



THE GOULANDRIS NATURAL HISTORY MUSEUM
GREEK BIOTOPE/WETLAND CENTRE



Capacity Building in Albania on Wetland Inventory using Information Systems

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Technical Publication



LIFE 3rd Countries ALWET

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I. INTRODUCTION

In the last decades there is an increased awareness of wetland values and benefits to society. At the same time wetland areas are under pressure from development. In the Millennium Ecosystem Assessment (2005), it is emphasised that a priority when making decisions that directly or indirectly influence wetlands is to ensure that information about the full range of benefits and values provided by different wetland ecosystem services is considered. A wetland inventory provides descriptive and spatial information on the number, extent and other features of wetlands. Wetland inventories feed management and policy planning, towards their conservation. The Ramsar Convention emphasises the importance of wetland inventory as one of the basic tools for the conservation and wise use of wetlands (Resolution IX.1).

Albania is one of the Mediterranean countries where, up until the 40's, wetland ecosystems were formed by a very rich and coherent network of wetland areas. In the beginning of the 50's, the coastal area of Albania included 250,000 ha of natural areas of which 60,000 ha were marshland (Gjijknuri and Peja 1992). However, after the 50's, Albanian wetlands were profoundly altered through the instigation of a marshland reclamation scheme and the expansion of agricultural land against riparian woodland.

A preliminary wetlands inventory at national level which was conducted in 2002 through Hellenic Aid funds by The Greek Biotope / Wetland Centre and ECAT Tirana (Mima et al. 2003) revealed 784 wetlands in Albania, that cover an area of 96,803 ha or 3% of the country's territory. The wetland number includes 16 complex wetland sites with 140 smaller wetlands considered as part of the complex sites. Also, 79 assemblages of small lakes are included, which are comprised of 200 lakes and are also considered as complex sites.

According to the 2002 Country's profile submitted to the Commission on Sustainable Development at the United Nations, in Albania although there are rich wetland resources, knowledge is quite limited, as referred to capacity building, education, training and awareness raising, and also to research and technology.

The ALWET project was conceived to build capacities on wetland inventories using information systems, and therefore to contribute to the conservation and wise use of Albanian wetlands.

I.1 ALWET PROJECT PROFILE

The project “Capacity Building on Conservation of Albanian Wetland Ecosystems (ALWET)” started in January 2004 and ended in December 2006. It was jointly executed by the Environmental Centre for Administration and Technology ECAT –Tirana (beneficiary) and The Goulandris Natural History Museum – Greek Biotope/Wetland Centre (EKBY). The project was co-financed by the European Commission (Life 3rd Countries) and the Directorate General of Forestry and Pastures of Albania with the support of the Ministry of Environment of Albania. The Hellenic Ministry of Foreign Affairs decided to co-finance the effort.

The overall ALWET project objective was to build capacities through transfer of know - how and the establishment of infrastructure for the maintenance of national wetland archives in Albania and thus to promote effectiveness and efficiency in inventory implementation and data dissemination as a prerequisite for wetland conservation in Albania.

The specific project's objectives were:

- To assess existing situation and determine the national needs for building capacity regarding wetland inventory issues.
- To establish basic infrastructure, i.e. hardware and software in order to make relevant bodies capable of maintaining national wetland inventory archives in a compatible form with other Mediterranean countries;
- To transfer knowledge to relevant bodies, focusing on inventory and mapping issues and electronic data management and GIS, in order for them to be able undertake wetland inventory actions compatible with those of other countries in Mediterranean;
- To apply the MedWet Inventory method at 3 levels: catchment, site and habitat level on 3 wetland sites, by scientists trained in the project;
- To disseminate project results at local, national and international level;
- To raise public awareness of: a) the European Union's policy on wetland conservation, b) the MedWet Initiative, c) wetlands values and d) the need for wetland inventories archives.

I.2 AIM AND CONTENT OF THE PRESENT PUBLICATION

This publication aims to make available to the scientific community, the national administrations and other interested bodies information on the technical aspects of the project methods and results. It presents methods and tools widely applied in wetland inventories and moves to the description of the approach applied for the capacity building dimension of the

project. Results are organised under the following headings a) Analysis of Capacity Building Needs, and b) Capacity Building Interventions. The latter are further discerned into i) Stakeholders Involvement and Networking, ii) Knowledge Transfer, iii) Development of Infrastructure and iv) Dissemination of Information and Results. The conclusions drawn from the whole process are cited at the end.

II. METHODOLOGICAL APPROACH

The methodological approach of the ALWET project is split into two broad fields: (i) Wetland inventories and (ii) Capacity building. The conceptual context of each field is presented below.

The project proposal, the deliverables and the technical reports that were produced have been used as sources of information for the development of the present publication.

II. 1 WETLAND INVENTORIES

A wetland inventory is recognised as necessary primarily for: (i) keeping a comprehensive record of the present requirements for wetland conservation and management up-to-date and answering questions such as: on what types of wetland should priorities focus? what are the most important features to be conserved? (ii) obtaining, analysing, developing, demonstrating and disseminating scientific information about wetlands; (iii) enforcing the development of a legal framework for the protection and/or restoration of wetlands; and (iv) encouraging local communities to practice a wetland sustainable management.

A review conducted by Hecker and Vives (1996) concluded that international wetland inventories had not used common definitions and systems compatible at international level especially for wetland typology, data categories collected, selection criteria, etc and there was no standardization until then. Moreover, Finlayson and Spiers (1999) showed that the then existing wetland inventory base worldwide was inadequate for assessing the distribution and different types of wetlands, the extent of likely impacts and vulnerability, the role of wetlands in climate change and the loss of wetland related economic and ecological values. Even later, Finlayson (2001) reported that: (i) comprehensive wetland inventories exist only for a few countries; (ii) much of the wetland inventory information collected had been largely descriptive, and/or stored in forms which could be easily manipulated to provide answers to fundamental questions, such as the spatial extent of wetlands and how many wetlands exist; (iii) a widely accepted basic standardised approach and standardised methodologies were not available.

