

# BENEFITS OF EC POLICY TO WATER QUALITY IN THE SW OF EUROPE

(Aportaciones de la legislación comunitaria a la buena calidad del agua de la ZNS)

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**ABSTRACT.** *Issued to guaranty the control of discharges in soils and waters and avoid deterioration of ecosystems, EEC Directives on urban and industrial wastewaters tried to improve water status in Europe. Elder than vertebrates, the unsaturated zone of soils is the natural filter to clean Earth and ecosystems, essential in the adequate solution against irreversible damage, the required step in the unstoppable water cycle. Laws to control ecosystems based on inadequate technologies are inefficient but common. The presence or absence of organisms still is the best indicator of the state of the referred ecosystems. Extracting phosphorous and nitrogen from waste waters (according to different reuse), allowing irrigation and simultaneously retrieve substances of economic value as raw materials, to avoid drinking water use for farming, urban and some industrial purposes, is the most important part of the package of measures essentials for achieving a good state of waters, using correct bio-indicators.*

**RESUMEN.** *Evitar el deterioro de los ecosistemas es el objetivo de las Directivas CEE sobre aguas residuales urbanas e industriales. La ZNS es más antigua que el Hombre que en ella se ubicó, recogió alimentos, cazó, desechó vertidos, desde las más primitivas de todas las civilizaciones. Habrá que volver hacia atrás en la búsqueda del filtro depurador por excelencia, la ZNS, peldaño esencial en el imparable ciclo del agua: imponer estrictos límites al contenido de los vertidos, controlar vertidos de plantas industriales y agropecuarias, recuperar de las aguas residuales las sustancias de valor económico, para evitar el riego con agua potable y el derroche del agua de mejor calidad para fines industriales, garantizando el suministro con agua realmente potable. Estas medidas forman parte de un conjunto, imprescindible, para lograr un buen estado del agua, que sea atestado por sus verdaderos y reales indicadores.*

## 1. INTRODUCTION

Whereas Georgics by Virgil (39 BCE) may be the first code of practice for environmental protection issued more than two thousand years before present, a large period of changes in habits and life styles implies some reflection.

Coming back to the 16th century - trying to understand relationship between policy and common rural practices - in order to ratify European country habits contemporaries of the oldest Portuguese policy on water - we noticed that the rejection of organic matter, around most of the European cities (Braudel, 1992), was mainly done by the reintroduction of organic wastes into the unsaturated zone of soils. At the same time that urban wastes (mainly home organic wastes and residues, as well as road sweeping), are used for agricultural purposes, paper mills sit before urban settlements, in order to ensure a good water quality for industrial purposes.

Five hundred years ago, to cause damage in water bodies was enough to receive a punishment. Since the beginning of the 17<sup>th</sup> century, throwing to the rivers all kind of products causing water damage was forbidden according to "Ordenações Filipinas", a compilation of Portuguese law made under Spanish domination (Almeida, 2002).

Despite the efforts to control all kind of rejection on the environment, the deterioration of ecosystems follows being the main reason for EC policy on water protection. However, better than putting on the paper a list of complex analysis to be done  $\underline{x}$  times and the methods needed to obtain reliable results, watching the Nature and trying to understand misdoing is the most efficient method of correcting and preventing damages: the natural processes remain unchanged, and the Laws of Physic follows dictating the movements of the Universe.

Scientists are supposed to go deep working in all subjects from a starting point that is deeper than universally accepted: considering it is the most consistent position, coherent with common knowledge.

Regarding Environmental Sciences, there are improvements in accuracy of measuring instruments, as compared with those previously used, due mainly to discoveries in technology and or new row materials.

More than 20 centuries after Virgil, EC policies on water remain being a need in order to obtain good water quality for domestic use in Europe, at the time more than 80% of human beings does not have yet enough water to survive in health conditions.

