



LIFE III

focus



Water, an essential resource

LIFE and the new European water policy



European Commission

**European Commission
Environment Directorate-General**

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Editorial Department: SOGES/AEIDL a/s Jean-Pierre Vercruysse – **Managing Editor:** Bruno Julien, European Commission, Environment DG, LIFE Unit - BU-9 02/1, 200 rue de la Loi, B-1049 Brussels – **Journalism:** Jean-Luc Janot – **The following people worked on this issue:** Pierre Ergo, Jean-Pierre Vercruysse – **Photos:** Javier Belver, Chris Heymans, Christine Lekeu, LIFE project sponsors – **Production coordinator:** Christine Charlier – **Graphic design:** Kaligram – **This issue of *LIFE-Environment Focus*** is published in 6 languages (German, English, Spanish, French, Italian and Dutch) with a print-run of 16 000 copies.

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Water

SUMMARY

LIFE, a guide to the new European water policy p. 2

Water, always p. 8

A more ecological chemical enterprise p. 9

To prevent flooding and pollution at less cost p. 10

Remote detection for coastal areas p. 11

Studying and protecting watercourses p. 12

An environmental management plan for the natural Park of lake Engure p. 13

Satellites to prevent oil slicks p. 14

Returning the river to the forest p. 16

Less iron in the water: restoration of a contaminated wetland p. 18

Saragossa (Spain): the city that saves water . . p. 20



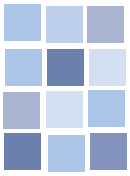
Patrick Murphy
Head of Unit – Protection of Water, the Marine and Soil, European Commission, Environment Directorate-General

European water policy is going through considerable changes at present. The adoption of the framework Directive on water provides a policy tool that enables this essential resource to be protected in a sustainable way. The Sixth Environment Action Programme (EAP) also provides for a number of measures for the integral and appropriate implementation of the framework Directive on water, but also other complementary policies: the nitrates Directive, the urban waste water Directive, the bathing water Directive, inclusion of the protection of the quality of water in agricultural and regional policies, etc.

But we are not resting on our laurels. The long-term protection of European water requires constant and practical innovation efforts in order to identify appropriate responses to very different environmental problems. This is where the LIFE programme comes in, enabling, complementary to legislative measures, a series of concrete actions to be taken in conserving natural environments or promoting methods of sustainable water management.

Hundreds of projects concerning water have been carried out since 1992 under the framework of the three headings of the LIFE programme. Sponsors of very varied projects have thus explored innovative solutions for a great many environmental problems. It is by assessing the results achieved in these projects that the new series of publications **LIFE FOCUS** seeks to contribute to the development of EU environmental policy, in particular on water, based on both legislation and experimentation aspect.

This first **LIFE FOCUS** publication presents numerous examples of projects dealing with water, carried out under LIFE-Environment and of LIFE-Nature. The presentation of projects, first-hand descriptions or reports from the field are intended to show the reader that the protection of water is a matter for us all. This brochure reflects the efforts of many players in the field, in all four corners of Europe, to find solutions that will provide future generations with the water resources they need.



LIFE, a guide to the new European water policy

The framework Directive on water provides the basis for an integrated Community policy on water.

Though the projects it supports, LIFE contributes to its implementation, as well as to the new sixth Environment Action Programme.



Despite sometimes remarkable results (e.g. improvement in the quality of inland waters, such as the Rhine and the Danube), the management of the European Union's water resources is still very critical:

- > a quarter of Europe's rivers are of poor or mediocre quality, which has a serious effect on aquatic ecosystems;
- > 20% of surface water is seriously threatened by pollution;
- > ground water has been overexploited in nearly 60% of urban and industrial centres;
- > half of the wetlands in Europe also suffer from overexploitation, which among other things causes salt water to enter the water table in a number of coastal areas, seriously affecting the soil and drinking water;

> for almost a quarter of the agricultural land in the Union, the available water contains concentrations of nitrates above the norms for drinking water. For a large proportion (87%) of this water, the level exceeds the target threshold.

The three main users of water are agriculture, industry and households. While efficiency in the consumption of water has improved noticeably in many industries, progress in the efficiency of consumption of water for agricultural and domestic purposes has been slow. Overall, the extraction and consumption of water resources in the European Union appear to be viable in the long term, but certain regions risk water shortages, particularly in southern Europe.

Whatever the case, the stakes are high: they run from problems of public health to long-term supply of drinking water, from the equilibrium of ecosystems, biodiversity and the conservation of the countryside to town and country planning. More than ever before, water is a delicate and extremely important natural resource.

Reform of EU legislation was long awaited, all the more so because the piecemeal development of instruments with a view to rational protection and management of water had led to a great deal of inconsistent legislation, with different, even contradictory, definitions, objectives and methods.

The framework Directive on water

Overwhelmingly approved by the European Parliament in June 2000 and adopted jointly by Parliament and Council a few months later, the **framework Directive on water**¹ reorganised under one and the same legal system the thirty or so regulations and other previous legal instruments regarding water, creating the basis for a concrete **EU water policy**.

The new legislation represents a major challenge because its aim is the **sustainable use of water resources** in Europe and applies to **all persons directly or indirectly involved in the use and the management of water resources**, both in Member States and candidate countries.

The framework Directive relates to all water resources other than marine waters: **surface water**(watercourses, lakes, etc., **groundwater, coastal and transitional waters**(semi-salt estuary waters, for example). It also concerns **relation between river basins**, either natural or artificial.

The framework Directive has set itself four groups of objectives:

- > the protection of the environment;
- > the supply of drinking water to the population;
- > the supply of water for other economic uses;
- > the mitigation of the effects of floods and droughts.

These objectives are combine in space and time in order to:

- > prevent further degradation and improve the quality of the ecosystems in their entirety;
- > promote the sustainable use of fresh water through its protection;
- > monitoring consistency with international agreements on the protection of continental and marine waters.

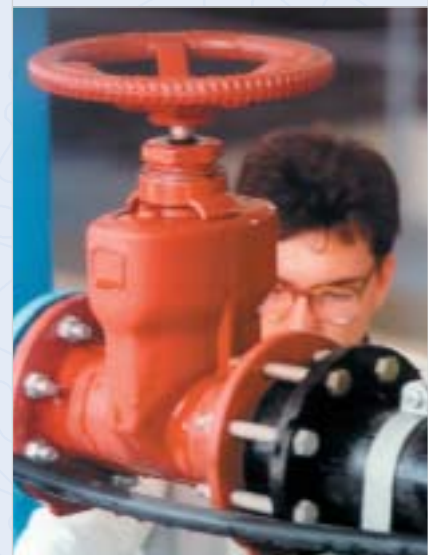
One of the cornerstones of the framework Directive is the development of **integrated management plans for river basins**, which will enable work to be carried out on the quality of water upstream and downstream, on the basis of predefined territorial areas. The objective is achievement of **"good water status"** as defined under the Directive for all the water resources of the European Union by 2015.

