries, the main three references used are: EDEN [9] [10], GEMET [11], the international glossary of hydrology of UNESCO [12] and the IDRC WaDImena initiative [13]. A web semantic approach was introduced using the SKOS format (Simple Knowledge Organisation System) [14] [15]. This will allow the development of more comprehensive water ontology.
- an "Open Source" Content Management System used by the European Environment Agency (EIONET [16]) allowing the sharing of software components, ensuring inter-operability and technical evolution.

NATIONAL WATER INFORMATION SYSTEM

The National Water Information System (NWIS) provides the necessary instruments for water management and governance. EU countries have already adopted such systems and are adapting them to fulfil their obligations (monitoring and reporting) for the EU WFD. An assessment of the current National Water Information System (NWIS) situation has been undertaken in 10 Mediterranean countries [17]. This study highlighted that except for Algeria and Tunisia, none of the countries visited have launched the implementation of a NWIS and that barriers to develop such systems are still significant (data not available, lack of financial and human resources, organisational frame-

Fig. 3:
EMWIS PROMOTION SEMINAR: NICOSIA (CYPRUS), 29/10/2004

work not adapted) although all the stakeholders met are now all convinced of the added value of such a system and identified opportunities for their development (better efficiency and quality of existing exchanges of data, available IT infrastructure, related ongoing projects).

In addition to the five generic topics of EMWIS, four thematic studies have been introduced to provide a synthesis analysis on subjects of interest to the Euro-Med water community. Two of these studies have been completed and are briefly presented in this article (see achievements) and two will be finalized mid-2006: the "Use of non-conventional water resources" and "Irrigation water management".

BEYOND INFORMATION EXCHANGES

In 2003, EMWIS was presented as a model for co-operation during the 3rd World Water Forum in Japan and provided valuable lessons on the development of water information systems for IWRM during the 4th World Water Forum in Mexico. Thus the EMWIS approach of a distributed system, based on the appropriation of the system at local level to meet national needs while being integrated in a regional system; was followed in Latin America with SIAGUA and in Africa with AWIS (see Figure 5). On the other hand, the EU Water Framework Directive [18] (WFD) is being implemented by the 25 EU member states and provides valuable knowledge (methodology, guidance documents) that may benefit non-Med Partner Countries—MPC. To identify the most valuable concepts, EMWIS carried out a survey among the national water authorities of the MPC as well as Basin Organisations [19]. In this context, two EU leaflets presenting the WFD have been translated into Arabic and can be obtained from the EMWIS Technical Unit. This survey shows a lack of awareness of WFD by MPC, but also a strong interest in the follow-up of its implementation in EU Member States. The two first concepts of interest are the characterisation of basins and the monitoring activities. The European Commission is using the conclusions of this survey for working groups of the Joint Process in charge of drafting recommendations for the convergence of legislation for non-EU countries towards the EU standards, as foreseen in the European Neighbourhood Policy.

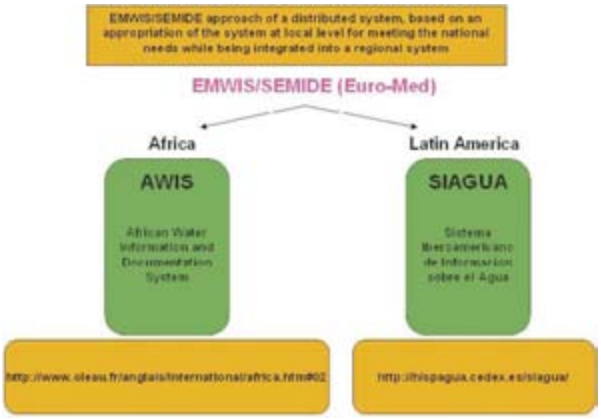


Fig. 5:
EMWIS APPROACH WAS FOLLOWED IN LATIN AMERICA WITH SIAGUA AND IN AFRICA WITH AWIS

An overview of the current policies for local water supply, sanitation and sewage in eight Mediterranean Partner Countries has been produced [20]. It shows positive trends but still limited results on the ground:

Development of new water strategies focus on demand management, socially sustainable tariffs and the economic efficiency of services; a lot of expectations of private sector involvement (investment capital, efficiency); fragmented institutional settings with consequent complex coordination mechanisms and inefficiency; access to drinking water supply is satisfactory although the quantities and the continuity of service are limited; information and data are still too scarce to draw any analysis of sewage, waste water treatment, investments and the costs of services.