With population expanding at a high rate, the need for increased food production is apparent. Whenever good quality water is scarce, water of "marginal quality" will have to be considered for use in agriculture (Pescod, 1992). However, its quality (and or economical value) also depends on the facilities of discharge given by municipal authorities and the more or less stringent monitoring processes. The control of discharges (from industrial plants) in public sewers is the key to avoid health hazards and contamination.

## **2. PRESERVING SOIL FERTILITY TO ACHIEVE AN EFFECTIVE WATER PROTECTION**

According to Bidlingmaier (1999) "biotechnology has been employed at an increasing rate for environmental engineering purposes." If the correct bio-indicators were used a good state of water may be achieved avoiding drinking water use for some urban, farming and industrial purposes. Municipal wastewater in spite of being made of primarily domestic sewage - contains a portion of industrial effluents discharged to public sewers (Pescod, 1992).

It seams evident and doesn't require demonstration, that:

- a) The improvement of water status is a goal very difficult to achieve.
- b) The assessment of water quality if done through chemical and microbiological analysis is inadequate to ensure purity and potability. In the meanwhile, the trail of macroinvertebrates could provide information of greater reliability.
- c) The soil, mainly along the layers of the unsaturated zone, is the best place for retention of solutes and particles. After passing through the unsaturated zone, water that attains great depths doesn't achieve excessive concentrations of chemicals harmful to human, plants and animal health.
- d) Roots, of both aquatic and terrestrial plants, play a fundamental role in adsorption, and are the guarantee of the preservation of a good quality of water flowing below the unsaturated zone to the water table.

Farmers selling goods in urban areas collected sweeping roads, and received all kind of housemaid organic wastes, to apply as fertilizers and grow crops. It means that, between the 17th and 18th centuries, organic residues returned to soils to enrich its organic matter content. The unsaturated zone of soils received enough nutrients to allow, as well as fertility, adequate water content.

Agronomic and economic benefits of wastewater use in irrigation is underlined in the Volume n. 47 of the FAO Irrigation and Drainage Paper Series, pointing out the valuable role of soils on filtering and recycling water.

Controlling farming and industrial plant activities as well as wastewaters discharge, extracting the natural content of domestic wastewaters to retrieve substances of economic value, allows avoid fertilizers use and irrigation water needs.

Expansion of urban populations and increased coverage of domestic water supply and sewerage, give rise of greater quantities of municipal wastewater. With the current emphasis on environmental health and water pollution issues, there is an increasing awareness of the need to dispose of these wastewaters safely and beneficially (Pescod, 1992).

Properly planned use of municipal wastewaters alleviates surface water pollution and not only conserves valuable water resources but also takes advantage of the nutrients contained in sewage to grow crops. The availability of this additional water near population centres will increase the choice of crops farmers can grow. The nitrogen and phosphorous content of sewage might reduce or eliminate the requirements for commercial fertilizers. It is advantageous to consider effluent reuse at the same time as wastewater collection, treatment and disposal are planned so that sewerage system design can be optimized in terms of effluent transport and treatment methods (Pescod, 1992).

### 3. FACING EC POLICY: DIFFERENT WAYS OF DEALING WITH WATER PROTECTION

The EC policy issued in the beginning of 90's is the result of strong efforts to control water pollution around Europe. Made by representatives of all countries it received contributions of the national delegates, according to their personal preferences, knowledge and scientific experiences. Starting from previously presented proposals, delegates worked for months in order to join enough accuracy, both in French and English versions, agreeing or disagreeing with statements, and voted according their own comprehension, following or not national decisions or orientations. Concerning Portugal, in the first steps of a recent democratic regime, have been allowed individual decisions and, consequently, insufficient discussion of the issues under evaluation. It may be the reason for the UK, Spanish and Portuguese ways of dealing with EC Directives on water, according to the previous study made under the referred Master thesis (Bento, 2003).

Observing the EC archive (Annex 1)<sup>1</sup> we realized that during a couple of years before 1989 the European Council and the European Commission staff tried to join information, asking for national representatives to participate in a preliminary text. After a first draft, documents sent to national representatives of all countries, both in English and French versions, in order to allow a productive meeting scheduled for almost one year after.