In response to the lack of a standardised approach and the urgency to address wetland loss and degradation, the MedWet Initiative has developed and further updated appropriate methods and tools for wetlands inventories. Furthermore, the Ramsar Convention proposed the “Framework for Wetland Inventory (FWI)” (Resolution VIII.6) which provides common standards, ensuring consistency in the collection of a core (minimum) dataset, and the “Integrated Framework for Wetland Inventory, Assessment and Monitoring (IFWIAM)” (COP8 DOC. 16 Information Paper) which addresses the wetland inventory, assessment and monitoring as tools for the conservation and wise use of wetlands worldwide.

More now, than ever before, up-to-date information is highly required in order to detect and be able to address rapid changes, intensive land use practices and increasingly complex environmental issues. Thus nowadays, the use of information systems, such as remote sensing, GIS and databases, is highly recommended in the inventory process. The use of advanced tools and innovative techniques and more specifically, the use of earth observation coupled with the use of geospatial data management techniques allow advanced processing and presentation of data including the ability to: capture and process data at higher accuracy levels, hold inventory data in digital format, present and interpret reliable inventory results, report in short time intervals and at multiple scales. Moreover, low-cost Geographic Information System (GIS) software and data have the capacity to be an extremely valuable tool for wetland inventory, assessment and monitoring applications (Lowry 2006). Figure 1 illustrates the different inventory processes (i.e. data capturing, processing, storage, retrieval and presentation) that can take advantage of the use of information systems such as remote sensing, GIS and databases.

Within the ALWET project, the above were translated into two key considerations:

- a) Inventories need be undertaken by applying standardised methods (including a world wide accepted habitat classification system) and using interoperable information systems so as to serve compatibility amongst nations, regions or even projects carried out at the same country; and
- b) Inventories should take advantage of modern technology tools, such as remote sensing and GIS for effective data capturing, storage, retrieval and reporting,

In this respect, the MedWet Wetland Inventory method and tools (Costa et al 1996, Farinha et al. 1996, Hecker and Vives 1996, Zalidis et al 1996)¹, developed by the MedWet Initiative as

¹ The MedWet inventory method includes a manual and a suite of publications on separate but linked tools (i.e. datasheets, database, mapping protocols). It was conceived not only as a means to register in a systematic way current knowledge on wetlands, but also as a powerful management tool, allowing in depth understanding of the situation in each wetland and assessing the impact of management measures. It was based on four main features: it should be: a) standardised to allow consistent use throughout the region and to allow comparisons between inventories, b) comprehensive, to include all relevant information, c) flexible, to allow use by entities with diverse

a standard methodology for wetland inventory in the Mediterranean region, and the Ramsar Framework for Wetland Inventory (FWI)², were followed, and combined with the most up-to-date information systems.

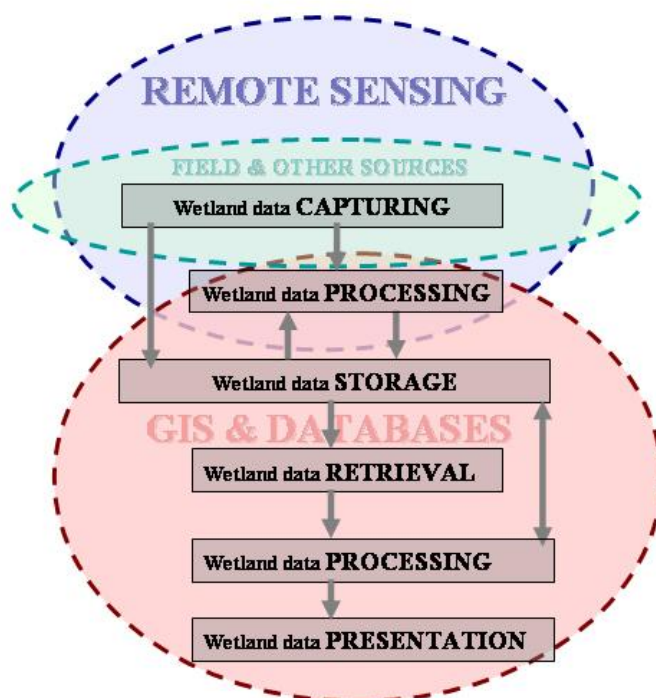


Figure 1: Wetland Inventory using Information Systems: processes (wetland data capturing, processing, storage, retrieval, presentation) and workspace environments (Remote Sensing, Field & Other Sources, GIS & Databases).

resources, and d) compatible, to assure comparisons and exchange of information with ongoing programs, such as the Ramsar database, the CORINE biotopes and the EU.s Natura 2000 network. It is noted, that the MedWet inventory toolkit is under revision which is expected to be published after 2007. The revision regards: (i) inclusion of additional datasheets to cover new fields (i.e. the Water Framework Directive, indicators, socioeconomics), (ii) enrichment of the method with a remote sensing module to provide basic knowledge and guidelines on the use of remote sensing data, and (iii) transformation of the MedWet Database into a Web Information System applicable to be used both by individual bodies or countries for storing and processing their inventory data and by regional entities and organisations for making status and trends assessments.

² The FWI has been developed by the Scientific and Technical Review Panel (STRP), working with the Ramsar Bureau, Wetlands International, the Environmental Research Institute of the Supervising Scientist (Australia) and others, in response to the recognized need of applying comprehensive national inventories as the vital basis for many activities necessary for achieving the wise use of wetlands, including policy development, identification and designation of Ramsar sites, documentation of wetland losses, and identification of wetlands with potential for restoration (Resolution VII.20). The FWI provides guidance on a standard approach to designing a wetland inventory program. It includes information on determining appropriate remote sensing techniques to apply, wetland classifications and existing standardised inventory methods, and recommends standards for core data fields and data and metadata recording. Furthermore the FWI provides guidance for designing wetland inventory at multiple scales from site-based to provincial, national and regional. It comprises 13 steps applicable to the planning and implementation of any wetland inventory. It should be used as a basis for making decisions for undertaking a wetland inventory under the circumstances particular to each inventory program. Guidance on the application of each step is provided.

