	<b>Reporting guidelines</b>	<b>Number of pages:</b> <b>1/11</b>
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<b>Mission reference</b>
2006 C3 T18 M3

<b>Date :</b> <b>13.03.2007</b>
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## Mission report

### Expert Name and Function

**Stela Barova** – junior expert of Monitoring, prognosis and information insurance department


### Wording of missions: *In short, objective or content of mission*

**BSBD Varna- Region of Crete - Directorate of water** project focuses on specific areas of interest, based on Integrated Water Resources Management (IWRM), that have been identified as:

- Implementation of the Water Framework Directive
- (WFD): the GIS work developed Article 5 requirements.
- Groundwater (exploitation and protection)
- Monitoring networks
- Administrative framework (organization of the River Basin authority)

There are specific goals and numerous of expectations associated to the **Region of Crete - Directorate of water** project. Overall, from the twinning between the basin organizations, much is expected to be gained regarding the operation of the other's organization, as well as the exchange of practices and knowledge on IWRM that will help improve their work. Based on the TWINBASIN XN project, it is expected that BOs will:

- Promote a friendly cooperation between water managers.
- Strengthen ties among basin organizations. Improve contact between the basin management organizations participating in the twinning project.
- Encourage the exchange of expertise, knowledge and technical personnel.
- Improve the effectiveness of integrated water management within organizations.
- Improve the overall functional operation of these institutions.

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## 1. CONTEXT

<b>Place, location</b>	<i>Country visited, Basin Organization concerned, other information about location</i> <b>GREECE, CRETE</b> <i>Region of Crete / Directorate of water</i> <i>Address: Ikarou &amp; 2 Stergiou Spanaki .; Heraklion, PC 71307, Crete</i>
<b>Mission duration</b>	<i>One week 25 February – 04 March 2007</i>

## 2. OBJECTIVES

<b>Initial objectives</b>	<b>Results</b>	<b>Results indicator</b> <i>explain with some details how far the results have been achieved if compared to initial objectives</i>
<b>1</b> Exchanging information for the implementation of the Water Framework Directive 2000/60/EC (WFD)	Concept, methodology, and adaptation of WFD for Integrated Water Resources Management (IWRM) in <i>Region of Crete / Directorate of water</i> Monitoring programmes of surface water bodies, groundwater, drinking water	The Bulgarian expert was acquainted with the integrated water management within the requirements of WFD in the region of Crete: <ul style="list-style-type: none"> <li>-Legislative framework</li> <li>-Administrative organization of management structures – functions, obligations, responsibilities, subordination</li> <li>-Practical approaches in decision of specific problems (e.g. technical decisions of problems with groundwater overexploitation, sustainable freshwater supply, etc.)</li> <li>-Cooperation with other institutions related with water resource management and exploitation (e.g. non-profit organizations, scientific institutions)               <ul style="list-style-type: none"> <li>- Stakeholder involvement (e.g. major water users)</li> <li>- Telemetric system of monitoring water and its application in water management</li> <li>- GIS and computer model application in water quality and quantity management,</li> </ul> </li> </ul>

			<p>- Implementation of decision support system.</p> <p>Due to similar problems with integrated water resource management (monitoring and analysis of the precipitation, surface waters and ground waters, saline intrusion, wastewater treatment, coastal and drinking water monitoring and water uses) between the two basins, the developed methodologies in <i>Re water</i> for the adaptation of WFD could be applicable for the BSBD Varna and for other river basins of Bulgaria</p>
2	<p>Water resource management in Crete</p> <p>Implementation of WFD 2000/60 in Greece for running waters.</p>	<p>Current situation, problems and issues were presented</p> <p>Typology and monitoring programmes of surface waters and in Crete</p>	<p>The implementation of sustainable water resource management is being considered to be a priority for BSBD. The following issues of great importance were discussed:</p> <ul style="list-style-type: none"> <li>-Identification of main stakeholders;</li> <li>-Pressures in water management;</li> <li>-Approaches and practice in water management</li> </ul> <p>The BSBD expert was acquainted with the implementation of WFD in the management of surface water in particular:</p> <ul style="list-style-type: none"> <li>-Identification and classification (typology) of surface water bodies;</li> <li>-Chemical status;</li> <li>-Ecological status;</li> <li>-Risk assessment for surface water bodies (qualitative and quantitative);</li> <li>-Monitoring system.</li> </ul>
3	<p>Administrative framework organization of the river basin authority: all departments and their functions.</p>	<p>Technical knowledge about the administrative structure of <i>Region of Crete / Directorate of water</i></p>	<p>As a result of the third final mission the following knowledge about the structure and functions of the two directorates have been gained:</p> <ul style="list-style-type: none"> <li>-The administrative</li> </ul>