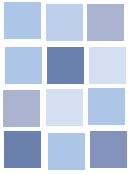
The Member States have a major role to play in these processes: they will have to identify **"river basin districts"** and for each apply a management plan as well as a programme of measures. In conformity with the **"polluter pays"** principle, they will have to integrate the environmental costs in the price of water in order to use water better and reduce pollution. To this end, the Directive imposes a system of water pricing depending on the use (domestic, industrial, agricultural). Each category of users has to pay an appropriate price.

Until now, matters regarding water were mainly dealt with by administrative and technical bodies. For the future, in the interests of greater transparency and consultation in the management of water, a joint approach is favoured. Article 14 of the framework Directive on the necessity of **informing and consulting with the public**. This approach is all the more important in an area where conflicts in use will be more and more important. A programme of work will be published for comment by the public, including consumers.

¹ Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000, establishing a framework for Community action in the field of water policy [Official Journal L 327, 22.12.2000] amended by Decision No 2455/2001/EC of the European Parliament and of the Council, of 20 November 2001 [OJ L 331 of 15.12.2001]

The framework Directive will have **very important consequences** on the future management of water resources and ecosystems in Europe. It will bring with it a major contribution to industrial and agricultural decontamination, starting with the **suppression of hazardous substances** such as atrazine, lead, cadmium, nickel and mercury.





The Lestijoki Project in Finland has tested the efficiency of lime filter drainage to reduce the acidity of sulphate soils.

Implementation of the framework Directive on water “River basin districts”, management plans and timetable

In order to apply the framework Directive on water, the Member States must first of all identify all river basins within their territory and assign them to “**river basin districts**”. River basins covering the territory of more than one Member State (Rhine, Danube, Meuse, Escaut, etc.) will be assigned to an **international river basin district**. An appropriate authority should be designated for each of the river basin districts by 22 December 2003.

Member States must complete by 2004 an analysis of each river basin district, including a review of the impact of human activity the water resources, and an economic analysis of water use. They should establish a register of the areas requiring special protection. All waters used for abstraction for human consumption of more than 10m³ per day or providing water for than 50 people per day should be identified.

By 2009, a **management plan** and a **programme of measures** must be produced for each river basin district, taking into account the results of the analyses and studies.

The measures included in a management plan are intended to:

- > prevent deterioration and enhance and restore bodies of surface water, achieve good chemical and ecological status of such water and reduce pollution from discharges and emissions of hazardous substances;
- > protect, enhance and restore all bodies of groundwater, prevent pollution and deterioration of groundwater and ensure a balance between abstraction and replenishment of groundwater;
- > preserve protected areas.

These objectives should be reached by 2015. This deadline may be changed, but without prejudice to the other conditions laid down by the Directive.

From 2010, the Member States must ensure that **water pricing** policies provide adequate incentives for users to use water resources efficiently and that the different economic sectors contribute to the recovery of the costs of water services.

By 2003, the Commission will publish a proposal which includes specific measures to prevent and control pollution of groundwater.

By 2012, and every 6 years thereafter, the Commission will publish a report on the implementation of the Directive. The Commission will convene, whenever appropriate, a conference of interested parties on EU water policy which will involve Member States, representatives from the relevant authorities, the European Parliament, NGOs, social and economic partners, consumer bodies, universities and other specialist.

Finally, the Directive lays down that Member States will determine **penalties** applicable to breaches of the provisions adopted. This should be effective, balance and dissuasive.



LIFE as a guide

Since the launching of the financial instrument for the environment (LIFE) in 1992, 1 855 such projects have been financed by the European Union. Many of these have had at least one action relating to the sustainable management of groundwater and surface waters.

In line with its the objective to promote the development of innovative techniques and methods, as well as to build on environmental policy, **LIFE-Environment** has contributed significantly to the drafting of the framework Directive on water. Projects financed (generally of 1.5 to 3 years duration) have served as an “demonstration tool” in this area.

Out of a sample of 75 LIFE-Environment projects aimed directly at water,

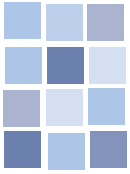
- > 43% are aimed at management of river basins;
- > 16% are aimed at protection of groundwater;

- > 16% are aimed at treatment of waste water;
- > 16% are aimed at pollution prevention and reduction;
- > 9% are aimed at the planning and organisation of water management.

About half of the LIFE-Environment projects to date in the area of water have a territorial dimension in the sense that they are aimed at integrated management of water in a defined area. These projects are generally in northern Europe, while Mediterranean countries frequently have a more sectoral approach, giving preference to rational use and recycling in a particular industrial sector.

As the protection of habitats and listed species is closely linked to quality of the water, **Life-Nature** has also been of service to EU water policy. Between 1992 and 2000, no less than 211 LIFE-Nature projects included measures relating to water or aquatic environments.

Public concern about tap water quality is partly responsible for the important growth in bottled water sales in recent years.



The territorial approach of the network of protected areas **Natura 2000**, which LIFE-Nature supports, coincides with the spirit of the framework Directive. It contains a number of specific measures relating to protected areas in such a way that Natura 2000 forms an integral part of the framework Directive. For example, the Directive requires that a register of protected areas, in particular Natura 2000 sites, be established and updated. The protected areas must be mapped and included in water management plans.

However, the considerable pressure from human activity to which protected areas are subjected must be evaluated. Among basic measures that must be applied for the whole of the river basin are those that enable the Community Directives on "Habitats" and "Birds" to be implemented.

In the same vein, if there is a need to restore wetlands to enable a body of water to achieve "a good status", this measure must feature in the programme of measures.

The benefits for Natura 2000 from the water framework Directive are two fold. Firstly, Natura 2000 benefits from the requirements of the framework Directive; secondly, it can contribute to finding solutions for sustainable management of water resources.

As pollution does not stop at the EU borders, **LIFE - Third Countries** also plays a role through the management of waters in third countries bordering the Mediterranean and Baltic Seas². Some forty projects devoted to water contribute to the creation of technical and human expertise capacities and organisation in the environment sector, as well as to the development of environmental policies and programmes in these countries.

² Other than the countries of Central and Eastern Europe that are applicant states for accession.

Organic treatment of waste water.



Beyond the Directive:

Water, a priority of the Sixth Environment Action Programme

LIFE is also an instrument that must compete to implement the Community policy defined by the Sixth Environment Action Programme (EAP) on the basis of a practical approach.

The Sixth EAP defines the main priorities and the principal objectives of environment policy for the next five to ten years, and specifies the measures that are to be taken.

The main priorities of the EAP are to mitigate climate change, protect nature and biodiversity, minimise the harmful effects of environmental pollution on health, promote sustainable use of natural resources and management of waste.

Sustainable use and high quality of water resources are among the main priorities of the Programme. In concrete terms, water quality levels must be both sufficient to be acceptable and of no risk to public health. Long-term extraction of water resources must be assured.