II.2 CAPACITY BUILDING

II.2.1. The approach to Capacity Building

Capacity building is conceived as a process consisting of analysis, planning, implementation and evaluation of capacity building interventions (Figure 2).

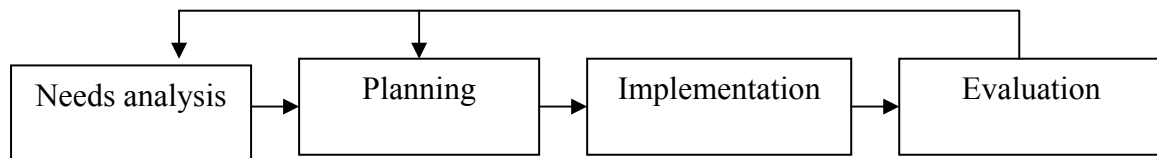


Figure 2. The capacity building process.

As capacity and capacity building are bound to the specific conditions of each region or each institution, the approach for conducting a systematic capacity building needs assessment should take these specific conditions into account, and select tools and instruments for the needs assessment process, which are adjusted to the existing conditions (GTZ 2005). In fact, experience has shown that the process of assessing or measuring capacity is as important as the implementation of targeted capacity building initiatives, especially if the assessment process involves participatory group discussions, workshops and joint assessment exercises.

The assessment tools should be selected according to the specific needs and resources. In selecting tools, one should consider the level of effort and resources required to develop the instrument, and to collect and analyse the data. Using several tools might provide richer and more comprehensive information and might help to balance their respective weaknesses.

In the ALWET case, the capacity building process involved 5 steps: (i) preparation, (ii) needs analysis, (iii) design and planning, (iv) implementation and (v) evaluation and re-planning. The aims, means and outputs of each step are presented in Table 1.

Table 1: Steps of the capacity building process

Aim	Means	Outcomes
STEP 1: PREPARATION		
<ul style="list-style-type: none"> - Identification of key issues to be addressed by the capacity building interventions of the ALWET project. - Agreement on project objectives, establishment of the workplan, determination of responsibilities, roles and functions to be performed by the project partners and the various stakeholders. 	<ul style="list-style-type: none"> - Development of the ALWET project proposal. - Conclusion of the project contract and the partnership agreement. - Establishment of project bodies charged with capacity building tasks. 	<ul style="list-style-type: none"> 1) Feasible project implementation plan. 2) Involvement of representatives from bodies which are likely to play a key role in the capacity building interventions
STEP 2: NEEDS ANALYSIS		
<p>Identification of existing capacity gaps in view of:</p> <ul style="list-style-type: none"> - Wetland conservation and management in Albania. - training needs at national level 	<ul style="list-style-type: none"> - Project task on the assessment of the current status and the identification of training needs, involving: <ul style="list-style-type: none"> (i) A questionnaire survey combined with focus group meetings. (ii) Capacity Gap Analysis. 	<ul style="list-style-type: none"> 1) Preliminary assessment of the current status of conservation and management of Albanian wetlands focused on the identification of gaps that could be filled in through training. 2) Priorities for training including its objective, target

<p>regarding a) wetland inventory, and b) electronic data management and GIS.</p> <ul style="list-style-type: none"> - Software development to cover national wetland data management. 	<ul style="list-style-type: none"> (iii) Identification of Training Needs. (iv) Identification of possible solutions. <ul style="list-style-type: none"> - Questionnaire survey on the establishment of basic infrastructure for the maintenance of national wetland inventory archives on: <ul style="list-style-type: none"> (i) the problems, constraints, and new needs regarding the Inventory Data Sheets and the MedWet Database in terms of content (fields, annexes), and functionality (interface, tools, reports), and (ii) the possible national scheme for maintaining the national wetland inventory archives. 	<p>groups and content</p> <ul style="list-style-type: none"> 3) Priorities for the “Adaptation of the MedWet Inventory Method” 4) Requirements for the establishment of a Database and GIS Unit at ECAT
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STEP 3: DESIGN AND PLANNING

<ul style="list-style-type: none"> - Design and planning to transform identified capacity building needs into capacity building interventions within the ALWET project. 	<ul style="list-style-type: none"> - Detailed design and planning of implementation of a set of inter-related activities for knowledge transfer, development of infrastructure, the promotion of stakeholder involvement and dissemination of results. 	<ul style="list-style-type: none"> 1) Design and planning of training activities including: <ul style="list-style-type: none"> - Design of the training package “Wetland Inventory Using Information Systems”. - Teaching plan for the ALWET training seminars. - Design of activities to apply the knowledge and skills acquired through training and to provide with feedback on the effectiveness of training. 2) Design of software to cover extra national needs on data archiving.
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		3) Technical specifications and description of the needed software packages and hardware units for the establishment of a Database and GIS Unit at ECAT.
STEP 4: IMPLEMENTATION		
<ul style="list-style-type: none"> - Implementation of capacity building interventions. 	<ul style="list-style-type: none"> - Project tasks on the transfer of knowledge. - Project tasks on the development of infrastructure. - Project tasks for promoting stakeholder involvement and dissemination of results. 	<ol style="list-style-type: none"> 1) Training package “Wetland Inventory Using Information Systems”. 2) Trained Albanian scientists and trained future trainers. 3) New modules to the MWD. 4) Established Database and GIS Unit at ECAT-Tirana. 5) Wetland Data Sheets, Digital wetland habitat maps and MWD archives for selected sites. 6) Information material. 7) Routes of communication among stakeholders.
STEP 5: EVALUATION & RE-PLANNING		
<ul style="list-style-type: none"> - Evaluation of outcomes and impacts obtained from capacity building interventions and re-planning. - Evaluation may lead to modifications of the needs analysis or/and the design of interventions. 	<ul style="list-style-type: none"> - Implementation of LIFE Standard Administrative Provisions. - Overall project management . 	<ol style="list-style-type: none"> 1) Assessment of training. 2) Final project report. 3) Proposals for future action on a) wetland conservation in Albania and b) Application of project results in other cases.

II.2.2 Methods for analysing Capacity Building needs

Capacity building needs analysis was based on: (i) questionnaire surveys and focus group meetings and (ii) other inputs related to the establishment and operation of the GIS department at ECAT-Tirana and to the Adaptation of the MedWet Database in Albania.