			<p>framework is similar. Compared with Basin Directorate in Varna, Basin Directorate in Crete needs of more staff, because at this moment the number of people working there is not enough.</p> <p>-The two directorates are new, but having some common particularities.</p> <p>For example: administrative structure and organization at basin level. It would be interesting to see each department's functioning in depth as well as coordination between <i>Region of Crete/ Directorate of water</i></p>
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### 3. ACTIVITIES DEVELOPED during the mission

<b>Activity 1</b>	<p><b>Topic :</b> <i>(Legal aspects, Regulation, Institutional, Finance, Communication ...)</i></p> <p><b><i>Institutional Framework and Capacity building of Region of Crete / Directorate of water in Heraklion</i></b></p>
<p><b>Description</b> <i>(Exchange of experience or practice, Increasing of knowledge and learning, Development of methodology, Training ...)</i></p>	<p>Exchange of experience and the acquaintance with administrative framework and capacity of Greek institution, responsible for integrated water management at the basin level. Visit to <i>Region of Crete / Directorate of water</i> in Heraklion</p> <ul style="list-style-type: none"> <li>- Description of departments, the sections and their areas of functioning. BSBD expert visited Crete water management structure and observed how it functioned.</li> <li>- The structure was presented by Marinos Kritsotakis - Head of the section of Planning and Development and Aggeliki Martinou – chemist engineer.</li> </ul> <p>As a new institution Basin Directorate in Crete needs of more capacity building for establishment and implementation of the objectives of WFD.</p>

<b>Activity 2</b>	<p><b>Topic: Surface water monitoring programmes according to WFD</b></p>
	<p>Mr. Kritsotakis presented the experience in design of monitoring programmes for surface waters and groundwater:</p> <p>Detailed presentation of the natural conditions of the island of Crete in relation with the water management: water circle, main water users, water balance, naturally and anthropogenic induced problems, protected areas, protection of water resources.</p>

	<ul style="list-style-type: none"> <li>- Surface water typology;</li> <li>- HPI analysis;</li> <li>- Monitoring programmes for surface water;</li> <li>- Register of protected areas.</li> </ul> <p>At this moment BD in Crete meets some problems in determination of hydrobiological monitoring of surface waters, especially for rivers.</p> <p>Both Directorates have finished and reported monitoring programmes for surface waters, coastal and groundwater on 22 March 2007.</p> <p>Basin Directorate - Varna will start some of the measurements of priority substances, physico-chemical and biological quality elements will start later than 2007 because of the lack of institutions that could measure and analyse them.</p>
<b>Activity 3</b>	<b>Topic: Use of computer models in sustainable water management. Telemetric system.</b>
<b>Description</b>	<ul style="list-style-type: none"> <li>- Mrs. Aggeliki Martinou made a demonstration of existing on – line telemetric system for constant monitoring of quality and quantity parameters of groundwater and meteorological conditions;</li> <li>- Mr. Marinos Kritsotakis presented a demonstration of functions of model for management and prognosis of quality and quantity of groundwater and surface waters (RIBASIN).</li> </ul> <p>The Greek experts shared their experience connected with the process of choice of a model, development of the system and exploitation of the system.</p> <p>Until now BSBD does not have any experience in exploitation of a telemetric system and computer models for simulation of quality and quantity of groundwater. The presentations of these topics were very interesting and useful and concerning the future development of the BSBD more exchange of experience is necessary.</p>
<b>Activity 4</b>	<b>Topic: Methodology for collecting data for assessing the ecological status of rivers with intermittent flow</b>
<b>Description</b>	<p>BSBD expert visited Anapodaris river basin situated in the central part of the island of Crete. Experts from Athens showed methodology of taking samples from monitoring sites and filled a protocol (STAR site protocol) in details.</p> <p>It was found that most of the rivers from the Anapodaris river basin have good ecological status.</p> <p>There are photos attached below.</p> <p>Both Directorates meet similar problems as concerns choosing and development of reliable biological quality elements and biotic metrics for assessment of ecological status of rivers with intermittent flow:</p> <ul style="list-style-type: none"> <li>- Region of Crete: Because of natural conditions during the summer, rivers dry up which imposes development of their own bio – indices. They use Italian, French, Spanish and German indexes for improving their own;</li> <li>- Black Sea basin Directorate – an adaptation and development of bio indices for assessment of surface waters is running at present in Bulgaria. Black sea Basin Directorate - Varna uses Irish index, which</li> </ul>