Community research programmes can help in the development of most recent technology, best management practice and methodologies and tools to support legislation on water. To this end, the EAP provides a set of actions intended to:

- > ensure the integral and appropriate implementation of the framework Directive on water;
- > ensure the integral and appropriate implementation of the nitrates Directive to stop eutrophication of lakes, rivers and seas in the European Union and to limit the impact on groundwater according to the norms established by the Directive on drinking water;
- > gradually eliminate hazardous substances from EU waters during the period set by the framework Directive on water (i.e. by 2020 at the latest);



- > re-examine the Directive on bathing water;
- > integrate the framework Directive on water and other policies regarding water quality in the revision of EU common agricultural and regional policies.

LIFE, and in particular LIFE-Environment plays a role as a showcase in the implementation of these actions.

Water quality levels must be both sufficient to be acceptable and of no risk to public health.



LIFE-Environment in the Netherlands

Water, always

Of the 9 Dutch LIFE-Environment projects approved in 2000-2001, four are devoted to water.



> The aim of "DROP-WISE" is to demonstrate the feasibility and efficiency of an integrated system of water management in towns. The project involves a number of innovative procedures: separate drainage of rainwater from roofs and pavements into watercourses; the use of rainwater for flushing systems, car-washes and fire hydrants; the prevention of general risks of pollution by combining two supply networks, one consisting of "clean" water, and the other consisting of "dirty" water.

> "Smart pump-and-treat" deals with the protection of phreatic waters, which is the subject of technical experiments to control sources of pollution and potential contamination. Slow pumping and control techniques are associated with devices for diverting contaminated waters. Natural methods are also tested on different types of water pollution;

> The project "Demonstration of integrated total water management" is based on a network of eight industrial enterprises. It implements an environmental management plan including the recovery of rainwater, the removal of discharges of nitrates and heavy metals from the surface water, the reduction in the consumption of water for energy or chemical purposes, the adopting of behaviour aimed at a rational use of water at all levels, and research into synergies between the different existing distribution systems;

> The "RAS" project is intended to provide the existing systems of distribution of drinking water with a new system, called "Smart Flow", specially sealed against the penetration of rainwater in treatment plants.

Ministry of Housing, Spatial Planning and the Environment Economic and Fiscal Instruments Department

Mr Just van Lidth de Jeude
Postbus 20951

NL-2500 EZ The Hague

Fax: +31 70 339.13.04

E-mail: just.vanlidthdejeude@db.dgm.minvrom.nl

LIFE-Environment in Portugal

A more ecological chemical enterprise

This technology could be of great value in the fertilizer industry, which is a major source of pollution.



In the Aveiro region in the north of Portugal, the company QUIMIGAL produces nitric acid, nitrobenzene and aniline for use in the manufacture of dyes, pesticides, herbicides and fertilizers. This activity involves the discharging of large quantities of water containing in particular many nitrates and aromatic compounds. The LIFE project first of all consisted of applying a "clean" technology to the production process. A reduction of almost 50% of the pollution resulting from nitrogen was achieved, the remainder of this substance being recovered in the form of raw material (nitric acid). The project then tackled the elimination of the aromatic compounds by creating macrophyte beds: the waste water is purified by passing it through these beds consisting of different layers of earth, aquatic plants and micro-organisms. The project consisted of making two beds composed of a root matrix formed of balls of expanded clay (LECA), which needs much less area than the process normally used. The

denitrification process used demonstrates an effectiveness greater than 85%, producing an effluent liquid that can be re-used in the industrial process.

The waste water is purified by macrophyte beds consisting of different layers of earth, aquatic plants and micro-organisms.

Total eligible cost: 355 857 EUR
LIFE contribution: 106 757 EUR
Beneficiary: QUIMIGAL, S.A.
 Quinta da Indústria – Apartado 40 – P-3861 Estarreja

Contact: Ana Pires
 Tel.: 351-234-842 226/810 300 (Ext. 342)
 Fax: 351-234-841 303

Period: from 1 February 1998 to 1 January 2000.



LIFE-Environment in France

To prevent flooding and pollution at less cost

The experience of Nancy, which lies in the adapting of existing infrastructures rather than in the building of new, costly plants, could be copied elsewhere in Europe.



Water treatment plant in Nancy.

Nancy and its suburbs (300 000 inhabitants) has 20 reservoirs of groundwater with a total capacity of 100 000 m³. One of these, the Gentilly reservoir (12 000 m³), was built in 1970 above all to contribute towards the prevention of flooding of the river Meurthe. Since 1991, a European Directive has obliged the local communities also to control the concentrated pollution in runoff from rainwater. The inter-communal authorities of Nancy have therefore had to develop a strategy integrating both the prevention of flooding and that of pollution. The LIFE-Environment project has enabled a relatively low-cost solution to be put in place by combining

three types of intervention: the use of a weather-forecasting unit employing real-time radar; dividing the Gentilly reservoir into three compartments, each having a specific function; increasing the number of sluices and of measuring instruments enabling optimum and continuous control of the water. These various works have represented a total investment of approximately 1.5 million EUR. It is estimated that using the same model it would be possible to modify all the other reservoirs in the urban area of Nancy for a total cost of 4 million EUR, which is about seven times less than the cost of the solutions that were originally considered. The experience

of Gentilly, which lies in the adapting of existing infrastructures rather than in the building of new, costly plant, could be copied elsewhere in Europe, with 80% of urban areas on the continent having similar discharge networks to that in Nancy.

An optimum and continuous control of rainwater.

Total eligible cost: 1 064 003 EUR
LIFE contribution: 399 320 EUR
Beneficiary: Centre International de l'Eau de Nancy
149, rue Gabriel Péri – BP 290
F-54515 Vandoeuvre-les-Nancy CEDEX

Contact: René Badot
Tel: +33 3 83 15 87 87
Fax: +33 3 83 15 87 99

Period: from 1 October 1996 to 1 October 1999.



LIFE-Environment in Denmark

Remote detection for coastal areas

Remote detection had demonstrated its effectiveness in the mapping of vegetation on Earth, but this method was not suitable for mapping submerged coastal vegetation until an attempt was made, with LIFE, to take on this challenge.



The telemeasuring system developed thanks to the LIFE project enables maps to be drawn that give an optimum view of the distribution of the types of vegetation over vast coastal areas. The new system combines data captured from a distance (by satellite or airborne scanner), geographical data in particular on the depth of the water and basic biological data, which considerably improves the interpreta-

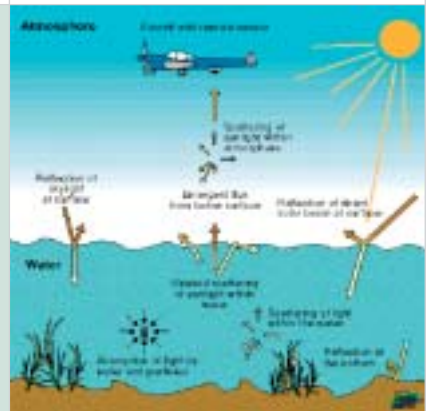
tion of the data relating to the submerged vegetation obtained by telemeasuring. The system can be used in different geographical areas after the information has been adapted. It can also be used in the mapping of other fixed biological environments of coastal waters, such as mussel banks.