II.2.2.1 Questionnaire Surveys and Focus Group meetings

The capacity building needs analysis was based on two main sources of information a) a questionnaire survey, combined with focus group meetings, applied for the Training Needs Analysis and b) a questionnaire survey on the “Adaptation of the MedWet Inventory Method”.

1) With regard to the former, the target group were scientists working in organisations active on wetland conservation and management, namely scientists working in: (i) the Educational and Research Institutes, (ii) the Central and Regional Services and (iii) the Non Governmental Organisations (NGO). For each organisation, a list of scientists, including the Head of the organization, was developed.

Two questionnaires were developed:

- i. The questionnaire entitled “Conservation and management status of wetlands” focused on the understanding of the status of wetland management in Albania.
- ii. The questionnaire entitled “Training needs at national level regarding a) wetland inventory, and b) electronic data management and GIS”.

These questionnaires were developed in order to obtain information on three main issues, i.e.: a) the current status of conservation and management of Albanian wetlands, b) the current level of knowledge of the Albanian scientists, and c) the training needs according to the Heads of the organizations and to their employees.

The questionnaires were designed to gather both qualitative and quantitative data.

An “Adaptation Working Group (AWG)”, which consisted of the ALWET project Administrator, the Scientific Coordinator and three Albanian scientists, was responsible for the distribution of the questionnaires to the target groups and for the coordination of their filling in.

Overall, the questionnaires were circulated to 92 scientists in 47 organisations.

A series of focus groups meetings with the Heads and representatives of several organisations were held in order to a) facilitate the questionnaire survey and b) complement the results of the questionnaire survey.

The analysis of quantitative data involved frequency counts and calculation of percentages. The analysis of answers to open format questions was approached through content analysis, both relational and conceptual.

The analyses of questionnaires described above were supplemented by the input provided from the focus group meetings. This input came in the form of the minutes of each meeting.

Training activities were designed accordingly. The objects of the design were:

- To define the general objective of the training package and its content,
- To select the modules and individual themes to be taught,
- To formulate the teaching objectives of each module,
- To determine the teaching approaches to be used,
- To prepare the teaching plan and establish the teaching hours to be covered,
- To determine the structure of the material contained in the package.

Overall, adult training tools were applied in the training package and modern teaching approaches on the learning process were taken into consideration (Courau 2000, Race 1999, Rogers 1998). These tools, which are suitable for various types of learning, differ from one another in the kind of interaction created between instructor and trainees and in the degree to which they favour the development of initiative on the part of the latter (Rogers 1998). Lectures, for example, are “teacher-centred” and permit interaction only between the instructor and individual trainees, whereas the other methods foster interaction among the participants and encourage individual initiative. These methods are frequently used in combination: thus, a group discussion may precede or follow a discovery activity. The training package is structured in such a way so as to allow the instructor to use it according to the trainees’ experience and needs and also according to the objectives, level and duration of each training programme in which it is used.

2) A questionnaire survey on the “Adaptation of the MedWet Inventory Method”.

The target group consisted of scientists that had been involved in wetland conservation projects in Albania. Overall, the questionnaires were circulated to 19 scientists.

The Adaptation Working Group (AWG), distributed the questionnaires, promoted their filling in through personal interviews, analysed the answers received and drafted the report “Adaptation of the MedWet Inventory Method”. The answers to closed format questions were

tabularised, whereas the answers to open format questions were analysed according to their content (content analysis).

II.2.2.2 Other input to the assessment of capacity building needs

A. Input related to the establishment and operation of the GIS department at ECAT-Tirana

As part of the Capacity Building needs analysis, the necessity and the requirements related to the establishment of data management infrastructure in Albania were discussed and defined. These were based on the one hand on the opinions of Albanian scientists on relevant aspects that were derived from the questionnaire surveys described above (i.e. on what organization would be ideal to provide services on data management, or on what would be the ideal scheme, in Albania, for wetland inventories). Significant input also came from a) the identification ECAT's perception of the objectives and functions of a Data Bases and GIS department and b) previous knowledge and expertise of EKBY on wetland inventorying using information systems.

The hardware, software and communications required in order to support the above functions as well as the related operational requirements were specified on the basis of an investigation of the available technologies and infrastructure in the market and on the available funds for the establishment of the department.

B. Input related to the Adaptation of the MedWet Database in Albania

In addition to the Albanian scientists' comments on problems, constraints and new needs regarding the MWD in terms of content (fields, annexes), and functionality (interface, tools, reports) that were collected through the questionnaire survey on the "Adaptation of the MedWet Inventory Method", the requirements for the adaptation of the MedWet Database in Albania were assessed on the basis of:

- a) Comments and proposals for modifications that have been put to the attention of EKBY by users of the MWD in Albania and elsewhere in the Mediterranean in its capacity as a member of the Inventory Working Group of the MedWet Initiative.
- b) The conclusions of the Technical Meeting of the 6th Mediterranean Wetlands Committee meeting (Tipaza, December 2004).

III. RESULTS

III.1 CAPACITY BUILDING NEEDS

III.1.1 Wetland Conservation and Management in Albania

The information on the current status on wetland conservation and management in the country was collected through the “Conservation and management status of Albanian wetlands” questionnaire survey. A total of 34 scientists participated (37% response rate). The respondents covered all target groups (Central and Regional Services, NGOs, Educational and Research Institutes). The results are presented in the TNA report (Hatziiordanou and Fitoka 2005). The main findings are as follows:

- A significant number of organisations in Albania (71%) are related to wetland management.
- The activities and responsibilities of organisations, with regard to wetlands, are related to the following: control of current activities in wetlands, sustainable use of wetlands, protection, management and monitoring of natural resources (wetlands, water, habitats etc.), environmental impact assessment of various activities, and environmental analysis. Few organisations are involved in wetland inventory, mapping and data management.
- For the majority of respondents wetland management in Albania is not sustainable. The main reasons for this situation appear to be unclear legal framework regarding wetland management; low environmental awareness; lack of human capacities, equipment, financial means and manuals; weak coordination of activities between different institutions and specialists from different fields; absence of a steering committee for wetland management. It must be stressed that most of the above factors have been found more or less to hold true for wetland conservation all over the Mediterranean basin even in the economically advanced countries.
- The organisations related to wetland management in Albania are not as efficient as desired. Most of the organisations would wish to have more governmental funding and better-trained personnel. Lack of documentation on the wetland inventory methodology, especially available in the Albanian language seems to be another problem.