	<p>is adapted for the specific conditions in Bulgaria. This index is based on macrozoobenthic fauna and used in routine biological monitoring for running waters in whole country, until the present moment. In relation of implementation of WFD, Bulgaria will also use other indices representing the quality of other quality elements (phytobenthos, macrophytes, fish). The Irish index in conjunction with the other indices will continue to be implemented in future.</p> <p>There are rivers, which does not have permanent flow during summer at the territory of Black sea Basin Directorate. These rivers are identified as an individual type of surface waters. Bulgarian experts as concerns the quality assessment of the rivers with intermittent flow could use the experience of Greek experts.</p>
<b>Activity 5</b>	<b>Topic: Implementation of WFD. Assessment of ecological status of streams with intermittent flow. Results of a pilot study (Workshop)</b>
<b>Description</b>	<p>BSBD expert attended to a Workshop about the pilot study of Anapodaris river basin area. Representatives from the Ministry of Environment, the government, the Directorate of Crete, local institutions participated the meeting. The programme contained the following activities:</p> <ul style="list-style-type: none"> <li>- A presentation of chemical situation of waters in the Anapodaris hydrological river basin and Mesara plain;</li> <li>- A presentation of ecological status of wetlands in Crete. Biodiversity of the Mediterranean (Northern and Southern part), especially in the island of Crete. Determination of the main sources of pollution (pesticides from different agricultures, wastewaters and substances from the olive and cheese production);</li> <li>- A presentation of implementation of WFD for rivers with intermittent flow. Because of the specific hydrological conditions in Crete and the impermanent flow of the rivers, Greek experts meet some difficulties of determination which biological quality element to be chosen for best representative of this type of rivers.</li> <li>- Discussion about the future consequences after building of a dam in the Southern part of Anapodaris river basin.</li> </ul> <p>Black sea Basin Directorate and Directorate of Ctere could exchange their experience about implementation of WFD related to biological quality elements and metrics for rivers with intermittent flow.</p>
<b>Activity 6</b>	<b>Topic: Approaches for sustainable water use. Stakeholder and scientific involvement</b>
<b>Description</b>	<ul style="list-style-type: none"> <li>- BSBD expert visited Mediterranean Agronomical Institute of Chania (MAICH) where learned about new scientific knowledge and practice for improvement of irrigation of cultures in order to sustainable water use by wastewater treatment and its reuse. In particular she was acquainted with an automatic experimental system for observation of the water need of plants depending on environmental conditions (type of cultivations, soil, air humidity, temperature, precipitation etc.) and farmer's involvement in economic and sustainable water use; There are photos attached below.</li> <li>- Visit to Institute's laboratories for microbiological analyses and genetics</li> </ul>

	<p>of fruits and vegetables;</p> <ul style="list-style-type: none"> <li>- Visit to the botanic garden of Mediterranean Agronomical Institute of Chania. There are more than 200 endemic plant species growing there. Most of them are alpine species found only at the island of Crete (total number of endemic species for Crete is around 1000);</li> <li>- BSBD expert visited Agia lake biotope. It is an artificial lake, used in the past for producing of electricity from local water power plant for the region of Chania town (during the rainfall period). The lake is fed by freshwater from mountains springs. It is constructed 17 years ago. Also Agia lake is an protected area for birds, especially one species of duck. Discussion about the water quality. The ecological status of Agia lake is defined as a very good; <ul style="list-style-type: none"> <li>- Visit Western Crete Development Organization. She was acquainted with the structure and functions of the non-profit management organization. Discussion about integrated management for distribution of drinking water and irrigation supply of the region of Chania. There are two main sources of freshwater – groundwater and mountains springs. The issues discussed and practical experience in monitoring, management and sustainable use of water can be applied also in Black sea region in future.</li> </ul> </li> <li>- Visit to meteorological automatic system for observation of meteorological conditions. Discussion about the system's function in details. There are photos attached below.</li> </ul>
<b>Activity 7</b>	<b>Topic: Monitoring of coastal waters</b>
<b>Description</b>	<ul style="list-style-type: none"> <li>- BSBD expert visited Biology department of University of Crete (Haraklion). Presentation of the laboratories' work, methods for analysing of physico – chemical and biological parameters. Presentation of exhibitions of reptiles, vertebrates, molluscs, geology of Crete and terrestrial and aquatic plants, some of them endemic species for Crete. The exhibition of scorpions is the biggest one in Europe. Discussion about the running projects related to conservation of biodiversity in Crete (Project Life02/NAT/GR/8492 for conservation of Bearded Vulture and Eleonora's falcon) and specific geological structures (European Geoparks under UNESCO); There are photos attached below.</li> <li>- Visit to Marine Biology and genetics Institute of Crete. BSBS expert learnt about the organization of taking samples and analysis (microbiological and chemical) of marine waters and monitoring programmes for microbiological parameters. The issues discussed were of big importance about the BSBD that meets the same problems concerning coastal water monitoring. Due to the tasks connected with implementation of WFD Black sea Basin Directorate could use the great experience of their Greek colleagues and exchange of experience between both structures is necessary.</li> <li>- Visit to the Aquarium of Marine Biology and genetics Institute of Crete.</li> </ul>