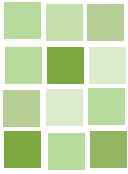
The complexity of the remote-sensing system used in mapping submerged vegetation.

Total eligible cost: 633 491 EUR
LIFE contribution: 316 745 EUR
Beneficiary: National Environment Research Institute (NERI)
 P.O. BOX 325, Vejlsøvej 25
 DK-8600 Silkeborg

Contact: Peter Bondo Christensen
Tel: +45 89 20 14 00
Fax: +45 89 20 14 14
E-mail: msh@dmu.dk; dkj@dmu.dk
Website: <http://www.dmu.dk/rescoman>

Period: from 1 January 1996 to 1 January 1999.





LIFE-Nature in the United Kingdom

Studying and protecting watercourses

Carried out by a partnership

of public-sector agencies responsible for the quality of fresh water and the protection of aquatic habitats, this LIFE-Nature project relates to 871 km of watercourses of Community interest spread throughout the territory of the United Kingdom.

Protecting river basins is a difficult task and is all the more complex when one takes into account the impact of human activities. These exert an enormous pressure and pose many risks for watercourses, the result being that many aquatic habitats have been seriously damaged in Europe, threatening the survival of the species that live in these habitats. Relatively little is known about the ecological dynamics of watercourses and their biotopes.

Nominated as being "Sites of Community importance" within the framework of Natura 2000, the seven watercourses affected by the project are home to 13 noteworthy species of animals such as the otter *Lutra lutra*, the crayfish *Austropotamobius pallipes*, the salmon *Salmo salar* and the pearl mussel *Margaritifera margaritifera*.

The watercourses were chosen so as to provide a representative sample of all the watercourses in the United Kingdom, according to the threats they face, the use that is made of the soil along their rivers and of the socio-economic players that can influence their ecology.



The LIFE-Nature project has a number of objectives:

> In consultation with the local authorities, users and people living along the river, the project aims to develop a strategy and conservation measures for each of the watercourses concerned. This pilot scheme should serve as a model for protecting other watercourses in the United Kingdom nominated as Sites of Community importance.

> Specific actions are planned for each type of species and habitat. They include a series of practical experiments: experimental farming of freshwater pearl mussels, the reintroduction of the crayfish in two rivers, a study on the impact of the behaviour of the otter and the plant environment on populations of fish, etc.

> In the long term, the project should result in technical solutions being developed for a number of key problems affecting the conservation of watercourses, as well as in establishing good practice that can be transferred throughout the United Kingdom and to other countries in Europe.

Total eligible cost: 2 241 039 EUR

LIFE contribution: 1 120 519 EUR

Beneficiary: English Nature, Northminster House, PE1 1UA Peterborough, Cambridgeshire (UK)

Tel: +44 1733 455 000

Fax: +44 1733 568 834

E-mail: david.withrington@english-nature.org.uk

Period: from 1 August 1999 to 1 January 2004.

LIFE-Nature in Latvia

An environmental management plan for the natural Park of lake Engure

The pollution of the water, the deforestation of the banks due to excessive forestry activities, as well as the growing pressure due to tourism required urgent and coordinated intervention.



300 hectares of reeds have been cleared.

With a surface area of 41 km², lake Engure – to the west of Riga – is the third largest lake in Latvia. This stretch of fresh water was formed by the gradual silting up of the Baltic coast and only a strip of dunes 20 km long and 2 to 4 km wide now separates it from the sea.

The lake is not at all deep: scarcely 20 or 30 cm of clean water cover a very thin layer of mud that has accumulated since the digging of a canal in the 19th century. Added to this, it has been seriously polluted with phosphorus and nitrates, which has caused algae and reeds to proliferate. In summer the water is unfit for fishing, while in winter many fish die of suffocation beneath the ice. Many species have disappeared, starting with the eel that gave its name to the lake (“engure” means “eel” in Latvian).

18 types of habitat were identified around the stretch of water, which is still home to a number of interesting varieties of fish and some 800 varieties of aquatic plant, while many birds, including the eagle and 11 other species protected by the “Birds” Directive, have chosen to live along the side of the lake. This latter forms

the heart of the natural Park of lake Engure, an area of 3 500 ha protected since 1957. The pollution of the water, the deforestation of the banks due to excessive forestry activities, as well as the growing pressure due to tourism required urgent and coordinated intervention.

LIFE-Nature enabled an environmental management plan to be developed. In addition to the operations of depolluting the water, the plan consists of:

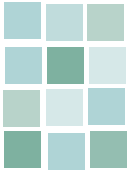
- > clearing 300 ha of reeds and restoring 107 ha of meadows with farmers living alongside the lake;
- > buying back 49 ha of private forest to put a stop to deforestation;

- > channelling tourist flows onto nature paths with observation towers;
- > building a performance and conference centre;
- > employing rangers in view of the massive area covered by the Park.



Total eligible cost: 520 270 EUR
LIFE contribution: 390 203 EUR
Beneficiary: Latvian Fund for Nature, Kronvalda blvd 4, 1842-Riga, Latvia/Latvija
Tel.: +371 7 034 894
Fax: +371 7 830 291
E-mail: dane@lanet.lv
Website: www.daba.lu.lv

Period: from 1 October 2001 to 1 October 2004.



LIFE-Environment in Greece

Satellites to prevent oil slicks

To deal with oil pollution in the sea, the LIFE-Environment project PROMED tackles the problem both from very high up – by using the latest satellite imaging techniques – and from the ground up by taking into account the needs of the administrations and the operators involved.



To fight oil pollution, the PROMED project is based on the development of the synthetic aperture radar imaging and very high resolution radiometry. Circle on left picture indicates the location of a possible oil slick.

Some 600 000 tonnes of oil every year – three times more than the oil slick caused by the Amoco-Cadiz in Brittany in 1978 – are spilled into the Mediterranean due only to “natural” losses from ships and tankers being cleaned. Added to this is illegal dumping (estimated, in coastal areas, at 330 000 tonnes every year or even a great deal more according to some sources) and losses, varying greatly in volume, due to accidents. A sea route that is heavily used in a confined geographical area, the Mediterranean suffers worryingly from attacks on its ecosystem, as well as from a serious attack on the fishing and tourist resources of its coastal areas.

At present, pollution at sea is detected mainly by sensors on aircraft or boats. While this approach remains essential, combining it with satellite detection would enable a greater geographic coverage and better prevention of risks. It is then a matter of guaranteeing the rapid and relevant processing

of teledetection data, communicating urgent information to the authorities concerned and the immediate availability of methods of intervention in order to act as quickly as possible to prevent sheets of oil from reaching coastal areas.