STRATEGY FOR THE NEXT TEN YEARS

EMWIS reflects a real need and a strong demand of all the partners. By giving access to knowledge in the institutional, technical, and know-how fields, EMWIS proves to be a very powerful tool supporting the implementation of sustainable development policies in the field of water management.

EMWIS must be considered within a long-term approach, as its implementation must be supported by the evolution of the operating methods of water sector stakeholders in the concerned countries. Thus a gradual approach, taking national water institutions and policies into account, is needed. At their last meeting in Rome in November 2005, the Euromed water directors validated a development strategy for the next 10 years outlined in Figure 6.

Strengthening	National Water Information Systems in all the Mediterranean Countries	• Intranets for IWRM • Better water governance and public participation
Asserting	EMWIS as the reference informationmedia for inland water for the Mediterranean Region	• Maintaining quality and up to date information • Promoting standards information formats and protocols • Collaborating with international and regional initiatives
Providing	a regional water observatory based on national water information systems	• Responding to National strategies • MDG and MSSD - Water and Sanitation issues
Valorising	results from existing initiatives, projects and programmes	• Transferring knowledge from EU programs • Exchanges on IWRM and extreme
Developing	an advisory network of institutional decision makers in the water sector	• Providing guidance to regional programs

Fig. 6:
EMWIS TEN YEARS STRATEGY

PRIMARY TARGETS

The major challenges are related to the development of efficient national water information systems allowing for better water management and governance (including public participation). Further a regional water observation mechanism within the Emwis will be build up to monitor the indicators towards the achievements of the Millennium Development Goals related to water and sanitation in the Mediterranean. Also the water-related section of the Mediterranean Strategy of Sustainable Development will be implemented, based on the information provided by the National Water Information Systems, wherever they exist. Such a system can provide valuable inputs for the new Horizon 2020 initiative for depolluting the Mediterranean Sea. Finally Nfps in the Mediterranean countries who are not signatories of the Barcelona Declaration will be developed, who would request it officially, in particular the Balkan countries and Libya.

FURTHER INFORMATION:

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FRENCH ABSTRACT

Le Semide est un instrument de coopération en matière deau entre tous les pays du Partenariat Euro-Méditerranéen. Le Semide vise à:

- Faciliter laccès à linformation sur le savoir-faire dans le domaine de leau
- Développer la mise en commun dinformations, tout en donnant la priorité aux cinq thèmes suivants:

1) Les institutions engagées dans le domaine de l'eau ainsi que leurs représentants,
2) la documentation dans le domaine de l'eau,
3) la formation dans le domaine de l'eau,
4) les programmes de recherche et développement,
5) ladministration des données

- Développer des produits communs et des programmes de coopération

MEDA WATER INTERNATIONAL CONFERENCE ON SUSTAINABLE WATER MANAGEMENT

TUNIS: 21 TO 24 MARCH 2007

THE CONFERENCE IS ORGANIZED IN THE FRAMEWORK OF THE ZER0-M PROJECT FUNDED BY THE REGIONAL PROGRAM FOR LOCAL WATER MANAGEMENT OF THE EURO-MEDITERRANEAN PARTNERSHIP OF THE EC (www.zer0-m.org)

OBJECTIVES

The conference aims are sustainable water management stimulating the interest of people in water saving, considering treated wastewater as part of the community's water budget, considering the substances contained in wastewater as resources and adopting approaches that preserve the public health and the environment.

In the context of increasing water resources depletion, the conference will focus on water saving, alternative water resources like rainwater harvesting and wastewater reuse after treatment, wastewater treatment technologies suited especially for decentralised sanitation in peri-urban and in rural contexts or tourism facilities located in remote areas.

The conference addresses itself to the competent authorities and all actors involved in the specific field by providing new ideas, knowledge and know-how on various technologies, methods and tools for promotion and decision-making. It represents an opportunity to promote these new approaches among Government Agencies and Municipalities. Successful case studies and salient results from ongoing sustainable water projects will be presented and discussed.

The conference will also provide an opportunity to celebrate the World Water Day 2007 on March 22nd and bring together professionals from government departments, private institutions, consulting firms, research-, education- and training-institutions.

The main topics will be reclamation of treated wastewater, constructed wetlands, greywater treatment, rainwater harvesting, water saving devices, urine seperation, compost toilets.

ANNOUNCEMENT OF WORKSHOPS

Tübitak Marmara Research Center, Gebze, Turkey	End of October 2006	Universities (lecturers and student)
	May 2007	NGOs and interested public
National Research Center, Cairo, Egypt	31. 12. 2006	

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MEDA WATER PROJECTS

www.emwis.org/meda/projects.htm

MEDA Water