## 2. LESSONS LEARNT during the mission

*(What could be shared with other partners and/or introduced in guidelines, as far as IWRM is concerned)*

- **About Methodology :**

The following main accents of the approach for integrated water management in the Region of Crete should be shared with other partners or included in Guidance:

- Approaches for sustainable water management in conditions of restricted water quantity (predetermined by both natural and anthropogenic conditions);
- Approaches for integrated water management in conditions of conjunctive use of surface and ground water.
- Approaches for integrated water management of surface water and protected areas;
- Approaches for sustainable development of wetlands and biodiversity;
- Methodology for ecological and chemical assessment of rivers with intermittent flow;
- Relations with other institutions – scientific, non-profit and stakeholder organizations. Approaches for their involvement in water management;
- Application of GIS and computer models in the process of monitoring, prognoses and management of quality and quantity of water. Approaches for design and optimization of a monitoring set and programme. Methods for control, analysis and assessment of the monitoring data.

- **About Practice :**

The following practical experience should be shared with other partners:

- Irrigation systems for different cultures (non greenhouse and greenhouse cultures);
- Wastewater treatment processes and monitoring of the effluent water and reuse;
- System for observation (monitoring) of the water needs for agriculture;
- System for observation (monitoring) of quantity of waters in an irrigation system;
- Assessment of chemical and ecological status of rivers with intermittent flow;
- Telemetric system for observation of the precipitation and their relation with the groundwater;
- Meteorological automatic system for observation of the meteorological conditions;
- Approaches for estimating of evapo - transpiration and average rainfall;
- **Approaches for conservation of biodiversity in Crete.**
- **Development of projects related to integrated water management.**
- Modelling of water quantity and decision support system.

## 5. **DISSEMINATION (opportunities and difficulties).**

*In what measure these learnt lessons are applicable to:*

### **a) The Basin Organization the expert belongs to:**

The learnt lessons are applicable in BSBD Varna especially for the following departments:

- Water and water economic cadastre;
- Administrative economic department;
- Monitoring, prognoses and information insurance;
- Planning and management department.

The dissemination of information could be performed through the site of BSBD Varna ([www.bsbd.org](http://www.bsbd.org)) as well as directly by e-mailing information to people involved in relevant issues.

### **b) National IWRM practice:**

The learnt lessons are applicable to the Ministry of environment and water MOeW, Water Direction. The dissemination of information could be performed through the

site of MOeW ([www.moew.government..bg](http://www.moew.government.bg)) ,as well as directly to the people involved in different activities .

### **c) Regional experiences:**

The learnt lessons and obtained information are applicable to the International Network of basin Organizations. In particular the Mediterranean Network of Basin organization on the related to the implementation of WFD the EURO- INBO – group. The information could disseminate by Internet through the site of INBO ([www.Inbo.org](http://www.Inbo.org)).

### **d) Worldwide :**

The learnt lessons as well as obtained information are applicable to the International Network of basin Organizations. Particularly The Mediterranean Network of Basin organization is related to the implementation of WFD the EURO- INBO – group. The information could disseminate by Internet through the site of INBO ([www.Inbo.org](http://www.Inbo.org)).

Furthermore the specific web site that has been designed for The TWINBASIN project ([www.twinbasin.org](http://www.twinbasin.org)), could facilitate the exchange of information on best water resources management practices of River Basin Organization.