Meeting these needs is the objective of the PROMED project, first of all targeting oil pollution at sea and based on the development of the latest techniques: synthetic aperture radar imaging (SAR), advanced very high resolution radiometry (AVHRR), etc. Innovative because of its complete and integral character, but also because of the flexibility of use of its different modules, the system developed by PROMED can be applied at the European level and can be used in the event of other risks to the environment such as forest fires and flooding. Another asset is its cost/benefit ratio.

Its success depended on the availability of a large range of observation data so that the results obtained are reliable and can be transferred from the area of research and development to that of practical application by the authorities responsible and the operators involved. This is why the PROMED team evaluated a number of prototypes of risk detection systems and data management systems, developed both within the European Union and by the international scientific community. The choice fell on a detection module with two aspects (the first using the computer program Erdas Imagine and the second the software Map Objects) and on a monitoring and assistance system based on the approach of the National Oceanic and Atmospheric Administration (NOAA) in the United States, adapted in the pilot phase to the conditions in Crete. Complementing the Greek project, a Spanish team worked along the same lines, but only on the basis of Erdas Imagine.



Once the risk is detected, the PROMED system uses Erdas Imagine to process satellite images, which enables the different parameters to be taken into account, any corrections that are necessary to be applied, perform the "georeferencing" of the SAR images (plotting them on the map) and determine accurately the perimeter of pollution and the areas threatened.

In addition to this high-technology research, a great deal of information has been collected about the needs and requirements of the public administrations as well as of companies involved in the approach to marine pollution that has been put forward. This has been the subject of various tests in Crete, under the auspices of civil defence, and in Spain under the aegis of SASAMAR (the coastguard organisation). A decisive step has been the establishing of a detailed thematic cartography of Crete based on various pieces of information provided by the Region.

PROMED has also carried out an analysis of the harmful effects of oil that have taken place in Greece in order to improve their knowledge, which until now has been very unsatisfactory, establish statistics and draw up a list of the regions that are most at risk, with Crete heading this list. The project also involved an evaluation of the best materials and methods for

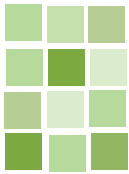
dealing, in practical terms, with oil pollution of coastal areas, taking their outline into account. In this respect and contrary to popular opinion, the best method is not necessarily to send cleaning teams, whose intervention often has the negative effect of pushing the fuel oil into the sand and in particular between the rocks, resulting in more damage to the environment than letting nature take its course.

Finally, PROMED undertook a study of the threats to the environment throughout the Mediterranean basin and according to various activities including mass tourism, fishing, etc. which have their own negative effects on the ecosystems and the resources of the coastal areas.

Total eligible cost: 1 232 851.43 EUR
LIFE contribution: 516 089.51 EUR
Beneficiary: Institute of Meteorology and Physics of the Atmospheric Environment
 Lofos Nymfon, Thission, PO BOX 20048
 GR-11810 Athens

Contact: Ms D.N. Asimakopoulos
Tel.: +30 1 3490112
Fax: +30 1 3490114
E-mail: dasimak@atlas.uoa.gr

Period: from 1 October 1999 to 1 October 2001.



LIFE-Nature in Austria

Returning the river to the forest

The aim is to return natural dynamism to the ecosystem of the alluvial forests by arresting the drying out process which it has been suffering for more than a century: the challenge being one of scale. In order to address it, bold measures have been introduced in the National Park of the plains of the Danube. The LIFE-Nature project, which will produce very positive results in the short term, is a milestone along this road.



Straightening the Danube more than a hundred years ago to facilitate river transport caused a certain amount of damage to the vast alluvial forests of the plains of the Danube to the east of Vienna. Accelerating the current led to the river bed being deepened. The creation along the bank of a low dike suitable for motor vehicles (the "Trep-pelweg") isolated the many ox-bow lakes which cross the forest, resulting in raising of the ground following the depositing, during flooding, of sediment which can no longer flow back. Once heavily flooded, the forest is now dry for most of the year.

This gradual drying out had weakened the dynamism of the alluvial ecosystem, altered the structure of the forest and adversely affected biodiversity. Mature standing timber now predominates over the original plant formations, and willow plantations, as well as the beaches of pebbles and mud, have virtually disappeared.

Only by restoring an "adequate system of atmospheric changes" will it be possible to arrest this process in the long term. A project stabilising the bed of the Danube by moving massive quantities of pebbles to certain places was started in 2001 by the Austrian administration of navigable waterways. Other works aim to lower the Treppelweg locally and remove the various obstacles to water flowing across the plain. One of these projects was a small-scale one carried out in 1996 in the Regelbrunner Au area, in a forest owned solely by the WWF. It was completely successful, opening up the way for other initiatives under very favourable auspices. The LIFE-Nature project, launched in 1998, was based mainly on an action of this kind.

After a delay on the timetable due to more complicated procedures than expected regarding the awarding of permits, the works were able to start during 2000. Concentrated on the

Orth site of the National Park, they involved joining ox-bows of the river to the bed of the Danube, lowering the Treppelweg, moving a dike, creating an island of gravel, strengthening banks with gravel, as well as the works intended to recolonise water-courses with a dogfish, *Umbra krameri*, which was thought to be extinct in Austria until it was sensationally rediscovered in 1992.

A whole range of public awareness and dissemination of results campaigns has also been carried out: information posters and leaflets, public debates and activities in schools, an information brochure on *Umbra krameri*, etc. LIFE-Nature has also financed the drawing up of a detailed revitalisation plan.



The works involved joining ox-bows of the river to the bed of the Danube.

In view of the size of the problems – of which the National Park, the beneficiary of the project, is perfectly well aware - the involvement of LIFE-Nature has continued to be relatively limited in what it has achieved in practical terms. It will nevertheless have rapid and significant effects on the ecosystem and is a decisive step on the ambitious road to the general restoration of the environment which still requires more radical solutions in the decades to come.

This perspective is part of a political context which has been difficult since 1984 when a hydraulic dam-building project in Hainberg triggered a string of controversies until the decision in 1996 to create the National Park. Many riverside residents were not in favour of the Park and the restrictions which it meant for hunting, fishing or water sports. The municipalities in particular were reticent about the projects involving the dumping of this material outside the Park. On the other hand, the highest authorities, namely those who are in charge of management of the Danube basin, are experienced in the ecological objectives of the National Park. The protection of Vienna against flooding by environmentally-friendly methods is one of

the major stakes. The awareness campaigns for inhabitants and visitors are particularly important in this context.

Although, with their birdlife, the riverside forests are one of the major points of interest in the National Park in the context of the Nature 2000 network, the LIFE project has not involved specific forestry management measures. The project sponsor's strategy is primarily based on the ability of the alluvial forest to gradually return to its original structure. A forestry inventory, drawn up alongside the project, will make it possible to

determine the management measures required in future. One of the ideas taken into consideration is the rational use of the wood to be burned. The creation of buffer zones between the park and its surroundings is also considered, whereas a management plan for the leisure activities should enable damage to be prevented.

