

*Instrumentos Institucionais para uma maior eficiência na utilização da água em áreas industriais: impactos da legislação e da administração da água; fontes de abastecimento públicas e privadas; tarifas e outros incentivos económicos.*

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#### ABSTRACT

*The importance of Hydric Resources for the Socio-Economical development of the country is analysed and, as a logic consequence, the necessity of a politics of management of those hydric resources.*

*The general principles to which a correct politics of Water Management must obey are pointed out, being evidenced the importance of control of position by means of fixing norms.*

*After, a short history of the problems of Hydric Resources in Setubal Peninsula is done, being mentioned the fundamental role played by Local Authorities in unchaining all the process, mainly "Setubal-Project" (Cooperation Project Between Portuguese Government and the United Nations Program for development), a pioneer work in Portugal of systematic analysis of an Aquiferous in a coast area and Estuaries, applied to its development and management.*

## R É S U M É

On analyse l'importance des Recours Hídriques dans le developement Econo-mique-Social du Pays et logiquement le besoin d'une politique de gestion de ces Recours Hídriques.

On souligne les principes genereaux auxquels doit obeir une politique cor-recte de gestion d'eau, en metent en évidence l'importance du control de la posi-tion de la fixation des normes.

En continuant on fait un petit historial de la problematique Recours Híd-riques dans la Peninsule de Setubal et du role principal qui ont les Autarchies Locaux dans le debrouillement de tout le procēs surtout le "Projecto Setubal" (Project de Cooperation entre le gouvernement du Portugal et le programme des Na-tions Unies por le developement - PNUD), travaille d'avant garde au Portugal d'a-nalise sistematique d'un Aquifère dans la côte et des Estuaires apliquée au de-velopement et gestion.

## R E S U M E N

Se analiza la importancia de los Recursos Hídricos en el desarrollo Econó-mico-Social del País y como consecuencia lógica la necesidad de una política de gestion de esos Recursos Hídricos.

Se apuntan los principios generales a que obedecera a una política correc-ta de Gestion del Agua, salientandose la importancia del control de la posición por la elaboración de normas.

En seguida se hace un pequeño historial de la problemática de los Recursos Hídricos en la Península de Setubal y del papel fundamental que tendran las Au-traquías Locales en el desenrollar de todo el processo fundamentalmente el "Pro-jecto-Setubal" (Projecto de Cooperación entre el Gobierno de Portugal y el pro-grama de las Naciones Unidas para el desarrollo - PNUD), trabajo pionero en Por-tugal de analisis sistemática de un Aquifero en la zona costera y de Estuarios aplicada a su desarrollo y gestion.

Water is a natural resource essencial to Man's subsistence and activities. It isn't only an absolutely necessary element for life. According to its quantity and quality, it is a conditioning factor of economical development and social welfare.

The actual problems that are arisen concerning Hydric Resources oblige us to try to avoid that the growing scarcity of water might be an obstacle to the Socio-Economical development we all wish.

In Portugal, Hydric Resources occupy a major place in the Natural Resources available in the country. In the last decades, the politics of utilization of Natural Resources, and in particular of Hydric Resources, hasn't always taken in to account the real interests of populations and of National Economy.

The Democratic situation created in Portugal after April 1974 helped to open new perspectives to change this situation, not only as a result of the possibility of a greater consciencialization and capacity of intervention concerning water problems by the population and technicians, but mainly because of the changes occurred in the country.

We must stress the Constitutional principles that sanction "collective appropriation of Natural Resources", "a right common to everybody, to a human environment, healthy and ecologically in equilibrium, and the right of defending that right, being a duty of the state to develop the rational utilization of Natural Resources, keeping its capacity of renewing as well as its ecological stability and the progressive improvement of the quality of life of all the Portuguese".

The solution of the problems of Hydric Resources can only be reached establishing an adequate politics of management that aims not only at a better utilization of the available water but also a good planning of the utilization of Hydric Resources.

In a short way, we can say that the management of Hydric Resources aims at the practice of technics that may obtain a maximum advantage for society, from the utilization of those resources, guaranteeing at the same time the maintenance of water, for an indefinite period of time, in good conditions of use.

The necessity of water Management is mainly a consequence of the very particular characteristics of Hydric Resources, of which we stress the principal:

- Water is something indispensable for Man's survival;
- Water is a basic factor of production, and in many cases impossible to replace, for economical activities;

- Water is a Natural Resource which can be renewed, although in limited quantities;
- Water is a movable resource;
- Water is a resource of intersectorial utilization as it serves not only the primary sector, but also the secondary one, as well as Services.

In the conception of a politics of water Management factors of institutional nature take place which condition, in a certain way, the principles to which Water Management must obey.