During almost three years of preparation, national delegates joined the contributions of researchers and universities to contribute for a best version. The EC assumed the orientation of works but giving national delegates the opportunity to agree or disagree, expressing theirs own needs for introducing amendments.

When Brussels was focussed on water protection trying to implement Directives there were three different feelings, obviously depending on the needs, dictating three different ways of facing law, in the UK, Spain and Portugal: the UK<sup>2</sup> assumes to use 32% of groundwater for drinking water supply, Spain<sup>3</sup> 40% and Portugal<sup>4</sup> 70%. Began in 17 January 1989 with a "Proposal for a Council Directive concerning the protection of fresh, coastal and marine waters against pollution caused by nitrates from diffuse sources" sent to delegates, to be examined on 25 January 1990 by the "Working party on the Environment". However, it was not the starting point of the EC efforts to protect water around Europe.

According to the archives of the Council of European Communities:

- a) The UK assumes that had been done efforts to protect waters, codes of practice for environment protection were issued, and a service of consultation - support service to the public – was a guaranty of hitting objectives.
- b) Spain didn't give special attention to the control. The amounts of amendments and fertilizers were unknown in a general way: both in regional and national statistics.
- c) Portugal says that there were no published laws or control of effluent or sludge used for agricultural purposes.

To enable industry to adapt to new laws (EC Directives) in Portugal were signed during the 90's some "contracts for environmental protection" allowing the possibility of spread over time the goals, transforming the industrial units in a phased form. Thus, legally, the potentially pollutant waste followed being rejected in water, without breaking the law (Kirkby, 2001).

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<sup>1</sup> Annex 1 shows the scheduled meetings attended in Brussels by national representatives.

<sup>2</sup> Merkel W., 1985. *cit COM (88) 708 final*.

<sup>3</sup> Information obtained from the Directorate General of the Distribution of Waters (in 1986.11.26). *cit COM (88) 708 final*.

<sup>4</sup> Unofficial information obtained from the Portuguese Ministry of the Environment. *cit COM (88) 708 final*.

Nowadays, Portuguese ecosystems, despite the fact of a lot of money and work spent, are still damaged. There are evidences of fallibility, irreversible damage caused by either inexperience, or inadequate solutions.

#### 4. CONCLUSIONS

The unsaturated zone of soils follows being the birth place of micro-organisms involved in soil fertility restoration, as well as the optimal site for roots, where heavy metal can be adsorbed avoiding to reach the water table.

Changes in the relationships between rural and urban styles and livings are the main reason for changes in the needs of water along the last two thousand years:

- a) In private consumption, from a few liters per day to more than six hundreds in the 70's;
- b) Deep changes in agricultural practices: starting from the use of organic wastes to grow crops, passing through fertilizers in order to enlarge productions, and the use of synthetics to substitute water;

Starting from a few small towns and very large rural areas, with a few and thin ways and streets, to a few square meters to grow crops and the main area covered by buildings and a very fat and large multi-cross of roads.

- c) Also very deep changes in the relationship between farming and animal growth, implied an increasing in wastes and discharges. Growing up and feed cattle in small and limited areas needs strong mechanisms of leaching wastes and waters in order to avoid pollution and contamination.

To follow water along the water cycle is the way to prevent the deterioration of ecosystems. Sustainability is the keyword to fight against the tide of empty numbers that covers great part of scientific papers, despite the presence, or absence, of organisms still is the best indicator of a good state of the referred ecosystems.

Controlling wastewater disposal as well as water reuse, both are essential steps in a coherent regulation for water protection.

To extract wastewaters natural contents is to retrieve substances of economic value.