Total eligible cost: 2 822 030 EUR

LIFE contribution: 1 411 015 EUR

Beneficiary: Nationalpark Donau-Auen GmbH
Fadenbachstraße 17
A-2304 Orth

Contact: Dr. Michael Kaplan, Dir. Mag. Carl Manzano,
Dr. Christian Baumgartner

Tel.: +43 2212 3450

Fax: +43 2212 3450 17

E-mail: nationalpark@donauauen.at

Period: from 1 July 1998 to 30 June 2002.



LIFE-Environment in the United Kingdom

Less iron in the water: restoration of a contaminated wetland

LIFE-Environment has supported the first attempt carried out in the United Kingdom to restore the water quality of a river by the sole use of organic techniques.

In 2000, the project was awarded the "Rural Wales" prize.



Implemented in the region of Tonmawr in West Glamorgan (Wales), the LIFE project involved the treatment of mine waters discharged into the tributaries of the river Pelenna. It was a case of restoring the water quality in order to protect the fish and other wild flora and fauna, and to put an end to the unsightly colour of the river caused by the waters from the mines.

The pollution of the river was directly connected with the changes in the level of the groundwater which had accompanied the working, then the closure of the mine: the phreatic layer had gradually fallen due to pumping,

thus exposing iron pyrites to the air and the formation of soluble iron compounds. When the mining work stopped, the pumping stopped, the phreatic layer returned to normal and the iron compounds dissolved in the water, as the groundwater level rose, and the mines were flooded. Finally the contaminated water emerged at the surface and mixed with the local waters receiving it.

The characteristic yellow orange colour of the Pelenna river resulted from the precipitation of the iron compounds, or ochres, which occur when iron-containing mine waters are

discharged into a watercourse. Not only were these mine waters directly toxic to aquatic life on account of the high concentrations of iron dissolved in the water, but the deposits formed on the substrates also had long-term effects on the habitats of invertebrates and the gravel serving as a spawning ground for the fish.

In order to rehabilitate this area, it was decided to create a large-scale system that treats the discharged waters by natural biological processes, without using machines, pumping devices or chemical treatment. It was necessary to reduce the quantity of iron discharged upstream from two tributaries of the river: 95% reduction in the Nant Gweffrwd river and 50% in the Blaenpelenna river. The ultimate objective was to make the watercourses suitable for recolonisation by members of the salmon family.

Structures built of concrete and/or brick were installed in the wetlands. They were covered with an impermeable membrane or a layer of clay, then a substrate of peat-free compost 700 mm thick, with a constant maximum water level of 300 mm.

To treat some of the most acid discharged waters, it was necessary to set up a separate treatment unit upstream of the wetlands, with buried drains filled with lime.

During subsequent phases of the project, other elements were introduced such as aeration cascades, ochre collection terraces and juxtaposed devices with alkalisising properties. A filtration tank and a decanting tank were built at certain points to regulate the flow and pre-treat the water.

Compost was used to make up a plant substrate from bullrushes, rushes, yellow marsh iris or the common reed. It was possible to regulate underground and surface flow by buried drains.

A certain number of demonstration elements were added, in particular wetlands for the flow of surface waters and groundwater, different types of substrate (bark mulch) and different types of plants (*Typha* cultivated in a greenhouse and *Juncus*, a local plant). This project was a complete success: the monitoring and evaluation work proved the effectiveness of the water purification system which made it possible to restore the water quality of this river to the extent that it could accommodate salmon again. The level of iron eliminated is currently approximately 90%. It will take longer to improve the aesthetic appearance of the river because the iron deposits

and the stains which have accumulated through the years are only eliminated gradually by the water.

The results show that the operating and investment costs are not high compared with those of other systems. The measure put in place also offers additional environmental benefits such as the diversification of the habitat of wild fauna and flora.

Having made it possible to create computer modelling programs, the project had a resounding success in the United Kingdom, elsewhere in Europe and in other regions of the world, by demonstrating sustainable and non-aggressive methods of eliminating the iron contained in the mine waters, by the detailed description of the processes involved in these systems, as well as by the implementation of engineering processes and diffusion methods.

Total eligible cost: 1 505 311 EUR

LIFE contribution: 647 284 EUR

Beneficiary: Neath Port Talbot County Borough Council
Civic Centre, Y Ganolfan Ddinesig
SA11 3QZ Neath
Castell-Nedd
United Kingdom

Contact: Andrew Parry-Jones

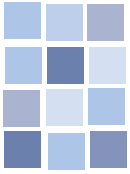
Tel.: +44 1639 764412

Fax: +44 1639 764129

E-mail: a.parry-jones@neath-porttalbot.gov.uk

Period: from 1 October 1994 to 1 October 1999.





Saragossa (Spain): The city that saves water

LIFE-Environment was the trigger for the "Zaragoza Ciudad Ahorradora de Agua" operation, a global and integrated operation aiming to make rational use of the limited water resources of the capital of Aragon. A model to be followed.



Wearing a white coat and with the calmly hurried air of a hospital doctor, Dr. Sebastien Celaya guides us into the maze of basements of the hospital Royo Villanova of which he is in charge. The object of the exercise is to observe the new ionisation water purification system with which the hospital was recently equipped. This was an investment of 60 000 EUR which was advantageous on two counts: it saved water but it also considerably reduced the relatively high risks of legionnaires' disease in a hospital environment. "Before installing the system, it was necessary to turn on

all the taps in the hospital every month and let them run for about ten minutes; today, a very simple annual check is all that is required. In addition to the reduction in the risk of legionnaires' disease, we now have water consumption of 412 litres of water per bed per day, compared with 760 litres in the Norwood Hospital in Boston, which is a benchmark in this field." Situated in the outskirts of Saragossa, the Royo Villanova general hospital – 200 beds, 600 employees – is one of the 50 "Buenas Prácticas" (good practices) establishments of the "Zaragoza Ciudad Ahorradora de

Agua" operation (Saragossa, water-saving town) which has already enabled water consumption to be reduced by 5 to 6% in the large Aragon town (600 000 inhabitants).

Imagining is believing

The “Good Practices” operation is the continuation of a LIFE-Environment project which was implemented between 1997 and 1999. *“It involved moving from a policy of supply to a policy of demand, by promoting more responsible consumption of the resource and, in the long term, by creating a new water culture”*, explains Javier Celma, head of the Environment Unit for the municipality of Saragossa. *“The LIFE project fitted very well into the Sustainable Development Plan which the town had drawn up in 1994 and which in particular plans a 20% reduction in water consumption between now and 2010. There was also a considerable collective and mobilising dimension, while at the same time tackling the problem from a global perspective... What is more, the project was approached not as though expecting an imminent catastrophe but, quite the contrary, in a positive and creative spirit: the concrete realisation of the slogan ‘Imagining is believing’ to some extent.”*

Besides the government of Aragon and several private partners (savings bank, enterprises, associations, etc.), the town has joined up with the initiator of the project, la Fundación Ecología y Desarrollo (Ecology and Development Foundation, *see box*), the beneficiary of a LIFE-Environment grant of 480 230 EUR, half of which is borne by the European Union.