Given that the survey was focused on the identification of gaps that could be filled in through training, it is highly likely that positive developments and achievements with regard to wetland conservation in Albania are under-presented.

III.1.2 Maintenance of National Wetland Inventory Archives

The information on the maintenance of national wetland inventory archives was collected through the questionnaire survey on the “Adaptation of the MedWet Inventory Method”. In total, ten responses were obtained (53% response rate).

The results comprised:

1. An assessment of past efforts of application of the MedWet method.
2. Opinions on the possible scheme for the maintenance of the national wetland inventory archives.

The main findings were:

- The structure and the layout of the Inventory Data Sheets were considered fit for purpose. Weaknesses in the application of the MedWet inventory method in the past regarded the collection of field data, mapping and the application of GIS tools.
- There was poor experience on the application of the MedWet Database (MWD).
- There is interest in using the MWD for establishing a national standard for managing information on wetlands and in gaining experience from other countries with regard to the use of modern wetlands data management tools in decision making.
- Ideally, the MWD would be integrated with other existing information systems. However, the specific requirements for an integrated system were not clear; lack of maturity also applied to the integration of requirements stemming from the Water Framework Directive in the MWD.
- The most appropriate organisation to lead wetland inventories, report inventory data and disseminate information is the Ministry of Environment, Forest and Water Administration (MEFWA).
- State and private organisations with GIS capabilities, such as ECAT Tirana, the Soil Research Institute, the Institute of Geography, the Institute of Forests and Pastures and GeoAlba could be responsible for the management of inventory data. Private organizations could participate on a contractual basis.
- The state services are the most appropriate organisations for seeking funding for wetland inventories, with the MEFWA heading the list. Among non-state organisations/NGOs, ECAT Tirana is considered the most appropriate body.

Based on the above findings, the following scheme could be proposed for the management of wetlands inventory data:

- The MEFWA could lead the process of maintaining national wetland archives.
- The national wetland archives could be hosted in structures closely related to the MEFWA.
- A detailed inventory of Albanian wetlands according to the MedWet methodology, including wetland mapping, is needed. Screening of the existing information in MEFWA archives could provide an input. Periodic information updating should be planned.
- Internationally sponsored projects can provide information on specific sites.
- It has recommended that future wetland related projects are planned so that information is collected according to MedWet standards.

III.1.3 Training Needs

A total number of 48 scientists answered the questionnaire “*Training needs at national level regarding a) wetland inventory, and b) electronic data management and GIS*” (52% response rate). Most of the responses came from Educational Research Institutes (42%) whereas the remaining covered almost equally the rest of the target groups (Educational Research Institutes, Central and Regional Services and Non Governmental Organisations).

Through the Training Needs Analysis (Hatzjiordanou and Fitoka 2005) i) the level of knowledge of Albanian scientists as regards wetlands inventorying and the use of information systems was assessed and ii) the perception of Heads of organizations involved in wetlands inventory, electronic data management and application of GIS, and of their employees, of training needs at national level regarding a) wetland inventory, and b) electronic data management and GIS were recorded.

The main findings were as follows:

(i) Current level of knowledge of the Albanian scientists:

- There is little experience in wetland inventorying at site level and lack of experience at national level. Scientists are more experienced in the use of field data in combination with base maps. Experience in using aerial photos and satellite images and in photo-image interpretation for wetland identification and mapping is limited.
- The majority of employees have limited experience in using information systems in general. They use databases at a basic level. Few use remote sensing software for image and map georeferencing, image classification and photo interpretation purposes. There is also lack of knowledge of basic issues related to geodesy and cartography. Few

employees use GIS.

- Only part of the capabilities offered by GIS are used; GIS are used mainly for digitization and thematic mapping (land use maps, habitat maps, forest maps, biotope maps, protected areas maps).

(ii) Training needs according to the Heads of the organizations and to their employees.

- Most of the TNA questionnaire respondents considered the training in wetland inventory to be of high importance (62% out of 22 respondents). Similar interest was expressed for training in databases and GIS for wetlands inventorying (56 and 55% out of 22 respondents respectively). There was strong interest in basic GIS training. There was also a request for training on the most updated GIS software package (ArcGIS or equivalent). Interest was also shown in case studies on specific wetland inventories.
- The training should offer knowledge and skills that are necessary in order to:
 - plan a wetland inventory at national and site level;
 - gather and collect inventory data on wetlands systematically by applying standardized methods so as to increase compatibility both among Albanian bodies and with other Mediterranean countries;
 - extract information from aerial photos or satellite images, using Remote Sensing techniques;
 - manage collections of field data using databases and specifically the MedWet database;
 - use GIS tools for data management, mapping and geodetic purposes;
 - use advanced GIS tools for data processing, analysis and visualization.

III.2 CAPACITY BUILDING INTERVENTIONS

The capacity building interventions that were made during the ALWET project fall into 4 fields: (i) stakeholder involvement and networking, (ii) knowledge transfer, (iii) infrastructure development, and (iv) dissemination.

III.2.1 Stakeholder Involvement and Networking



ALWET kick of meeting (EKBY's Archive)

The identification, involvement and empowerment of stakeholders were a key consideration of the ALWET project. Their identification was one of the first steps of the process and was based on existing records of project partners and questionnaire surveys.

More specifically: The involvement of the key stakeholder for wetlands management in Albania, i.e. the Albanian Ministry of Environment was ensured through his chairing of the project Steering Committee. The Committee was formed to guide and supervise the capacity building activities in order to adequately respond to identified needs.

The formation of a scientific body, which was named as Adaptation Working Group (AWG), proved valuable in linking stakeholders and promoting their cooperation in activities of scientific and technical nature. Their operation contributed greatly to the quality of project training activities and the development of infrastructure for the maintenance of wetland archives. Their knowledge of local conditions proved substantial.