Of these principles, the most important is probably the one that stipulates the necessity of considering the Hydrological Basin as a basic unity for water Management, as the several forms of occurrence and utilization of water in several points of a basin are, in a general way, interdependent. The execution of water Management of each Hydrological Basin must be done by an entity belonging to the state, but being taken into account the convenience of a decentralization which allows the Authorities to go on executing the actions that belong to its sphere of influence concerning Water Management.

The execution of a politics of Water Management must take into account the global perspectives of development and, in particular, the impositions of territory administration and the conditioning of existent situations. Concerning this point the politics that must be drawn, in relation to the installation of new activities of utilization, must prevent the existent situation from being aggravated, and in relation to the already installed utilizations, must establish programs of progressive regeneration of Hydric Resources until the aimed quantity and quality levels are reached.

We will explicit some of the principles that a correct politics of Resources Management must take into account:

- All the Hydric Resources must be of Public domain and under the Administration of State (progressive disappearance of private propriety of water);
- Rational and integrated utilization of Hydric Resources with priority to the provision of potable water for domestic utilization;
- Observation, inventory and permanent control of Hydric Resources and inventory of its forms of utilization;
- Prohibition of opening new installations that aren't equipped with the necessary means of preventing water pollution;
- Active participation of the population in all the actions that aim at the rational utilization and the maintenance of Hydric Resources;

More specifically, we think that Local Administration should have the following responsibilities:

- Distribution at the domicile of potable water;
- Domiciliary gathering of residual waters;
- Gathering and drainage of pluvial waters;
- Water captation, treatment, adduction and reserve;
- Transport, treatment and final throwing of residual waters;

Captation and adduction done by Authorities should be submitted to appreciation by the competent organisms in Central Administration, as well as the cases of treatment and final throwing of residual waters.

#### Water pollution control. Norms, taxes and prizes

A very used system to reach pollution control is to settle norms having the aim of defining the maximum limits of pollution admitted in the effluent.

To make the control easier, the norms should mention the characteristics of the effluent waters and not the characteristics of the water in the receiving area after having received the effluent.

The infraction to one norm should be punished with a pecuniary penalty proportional to the degree of transgression. It should be proportional to the degree of pollution thrown, besides the fixed values. To discourage the attempts of infraction, the penalties must be rather high, being much higher than the amount needed for treatment which is necessary to effectuate.

The application of those penalties must not interfere with the civil responsibility that may exist due to damage caused to a third entity.

#### Economical incentives. Taxes and prizes

The necessary information for the correct definition of the norms of pollution is very wide and complex, so the installation of a system of norms may oblige to considerable expenses. That's why it is considered better to adopt economical incentives that can take the form of exaction to the agent responsible for pollution of taxes whose amount raises according to the caused pollution, or the form of payment, also to the polluting entity, of prizes that will increase according to the degree of reduction of pollution.

Although it is possible to show that tax and prize systems are theoretically equivalent, in fact the prize systems may origin inconvenient distortions

and may cause difficult administrative problems.

Besides, the prize system is not psychologically accepted by public opinion.

Another advantage of the tax system is to assure automatically the financing of expenses with the maintenance of the structure responsible for Water Management and the construction of collective works that may seem necessary.

### Hydric Resources in Setubal Peninsula

As everybody knows, after the 25 of April 1974, the town councils started to develop an activity which was more related to their natural vocation. A deep connection with the wishes of the populations was inculcated in the Local Authorities Management, existing a deeper engagement in the search of solutions to solve the most urgent problems.

In October 1974, the Councils of the District of Setubal analyzed the urgent problem of water supply to the area of the District, which was studied in a detailed way in November of the same year, being decided to submit the subject to superior appreciation of the Minister of Social Equipment and Environment, of the Ministers of State of Public Works, Habitation and Urbanism, Minister of State of Environment and General Director of Hydraulic Services.

The problem of water supply to the District of Setubal arose as a consequence of the fact that we came to know the existence of a work executed after an order of the Cabinet Council, for the economical subjects of December, 3, 1968, whose aims were as follows:

- 1- Analysis of water availability in the Continent:
  - Hydro-Ecological conditionings;
  - Natural Resources and its characteristics
- 2- Analysis of the water consumption in the Continent, considering a period up to the year 2010;
  - Populational, industrial and agricultural growth;
  - Comparative analysis of capacities and consumptions with the aim of defining the areas of the Continent with lack of water.

Such results were published only in 1972, having reached the following conclusions:

- a) - The totality of water available in the Continent has the value of 21.375 millions of cubic meters per year, while the consumption

expected for the year 2010 is 11.167 millions of cubic meters per year. Considering the whole situation of the country the situation is satisfactory, if we consider the period until the year 2010.

- b) - Considering the Districts, and for the above mentioned period, only the Districts of Lisbon, Leiria and Setubal will be deficient.
- c) - More exactly, a deficit of 1080 millions of cubic meters per year will take place in the District of Setubal, in the year 2010.