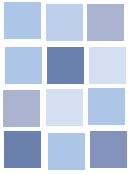
“We set ourselves a quantitative objective of one thousand million litres of water to be saved in one year”, says Marisa Fernández, the coordinator of the project within the Foundation. *“In operational terms, six criteria guided our approach: to break a vicious circle in water management – the increase in supply encourages waste and vice versa –, therefore concentrate on demand and no longer on supply, introduce the principle of shared responsibility involving all the players/users, adopt a technological approach which prolongs water-saving beyond the end of the project, mobilise all types of water users, affect a maximum number of people in order to change mentalities and trigger a true cultural change in water consumption.”*

The project took the form of an awareness campaign setting concrete targets for the consumer:

- > installing individual meters for hot water;
 - > introducing various measures and devices making it possible to save water (repairing leaks, reusing domestic water, etc.);
 - > encouraging people to change their water consumption habits.
- > purchasing new sanitary ware (toilets, taps, showers, etc.) enabling households to save water;
 - > replacing old public sanitary ware with new, more water-saving sanitary ware;
 - > purchasing domestic appliances (washing machines, dishwashers, etc.) with built-in water savers;

Saragossa promotes the use of low water consuming plants in gardens.





This important domestic appliance manufacturer is one of the 10 industrial enterprises which participate in the water saving project.

“The pump has been primed”

The initial preparation phase started in February 1997. It consisted first of all of mobilising the sanitary ware distributors as well as the organisations likely to contribute to the success of the campaign (media, associations). The implementation phase proper was launched in October 1997. It took the form of a massive information campaign, using most of the promotional tools available: newspapers, television, radio, posters, advertising posters on buses, brochures, stickers, display cases in businesses, postcards, etc. A telephone helpline was set up, a website on saving water was created (www.ecodes.org/agua/). The campaign ended on 25 January 1999 with an international symposium on the effective use of water in an urban environment.

The operation in which 150 organisations and 183 schools (70 000 pupils, 474 teachers) actively took part, made it possible in 1998 to save 1.176 thousand million litres of water. More than 140 companies in Saragossa are now marketing water-saving products. Two thirds of the shops selling sanitary ware, taps and domestic appliance and meters actively took part in the project, usually in the form of discounts on water-saving products. The sales of

domestic appliances with built-in water savers increased by 15%. Four times as many individual meters and 6 times as many water-saving taps were sold. Before the campaign, only one household in three practised any kind of water-saving measure (a device or consumption habit); at the end of the operation, this proportion had increased to two out of three.

This initial success has to be placed in context, however: *“certainly we are experiencing a ‘flurry of interest’*, says Antonio Marin, the owner of five sanitary ware shops which had taken part in the campaign. *“We are certainly selling more and more water-saving devices, but another market is growing just as quickly as the quality of life is increasing: jacuzzis and so on that consume large quantities of water, etc. The fact still remains that in terms of new water-saving behaviour, the pump has been primed, there is no denying it!”*

Continuing what has been started: LIFE as a springboard

It was important not to stop, having got so far. Knowing that the awareness campaign was only a first step, the "Zaragoza Ciudad Ahorradora de Agua" partners decided to start a new, more targeted phase based on concrete investments by large water consumers (public and private buildings, industries, parks and gardens).

As the LIFE-Environment project had ended, a new partnership was put in place around the Foundation, consisting of the same partners as for LIFE but also with the ACESA, a public water management agency of the Ebre basin, and the international foundation AVINA, active in sustainable development projects.

Laurent Sainctavit, a water engineer at the Fundación Ecología y Desarrollo and a spokesman for industrial enterprises, explains: *"the LIFE project targeted four groups of consumers: distributors, communities, schools and households. Furthermore it was more a question of 'intangible' operations, aiming to change habits. In the case of the new, 'Buenas Prácticas' campaign, we opted for a strategy and, above all, different targets: the idea was to move up a gear by encourag-*

ing large 'beacon' consumers to invest in water-saving, in the hope that they would carry along the rest of their industrial sector and the population in general."

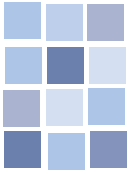
Planned up to 2003, the Good Practices campaign is working hard to mobilise industrial enterprises. And ten of the largest in Saragossa are already taking part in the project. *"Unlike the LIFE campaign based on mass information, the current operation started with a personalised letter sent to the city's enterprises representing various key sectors. Those involved sign a collaboration contract with us. We then carry out an eco-audit in situ, followed by a formal report including a series of costed recommendations. When the investment has been made, the enterprise is given the label 'Buenas Prácticas' which is associated with a series of advantages giving it the image of a 'responsible' enterprise. Our campaign supplements the ISO 14000 or EMAS¹ actions in which some of these enterprises are already involved."*

At the end of the programme, the Ecology and Development Foundation is also hoping to award the Good

Practices label to 50 large "symbolic" consumers: in addition to the 10 industrial enterprises already mentioned, 30 public establishments have been identified (including the Royo Villanova hospital and a school with 1 800 pupils), as well as 10 green areas or gardens. *"The latter have a dual interest in this: they are large consumers of water and the water-saving gardens which have been created at various places in the town may inspire a large number of private individuals"*, says Diego Checa, who is in charge of the Foundation for this sector and an author of a Practical Guide on water-saving technologies for communities and public services, one of the various methodological publications which have been produced as part of the operation. Nor is the general public forgotten in this: a thousand "water-saving kits" (consisting mainly of water filters) are soon going to be distributed at a low price.

183 schools have been equipped to save water.





Democracy and the right price

The Good Practices campaign is in fact only the most visible dimension of the long-term task taken on in Aragon and more particularly in Saragossa: at municipal level, a coordinating and water monitoring committee has been set up and the town is involved in a series of large projects aiming to reduce its water consumption from 80 to 64 cubic hectometres per year. All the municipal services (offices, swimming pools, leisure centres, etc.) have been subjected to a water management audit, the drinking water distribution network is currently being improved (budget of 120 million EUR) and a new treatment plant for waste water will very soon make it possible to save 4 cubic hectometres of water annually.

"Saragossa has become the most water-saving town in Spain, with a weekly consumption of 96 litres of water per inhabitant", says Javier Celma, the head of the Environment Unit proudly. "We very much subscribe to the philosophy of the new framework Directive on water and, through the 'Saragossa an economical town' campaign we have concentrated first of all on developing a civic consensus among the population, which should sooner or later be prepared to pay the right price for water: at 0.5 EUR per cubic metre for households, Saragossa is the fifth on the list of large European towns where water is cheapest..."

"The Spanish are going to have to seriously review their relationship with water", says Victor Viñuales, Director of la Fundación Ecología y Desarrollo. "What we are doing at Saragossa is a solution which is both viable and democratic, totally within the ethos of the new framework Directive and which may serve as a model to some 8 000 municipalities in the country".