## **6. IDENTIFIED TIPS**

*Identified tips which could be useful for colleagues*

The mission is characterized as a successful, achieving all goals, and some contributing to that are summarized below:

- An agreement on the agenda before the mission;
- Experts should present the related to the agenda topics;
- PowerPoint presentations;
- Demonstration of software, electronic maps, GIS, etc.
- Inside visit and discussions with the involved experts;
- Preparations of a dossier, including all relevant information, articles, maps etc.
- A learn about the evolution of conveyance system in Crete from early Minoan period (2.500 B.C.) via Romans via huge Venetian's constructions up to the contemporary systems

## **7. PERSONAL COMMENTS**

*What does the missionary think about his mission?*

The mission was very interesting, useful and it was well organized. It should be mentioned that that over 15 people were involved in different activities developed. The people which were involved were experts in are specific field concerning the management of water sources. Furthermore, the hospitality and warmth of all Cretan people (typically southern people trait), turned a business trip to a wonderful experience exchange for all participants. There are photos attached below.

A very important remark is that water management systems are similar, but I found out also that the both Directorates have some differences in some activities. In that reason I determined in details all differences, which help us to decide major problems. As a new institution Basin Directorate in Crete needs of support and exchange of experience with other related national and world institutions.

Bulgaria and Greece are neighbour countries. BSBD, from geographical point of view and according to EU legislation is a responsible body for management of water at the basin level, witch is a management structure at the same level as Directorate of

water in Crete (Heraklion). BSBD is the only Basin Directorate in Bulgaria that deals with the monitoring and management of coastal waters and some very close partnership would be of great importance, providing long term experience of Greek institution in this area.

It was a good experience to see the Greek approach for sustainable water use.

The both Directorates are similar as basin authorities and they are quite close in principles and concepts for implementation of WFD 2000/60/EC.

Visits of historical – archaeological sites (Knossos’ palace and Venetian fountains) help for deeper understanding of development of the area.

Due to the good relations created between the both Directorates my suggestion is the contacts to be continued in future. The projects under Twinbasin are good experience for the experts from different institutions, associated to the water management.

## 8. CONTACTS

*Principal local contacts met*

Name	Occupation	E-mail	Phone Number
PAPAMASTORAKIS DHMHTRIOS	Director of Water Directorate of Crete	watermgn@otenet.gr	00302810278620
KRITSOTAKIS MARINOS	Geologist	marinos@crete-region.gr	00302810278620
MARTINO AGGELIKI	Chemist engineer	martinou@crete-region.gr	00302810278620
ANDROULAKI MARIA	Economist	m.androulaki@crete-region.gr	00302810278620
KOKOLAKIS STERGIOS	Geologist	kokolakis@crete-region.gr	00302810278620
AMARGIANITAKIS IOANNIS	Minor engineer	jamargian@crete-region.gr	00302810278620
PARASKAKIS NIKOS	Technical consultant	oadyk@oadyk.gr	00302810278620
XARITAKIS GIORGOS	Responsible for water distribution for OADYK (geo- agronomist)	oadyk@oadyk.gr	
SPANOUDAKIS MANOLIS	General Director - civil engineer	oadyk@oadyk.gr	00302810278620
VARDOULAKI JENNIE	GIS	jennie@oadyk.gr	00302810278620
XATZIDAKI MARIA	Economist	oadyk@oadyk.gr	00302810278620

## 9. BIBLIOGRAPHY

*Main documents, manuals or supports used during the mission which could be useful for colleagues*

Bibliography	
Name	Description / Notice
<b>“Hydrochemical and ecological quality assessment of a Mediterranean river system”</b>	<b>Prepared by the national Centre for Mrine Research Institute of Inland Waters</b>

Websites		
Name	Description / Notice	Address
	Region of Crete (Authority)	<a href="http://www.region-crete.gr">www.region-crete.gr</a>
	Mediterranean Agronomic Institute of Chania	<a href="http://www.maich.gr">www.maich.gr</a>

*N.B. This framework provides necessary information for further capitalisation and dissemination, but should not prevent experts from making any other comments (as far as basins characterisation is concerned, for instance).*

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2006 C3 T18 M3

<b>Date:</b> 13.03.2007
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## Financial report

<b>Expert Name:</b> Stela Barova
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Start	Departure	days	days cost (€)	travel cost (€)	Total
25 February 2007	04 March 2007	8x70	560.00	420.00	980.00

### Papers to join:

#### **X Original justificatives Plane Ticket and Boarding Pass**

Just keep one copy of due justificatives for yourself.

\* We use the Oanda currency converter to exchange in euro at the date on the travel invoice.

<b>Name and address of the Basin Organisation :</b>
To: Cenka Kostova Vasileva Bank's name: <b>FIRST INVESTMENT BANK - VARNA</b> Bank's address: Varna IBAN code: <b>BG199 FINV 9150 10EU R0FQ 49</b> BIC CODE: <b>FINVBGSF</b>

\*\* IBAN CODE is only for European country.

Send due report to following address:

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