The input of all stakeholders during the design and planning stage of project activities was sought after; several meetings and focus groups discussions enabled the expression of their

The establishment of networks, across institutions, geographical range, administrative structures and fields of authority and expertise as a capacity building dimension, was an essential mechanism that fostered communication, interaction and synergies. Within the ALWET project, each stakeholder group was attributed a distinctive role. Meetings and workshops, web information systems and databases, were used to increase the level of motivation, to support their operation and to ensure their enhanced contribution according to their capacities.

opinions and recommendations. A comprehensive list of stakeholders involved in wetland conservation that gather and keep wetland data is now available.

Numerous meetings and personal communications were made. Personal interaction strengthened working relations and commitments. It not only facilitated project implementation, but can also be seen as a long-term investment in wetlands conservation.

Training actions brought together thirty-five scientists from different backgrounds and institutions. Those among them that had been trained as trainers are hoped to act as catalysts in the transfer of knowledge to other stakeholders.

The installation of the MedWet Database (MWD) in several organisations strengthened their capacity in the management of wetland inventory data. The organisations had been screened against criteria such as their capacity and involvement in wetland conservation. The MWD was installed in the Albanian Ministry of Environment, Forest and Water Administration, Regional Environmental Agencies (REAs), Educational and Research Institutes, and Non Governmental Organizations, which now share a better understanding of the significance of wetland inventory and of the available methods and tools.

The project closing meeting was instrumental in discussing the future of cooperation for wetlands conservation and contribution of various stakeholders through more formal mechanisms.

III.2.2 Knowledge Transfer

Knowledge transfer in Albania has been achieved through:

- (i) The development of a training package entitled “Wetland Inventories using Information Systems”(Fitoka and Hatziiordanou 2006);
- (ii) The organisation of three training courses. Two were addressed to trainees of beginners’ and advanced level of knowledge, and one to future trainers; and
- (iii) The pilot application on wetland inventories using information systems at three wetland sites.

These are presented below.

III.2.2.1 Training Package

The training package has been designed to support the implementation of training in “Wetland inventory using Information Systems” of scientists active in the field of conservation and management of wetland resources, notably those working in central and regional services, educational and research institutions, and non-governmental organisations. Its design was based on the Training Needs Analysis in Albania (Hatziiordanou and Fitoka, 2005) and built on the existing experience of EKBY in wetland inventories using modern technology tools and in adults training.

Objective and Scope

The overall objective of the training package is to build capacities of scientists involved in wetland conservation in order to advance their knowledge and make them capable to undertake wetland inventories using modern technology tools like remote sensing, databases, and Geographic Information Systems (GIS), in line with the Ramsar Convention relevant framework and the MedWet Inventory Method. Various fields of knowledge, i.e. wetlands, databases, GIS, are organised in four strongly interrelated modules: i) Wetland Inventory, ii) Remote Sensing, iii) GIS, and iv) Databases. It incorporates most up to date methods on data recording, storage, retrieval, processing and presentation.

Structure

A training package should (i) describe its objectives and content; (ii) provide trainers and trainees with guidelines on how to use the training package; (iii) contain material to be used to implement learning activities; (iv) include wrap-up procedures in order to assess the knowledge and skills that trainees have acquired through the learning activities.

The project training material is divided in four training modules: a) Wetland Inventory, b) Remote Sensing, c) Geographic Information Systems and d) Databases. Each module includes:

- Main Texts, addressed to trainers;
- Activity Sheets, addressed both to trainers and trainees;
- Guidelines for the Activity Sheets, addressed to trainers;
- Complementary material (Lectures, Data and Supportive documents), addressed to both trainers and trainees;
- Evaluation tests and wrap – up activities.

III.2.2.2 Training Courses

Three training courses were undertaken. The first one, “Train the Trainers Course” was addressed to a limited group of scientists, who would serve as future trainers in Albania. Its objective was to train them in the training subject matter and in how to use the training package.

The second one, “Beginners Course” was addressed to Albanian scientists with basic knowledge on wetland inventories and the use of information systems. More specifically, the



“Train the Trainers” Course: 28th February - 4th March of 2005, EKBY, Thessaloniki, Greece.



Trainees and trainers of the Beginners Course, 1st June - 6th June of 2005, INIMA, Tirana, Albania.



“Beginners” Course: GIS module, 1st June - 6th June of 2005, INIMA, Tirana, Albania.

trainees had a university degree, some experience in wetland inventorying, previous basic knowledge on databases and GIS, and basic computer knowledge.

The third one, “Advanced Course” was addressed to the group of scientists who had successfully completed the “Beginners” seminar or possessed equivalent knowledge on wetland inventory using information systems.

Specific teaching plans (on the two different levels of training, beginners and advanced), were developed in order to meet the needs of the target audience and specifications set by the ALWET project (predetermined duration and budget).

III.2.2.3 Pilot Application

The pilot application regarded the implementation of a detailed wetland inventory at three wetlands following the MedWet Inventory Method. The wetland sites were selected according to specific criteria (data availability, urgency of conservation and management action, designation and legislation status, wetland type and size, geographical location), and are: (i) Butrinti Lake, (ii) Dumre Lakes, and (iii) Small Prespa Lake.

In the pilot application separate project elements were joint, namely:

- Albanian scientists that had been trained in the ALWET training courses undertook the inventory at the sites and produced the inventory archives and the wetland maps;
- The “Data Bases and GIS” department that had established through the ALWET project at ECAT-Tirana organised the inventory process and used remote sensing sources, GIS, and the MedWet Database to compose the wetland maps and store the inventory data.
- The inventory data was stored in the MedWet Database (v.3.0.1) that had been adapted as part of the ALWET project.