The facts are beginning to confirm that he is right: other towns and regions in Spain are turning to his team. One case in point is the government of the Balearics which has asked the Foundation to lead a wide-ranging consultation of the people on water management and to draw up a self-evaluation guide directed at schools so that, by involving the pupils, they can carry out their own eco-audit and put in place their own water-saving management programme. This is also true for the authorities in Vitoria, in the Basque country, which have included the Foundation in drawing up an integrated management plan for drinking water.

¹ ISO 14000: environmental management standard created by the International Standards Organisation (ISO); EMAS (Environmental Management and Audit Scheme): an environmental quality label created by the European Union.



Viable and democratic, the Saragossa model can also be reproduced in considerably different contexts; with the aid of the Foundation, Barcelona has distributed water-savers to 4 000 households in the Catalan capital, while a "Ciudad Ahorradora de Agua" campaign is currently being conducted in Andorra, in a large village with 8 000 inhabitants in the very arid province of Teruel.



The water-saving gardens which have been created at various places in Saragossa may inspire a large number of private individuals to follow suit.

The project sponsor: **Fundación Ecología y Desarrollo**

The two “Zaragoza Ciudad Ahorradora de Agua” operations are piloted by the Ecology and Development Foundation set up in 1992.

This joint technical assistance body is entirely dedicated to the cause of sustainable development, with activities based on three objectives:

- > to identify and put realistic ecological alternatives in place;
- > to combine socially fair and economically viable development;
- > to facilitate and enhance the synergies between public authorities, enterprises and civic society.

The Foundation has specialised in three types of intervention:

- > information and making decision-makers aware of the problems facing the environment (the Foundation is a member of the European Environmental Bureau);
- > the implementation of demonstration projects (LIFE, ALTENER) and the execution of local eco-audits;

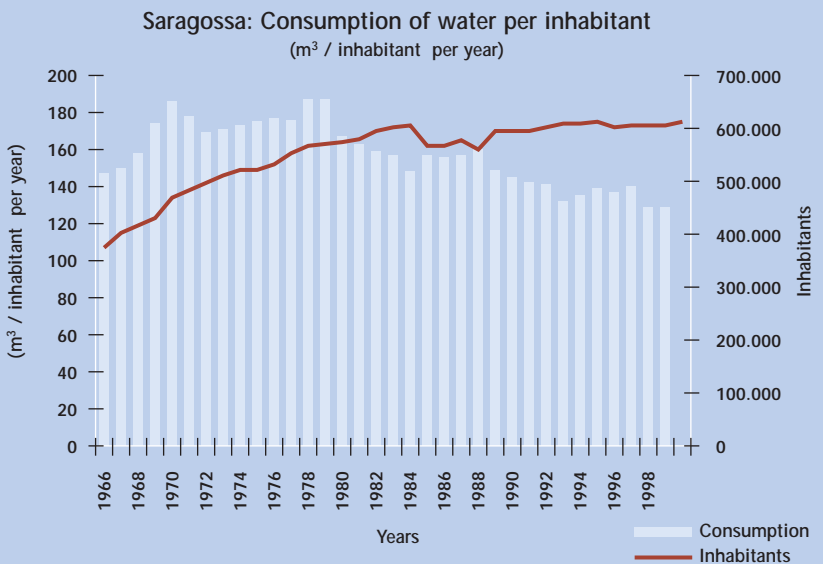
- > the setting up of ethical investment funds with companies quoted on the stock market. A Spanish representative of the SiRI Group (“Sustainable Investment Research international”, a pool of evaluation agencies present in 14 countries), la Fundación Ecología y Desarrollo advises investors wishing to turn towards enterprises which are “socially responsible” and environmentally-friendly.

With about twenty co-workers, Ecology and Development bases its activities on five themes: water, waste, energy, the promotion of socially responsible enterprises and cooperation with Latin America in environmental projects. Four employees are specifically allocated to the water-saving sector.

Its action in the area of water has led the Foundation to go on technical assistance missions to various Spanish authorities: the Catalan Water Agency, the WWF-Adena (Madrid), the Town and Water Company of Vitoria (Basque country) and the Government of the Balearic islands.

La Fundación Ecología y Desarrollo is currently conducting a new LIFE-Environment awareness campaign in Saragossa designed on the same model as for water but involving collection, recycling and reusing paper.

Fundación Ecología y Desarrollo
 Plaza de san Bruno, 9, 1º,
 E-50001 Zaragoza
 Tel.: +34 976 29 82 82
 Fax: +34 976 20 30 92
 E-mail: ecodes@ecodes.org
 Web: <http://www.ecodes.org>



Name LIFE ("L'Instrument Financier pour l'Environnement" / The financing instrument for the environment)

Type of intervention co-financing of actions in favour of the environment in the Community, in the countries of central and eastern Europe that are applicants for accession to the European Union and in certain third countries.

LIFE is made up of three subject headings: "LIFE-Nature", "LIFE-Environment" and "LIFE - Third countries".

Objectives

- > with a view to sustainable development in the European Union, contribute to the drawing up, implementation and up-dating of Community policy and legislation in the area of the environment;
- > explore new solutions to environmental problems on a Community scale.

Beneficiaries any natural or legal person, provided that the projects financed meet the following general criteria:

- > they match the priorities laid down at Community level and contribute to the objectives listed;
- > they are submitted by reliable participants from financial and technical points of view;
- > they can be carried out from the technical point of view, in terms of timetable and budget, and offer a good cost-benefit ratio.

Types of project

- > Eligible for LIFE-Nature are **nature conservation projects** which contribute to maintaining or restoring natural habitats and/or populations of species in a favourable state of conservation within the meaning of Directive 92/43/EEC.
- > Eligible for LIFE-Environment are **demonstration projects** which bring environment-related and sustainable development considerations together in land management, which promote sustainable water and waste management or which minimise the environmental impact of economic activities.
Five areas of intervention are preferred: the management and enhancement of the territory, water management, the effect of economic activities, waste management, integrated product policy.
- > Eligible for LIFE - Third countries are **technical assistance projects** which
 - Constitute a benefit for the Community, particularly on account of their contribution to the implementation of regional and international policies and agreements;
 - Promote sustainable development at international, national or regional level;
 - Bring solutions to serious environmental problems in the region and the area concerned.

Implementation the Member States or third countries send the Commission the proposals of projects to be co-financed. The Commission sets the date for sending the proposals annually and reaches a decision on these. It monitors the financing and follow-up of the implementation of the LIFE actions. Accompanying measures enable the projects to be monitored on the ground and, in the case of LIFE-Nature, to encourage certain forms of cooperation between similar projects ("Co-op" measure).

Period of involvement 5 years (2000-2004).

Funds from the Community approximately 638 million EUR distributed as follows: 300 million EUR to LIFE-Nature, 300 million EUR to LIFE-Environment and 38 million EUR to LIFE - Third countries.

Contact

*European Commission – Environment Directorate-General
 LIFE Unit – BU-9 02/1 - 200 rue de la Loi - B-1049 Brussels – Fax: +32 2 296 95 56
 Internet: <http://europa.eu.int/comm/environment/life/home.htm>*