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#### Annex 1

Archive of EC Directives referred:

- Document number 4174/90 - issued in Brussels on 17 January 1989.
- COM (88) 708 final - 8 February 1989
- Document number 4411/90 issued in Brussels in 30 January 1989 refers the Working Party on the Environment on 25 January 1990.
- Document number 4411/90 refers the Council Resolution 88/C209/02 of 28 June 1988 requesting the Commission to submit that proposal as soon as possible. "Perspectives for the Common Agricultural Policy" the green paper by the European Commission indicates that excessive use of fertilizers constituted an environmental risk, that common action was needed to control the problems arising from intensive livestock production and that agricultural policy must take greater account of environmental policy.
- Document number 60/85 issued in Brussels in 24 April 1989 refers the Working Party on the Environment on 13 April 1989.

- Document number 6692/89 issued in Brussels on 29 May 1989 referring that the Commission submitted the proposal to the Council on 5 January 1989
- Document number SI (89) 489/2 issued in Brussels on 19 June 1989 referring the meeting of Luxembourg on 8 and 9 June 1989
- Document number 8623/89 issued in Brussels on 16 September 1989 referring the meeting on 14 September 1989
- Document number 8733/89 issued in Brussels on 25 September 1989 referring the meeting on 7 and 8 September 1989
- Document number 9078/89 issued in Brussels on 9 October 1989 referring a French delegation contribution.
- Document number 9212/89 issued in Brussels on 16 October 1989 referring that the proposal was submitted by the Commission to the Council on 5 January 1989, and received opinions from European Parliament and the Economic and Social Committee on 26 May 1989 and 26 April 1989.
- Document number 9222/89 issued in Brussels on 18 October 1989 referring the meeting on 12 October 1989.
- Document number 9444/89 issued in Brussels on 8 November 1989 referring the meeting on Luxembourg on 23 and 24 October 1989.
- Document number 9535/89 issued in Brussels on 7 November 1989 referring the meeting on 28 November 1989.
- Document number 9760/89 issued in Brussels on 10 November 1989 referring the meeting on 28 November 1989.
- Document number 10020/89 issued in Brussels on 17 November 1989.
- Document number COM (89) 544 final issued in Brussels.
- Document number 4857/90 issued in Brussels on 22 February 1990 referring the meeting on 15 February 1990 and the modified submitted on 13 February 1990.
- Document number 4953/90 issued in Brussels on 23 February 1990 referring the meeting on 22 March 1990.
- Document number 5086/90 issued in Brussels on 6 March 1990 referring the meeting on 22 March 1990.
- Document number 5318/90 issued in Brussels on 16 March 1990 referring the Permanent Representatives Committee.
- Document number SN/2741/90 issued in Brussels on 21 May 1990 referring a French delegation contribute.
- Document number 6579/90 issued in Brussels on 22 May 1990 referring the meeting on 7 and 8 June 1990.
- Document number 6743/90 issued in Brussels on 28 My 1990 referring the meeting on 22 May 1990.
- Document number 6779/90 issued in Brussels on 1 June 1990
- Document number 7094/90 issued in Brussels on 18 June 1990 referring the meeting on 7 June 1990.
- Document number 9367/90 issued in Brussels on 25 October 1990
- Document number 5716/91 issued in Brussels on 17 April 1991 referring the meeting on 9 April 1991.
- Document number 5874/91 issued in Brussels on 23 April 1991
- Document number 5875/91 issued in Brussels on 29 April 1991 referring the meeting on 23 April 1991
- Document number ENV/91/43 issued in Brussels on 21 May 1991 referring the meeting on 14 May 1991.
- Document number 5991/91 issued in Brussels on 2 May 1991
- Document number 6517/91 issued in Brussels on 31 May 1991 referring a new draft
- Document number 6522/91 issued in Brussels on 31 May 1991
- Document number 6522/91 issued in Brussels on 3 June 1991 referring the meeting on 13 and 14 June 1991
- Document number 6752/91 issued in Brussels on 6 June 1991
- Document number SN/134/91 issued in Luxemburg on 14 June 1991
- Document number 7043/91 issued in Brussels on 28 June 1991 referring the meeting on 13 and 14 June 1991 referring a modified proposal
- Document number 7043/91 Addendum, issued in Brussels on 1 July 1991 referring the preamble of the proposal.

End of list