The pilot application resulted in: (i) inventory archives of MedWet format for the three wetland sites, their catchments, sites, habitats, fauna, flora etc and (ii) wetland maps of the sites and their catchments. Below are presented more details on these outputs:

(i) Inventory Archives in MedWet format

Inventory archives were produced by recording inventory data for each pilot wetland site with the use of the MedWet Data Sheets and the MedWet Database (v.3.0.1). Data were mainly derived from: the Inventory of Albanian Wetlands project (Mima et al. 2003), the 2001 Albania Forest Inventory, data sources provided by the Institute of Hydrology and the Institute of Soils, the Statistical Yearbook data and other available literature on the sites. Data related to habitat coverage and plant communities were updated through field visits and from provided by local authorities.

(ii) Wetland maps

Wetland maps (Figure 3 and 4) were produced by applying the MedWet Inventory method and with the use of information systems for each pilot wetland site. Mapping was based on remote sensing data (aerial photos for Butrinti Lake at 8 m resolution, SPOT images for Small Prespa Lake at 5 m resolution, and ASTER images for Dumre Lakes at 15 m resolution) coupled with field data and experts’ knowledge.

Wetland maps reflect the three level hierarchy of the inventory process, namely (a) catchment area, (b) wetland site and (c) wetland habitat. In particular, maps depict the land cover of the catchment(s) area of the wetland according to the CORINE Land Cover

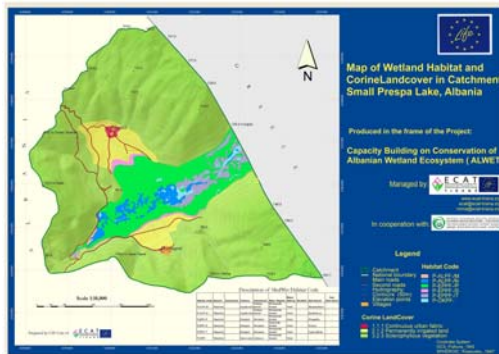


Figure 3: Wetland site and catchment map of Mikri Prespa Lake

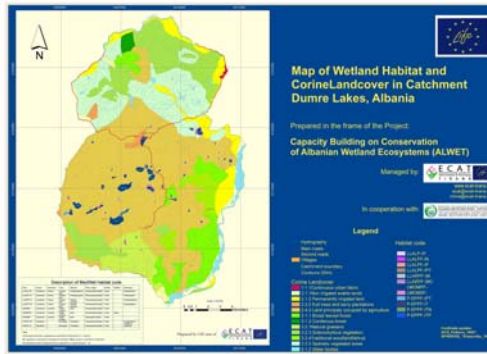


Figure 4: Wetland site and catchment map of Dumrea lakes

III.2.3 Infrastructure Development

Towards the establishment of basic infrastructure for the maintenance of inventory archives for the Albanian wetlands the following were elaborated:

- (i) A Database and GIS department established and at ECAT-Tirana;
- (ii) The MedWet Database (MWD) software modified according to the needs analysis carried out within the project, as a tool for wetland data storage, retrieval and processing.

Below more details on both outcomes are presented:

III.2.3.1 Database and GIS department at ECAT-Tirana

The establishment of the department was achieved through: the determination of its objectives, the purchase of hardware and software, its staffing, and training of the staff, including trainers' training in order to enhance the capacity of the department to organise training courses in the future.

The Database and GIS department at ECAT – Tirana that has been established through the ALWET project with the capacity to carry out inventory and monitoring of natural resources with the use of modern technology tools.

In particular, the functions of the GIS department were determined to be the following:

- Spatial data digitisation, scanning, processing and archiving;
- Remote Sensing data processing and archiving;
- Map composition and production using spatial and Remote Sensing data;
- Spatial data analysis (area & volume calculations, overlaying);
- Data base management and query.

To perform the above functions, a set of protocols on hardware, software and operational requirements has been developed, taking into consideration the available technologies and infrastructure in the market. The protocol includes the ideal requirements for the full operation of all functions of the department. The operational requirements will each time depend on actual projects and activities. One person may combine knowledge and skills that enable him/her to cover more than one of the job positions described.

The Databases and GIS Department operated successfully during the life project. It has coordinated and assisted the pilot application, provided spatial analysis of geographical data under the request from national authorities, and organised training courses on the use of GIS software and spatial analysis to address needs of Regional Environment Agencies, research institutes and students.

III.2.3.2 Adaptation and promotion of the MedWet Database (MWD)

In Albania, the MedWet Database (MWD), had been already used to store and manage the data for 784 wetland sites that were inventoried during the project “Inventory of Albanian wetlands” (Mima, et al. 2003). The adaptation of the MWD and the release of MWD v.3.01 were based on the needs analysis carried out within the ALWET project.

The MWD was installed in 11 Albanian bodies (Ministry of Environment, Forest and Water Administration, 2 non-governmental organisations, 5 educational and research institutes, 3 Regional Environment Agencies). The installation of MWD at governmental services and institutes has promoted its use as a user friendly and widely accepted tool to Manage the wetland inventory data of Albania. A revised users’ manual was produced, relevant training material was produced and training courses were organised.

Installation of the MedWet Database at Albanian organizations (ECAT's Archive):



at the Ministry of Environment.



at the Regional Environmental Service, Vlore



at Soil Institute



at the MedWet Coast project office

III.2.4 Dissemination

Dissemination of the knowledge generated and transferred to is a crucial intervention of the capacity building. The development and implementation of the dissemination plan aimed to extend the experiences acquired in the project to a wider audience at local, national, and international level. Thus, a multi-level approach was opted for, at which various groups were targeted and different results were produced accordingly.

More specifically, pertinent services and authorities acquired information on the project objectives, expectations, means and outputs through the organisation of meetings at the starting point, whereas concrete output, results, conservation benefits and perspectives were discussed at the closing meeting. The commitment and full involvement of the local beneficiary was considered to be quite appropriate for that.

Leaflets, posters and other information material were considered as suitable tools to also reach civil servants in Albania, whereas the project web page, including notifications for training courses and meetings was mostly directed to the scientific community.

It should also be noted that since the capacity building approach that was implemented in Albania can be adapted to meet other national and local needs, its potential to be used is enhanced at the Mediterranean level. This was stressed on the occasion of the extraordinary

MedWet Committee meeting in 2005.