Being aware of these facts, the Town Halls of the District of Setubal pressed the government towards the creation of preventive measures for the contention of the super exploitation of Aquiferous<sup>(1)</sup> which had a reflex on the legislation about water captation, being published the Decree Nº 367/77 which reformulated all the legislation about this matter and which took into account the necessity of controlling water use.

The above mentioned Decree adopted a regime of previous licence for the opening of wells and holes for water captation, reinforcing the restriction of the use of underground waters in Setubal Peninsula.

- (1)- The aquiferous system of river Tejo and river Sado corresponds to an underground reservoir formed by tertiary deposits of the basins of those rivers. This reservoir is limited to North and West by formations of Palaeogene and Cretaceous which form an impermeable limit, or by calcareous formations from the Jurassic which correspond to a permeable limit. To the East and South the tertiary formations are in touch with a paleozoic soil which forms an impermeable limit too. At last, in Setubal Peninsula the southern limit of this reservoir is formed by the oligocenic marls of the Arrábida Mountain.

In spite of an improvement in the situation due to law revision, situations of injustice still take place, caused by the super exploitation of underground waters by means of private holes, as it is the case, in the District of Setubal, of Quimigal (public enterprise in the area of Barreiro whose main activity is the production of chemical products, fertilizers, etc.) that often spends more water than all the population of Barreiro, Socel (public enterprise in the District of Setubal that works in the cellulose activities) and National Siderurgy (public enterprise in the area of Seixal that works in the production of steel), only to refer the most significant cases, although there are a lot of other situations.

As a contrast, we have the case of Lisnave in Almada (enterprise that de-

als with ship reparation and building - nearly 10 thousand workers) that wasn't allowed to open its own captations, having to use the normal services of the Autharchy and effectuating the normal payment of the services.

This situation must be analyzed by the Central Government, as such private holes contribute in a larger scale than Municipal holes for the exhaustion of the Aquiferous.

In financial terms we can conclude that a hole, in those circumstances is easily amortizable, being the water price very low, which doesn't give place to great restrictions and, on the other side, creates a situation of inequality between the population living in the District and the existent industries.

One possibility to surpass this situation would be to define a system of taxes to charge to private entities that extract water by means of their own captations, being fixed a price to be paid to the local Autharchy for each cubic meter of extracted water.

Nowadays in Almada, industrial and comercial entities are enclosed in a price (14\$00/m<sup>3</sup>) similar to the second price for domestic use (13\$50/m<sup>3</sup>).

We don't think this is the most correct situation, as the real average price for m<sup>3</sup> is nearly 20\$00, some studies being done so that large and middle industries and large and middle commerce start to be charged according to that real value.

A seminary took place in Almada, to examine those questions, under the theme "Study of Hydric Resources of Setubal Peninsula", promoted by the Town Halls of the District with the support of the General Direction of Resources and Hydraulic Resources.

One of the most important points revealed in the seminary was done by Mr. Quang Trac, technical consultant of UNESCO responsible for the equip of Setubal project, who informed that the Aquiferous system in all the extension of Low Tejo and Low Sado (from Tomar to Grândola) is one of the most important, quantitatively and qualitatively, of all the existent in Iberian Peninsula.

So it will be possible to go on with the hypothesis of counting with the conduct of Castelo do Bode<sup>(1)</sup> (being built now) to cover the increase of demand in Lisbon and the Northern margin until the year 2010, and cover the increase in Setubal Peninsula with subterranean water.

Besides being technically possible the alternative of supplying Urban and Industrial demands in Setubal Peninsula at a short, medium or even long date, it



is also possible from an economical point of view, as the cost of subterranean water will be nearly half the price of the alternative water imported from Castelo de Bode.

As a conclusion, we must stress the importance that the Autharchies have had in all this process, having largely contributed for the reality of "Setubal Project". After the analysis of all the problematics of Hydric Resources in Setubal Peninsula, it is clearly pointed the advantages that a correct cooperation between Central Administration and Local Autharchies will have for the development and creation of a politics of Hydric Resources Management.

(1)- The conduct of Castelo de Bode is basically formed by a 4,9Km long tunnel since the water captation until Portela, a pump station, a treatment station and a conduct between Asseiceira and Vila Franca de Xira 80 Km long. Initially, it was expected that the connection with the supplier conduct of Setubal Peninsula would be done in Vila Franca de Xira. This conduct would contour the Southern margin of Tejo's estuary up to Almada, with a pump station in Porto Alto.

#### BIBLIOGRAPHIC NOTES

This work was done having as a support "A gestão das Águas" (Water Management), by L. Veiga da Cunha and Others as well as the communications done in the "Seminary about water supply and drainage in Portugal" and the "Seminary about the study of subterranean Hydric Resources in Setubal Peninsula".