III.2.5 Evaluation of Capacity Building Interventions

Capacity building on wetland inventory using information systems has been accomplished in an effective manner. Inputs for the evaluation came from:

- (i) *The evaluation of the training courses.* Trainees assessed: i) the effectiveness of the training programme and content, ii) the trainers and iii) the training organisation. They expressed general remarks and proposals to improve the training. According to the trainees both courses were successful in all their objectives. The mean evaluation score of the training programmes corresponds to “very satisfactory, higher than expected”. Extension of the duration of the training courses was a common recommendation.
- (ii) *The evaluation of knowledge and skills acquired during the training courses.* Trainees were examined in written tests for each of the training modules (Wetland Inventory, Remote Sensing, GIS and Databases). The results were satisfactory .
- (iii) *Personal communication of the project team with stakeholders.* Comments (i.e. problems, constraints, new needs on fields, annexes, interface, tools, reports) on the MedWet inventory method and specifically on the Data Sheets and the MWD showed that there was satisfaction coupled with recommendations to further focus on GIS tools in the future.
- (iv) *The European Commission, in the context of the implementation of the LIFE procedures for reporting.* Useful remarks and suggestions were received regarding: the involvement of the national authorities, and the documentation and promotion of the project activities.
- (v) *The pilot application.* Selected Albanian scientists who participated in the “Train the Trainers“ and “Advanced” courses implemented the whole inventory process successfully to produce three wetland maps based on remote sensing data coupled with field data and existing knowledge.
- (vi) *The closing meeting.* Opinions on the project and its benefits for wetland conservation in the country were expressed at that meeting. In particular, the Deputy Minister of Environment, Forests and Water Administration, focused on the sustainability of the project achievements particularly in respect of the Albanian institutions networking, the capacities built on information exchange, and the establishment of a National Wetland Center. Also, the European Commission representative recommended that people responsible for policy making should make use of the achievement of the projects and the capacities built in the country.

IV. CONCLUSIONS & ACHIEVEMENTS

The ALWET project was conceived in order to build capacities in Albania, as regards the inventory of wetlands with the use of modern technology tools such as remote sensing, GIS and databases. With regard to wetland inventories, two key considerations have been taken into account: (i) Inventories need be undertaken by applying standardised methods (including a world wide accepted habitat classification system) and using interoperable information systems so as to serve compatibility amongst nations, regions or even projects carried out at the same country; and (ii) Inventories should take advantage of modern technology tools, such as remote sensing and GIS for effective data capturing, storage, retrieval and reporting. In this respect, the MedWet Wetland Inventory method and tools and the Ramsar Wetland Inventory Framework were followed, combined with the use of up to date information systems.

With regard to capacity building, a standard process consisting of: (i) analysis of the capacity building needs, (ii) planning, (iii) implementation and (iv) evaluation of capacity building interventions, was followed. In particular, the analysis of the capacity building needs, as regards the implementation of the wetland inventories and the maintenance of national wetland archives in Albania, resulted in a number of interventions covering stakeholder involvement and networking, knowledge transfer and the development of new infrastructure, and dissemination of information and project results.

Overall, it can be concluded that the project implementation process enabled the delivery of project results in an effective manner. It is worth noting that the various project dimensions acted in synergy. For example, the process of analyzing capacity building needs through questionnaire surveys and focus group meetings motivated stakeholders; Transfer of knowledge facilitated the establishment of new infrastructure and tools (i.e. the staff of the Databases and GIS Department had been trained in the project training courses) and vice versa (i.e. the new version of the MWD developed within the project was a teaching subject in the project training courses); Project meetings (i.e. kick off and closing meetings, focus groups meetings) and dissemination tools (i.e. information material, web page) promoted the need of training and motivated the participation of pertinent bodies in training activities.

Moreover, the operation of the Databases and GIS Department, the training in the use of the MedWet Database, and its installation in a number of central and regional services have: a) promoted the use of the MedWet Database as a tool for the storage and sharing of the Albanian wetland data, and b) increased awareness of the need to have an institutional arrangement for the maintenance of the wetland archives.

Useful conclusions have been drawn. These can be summarised as follows:

- The need of establishing an Albanian Wetland Centre is broadly acknowledged.

- The maintenance of national wetland archives can serve as a means for the conservation of Albanian wetland resources.
- There are proposals on the appropriate mechanisms for the maintenance of national wetland archives, including the pertinent body to lead the process (i.e. MOEFWA), a support body with technical capacities to operate the process (such as ECAT-Tirana) and the data providers (i.e. all organisations that hold wetland data).
- A combination of training courses, trainers' training, case studies and pilot applications, has proven an appropriate approach to capacity building.
- The knowledge transfer on wetland inventories with the use of information systems and according to the Ramsar Inventory Framework and the MedWet Inventory method, can contribute to achieving data compatibility among inventories undertaken by different bodies and countries in the Mediterranean.

V. FUTURE PERSPECTIVES

ALWET project continued the effective collaboration between ECAT and EKBY on the conservation of Albanian wetlands and specifically on the field of wetland inventory and monitoring.

The concrete results of the ALWET project -namely the training of 35 Albanian scientists from wetland related bodies, the establishment of a GIS and Databases Unit at ECAT Tirana, the installation of the MedWet Database at 11 central and regional Albanian bodies, and the creation of a training package that can be applied in future training efforts, together with outcomes such as the increased level of motivation of pertinent Albanian bodies for continuing wetland conservation action, form a good basis for future actions. These may include:

- (i) Consultations for the establishment of an Albanian Wetland Centre.
- (ii) Further development of information systems to support the management and dissemination of environmental data, and to facilitate networking of bodies and individuals working in the field of wetland conservation.
- (iii) Continuous up dating of knowledge of methods and technological developments as regards wetland inventory, assessment and monitoring and other fields of wetland management and conservation.
- (iv) Promotion of the use of the training package as a means to assist the organization of national inventories in other Mediterranean countries.

Finally, it should be noted that further to transferring knowledge and to developing infrastructure, concrete actions are required to address the factors affecting the conservation of wetlands, including the preparation of a national wetland strategy and action plans, wise resource allocation and the establishment of a steering committee for wetland management.

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