

SPAIN



GENERAL SUMMARY

Water

Very slight changes with little significance are foreseen for gross water demand, although this will have to be covered by better quality resources and, above all, much higher guarantees. For this purpose the tendency will be to install safer systems, on occasions with dual feed circuits to ensure supply, as in the case of highly profitable crops destined for export. In any case, competitive conflicts between the various sectors may worsen.

The most important environmental requirements should be covered by both the adoption of water saving policies and the so called "clean technologies". This item is of particular interest in the case of non-point pollution caused by the agricultural use of fertilisers and pesticides.

Although it is not foreseeable any important modification of irrigation water prices, the environmental policies addressed to obtain water savings and to improve its use practices, along with the modernization of infrastructures and the improvement of application systems (sprinkler and microirrigation), would certainly result in reductions of irrigation volumes that in some cases could compensate the demands of new irrigated areas. Any substantial increase of the irrigation water prices would certainly have very adverse effects on agriculture, particularly in fragile areas, leading to a reduction of both, the irrigated areas and the crop production followed by a massive abandonment of the rural milieu by the farmers, and the subsequent degradation of the environment.

Environmental policies will raise the production costs which, in certain cases, may result in a reduction of cultivated areas. However the greatest farming reductions are expected to be a consequence of the progressively lower aids from the UE Common Agricultural Policy (CAP), aimed to reduce the cropping intensity and to encourage the release of farm-land for environmental purposes envisaged in the same CAP.

On the other hand, the production reduction due to the abandonment of dry-farming marginal areas would be compensated by the higher productivity of other lands and by new areas put under irrigation.

Food Production

The food production system has reached a high level of stability, by combining an adequate level of self-sufficiency with the advantages of international commerce. However, if free trade is consolidated on a medium term basis between Europe and non European Mediterranean countries, this could cause a tense situation in the Spanish agricultural export area, especially where fruit and vegetables are concerned. This situation could have a repercussion on the profits of the sector, but would not affect water since, although demand may decrease, either pressure could be reduced on some of the aquifers which are currently over-exploited or spontaneous inter-sectorial water reassignment could be carried out.

Rural development

There remains very little to be done in Spain regarding rural irrigation policies. Policies for the founding of new population centres in the rural environment do not seem to be called for, since this is already occurring in regional middle size centres. However, development is expected to be maintained in new agricultural foodstuff industry development projects which will increase the possibilities of these regional centres. While there will be a very modest demand for quantities of water for these projects, high standards of quality and guarantees will be required.

In the same way, endogenous development processes may be encouraged which make the most of advantageous environmental conditions. These processes are linked with mountainous areas and natural open spaces. In these cases it is not a question of new water demand, rather it entails restriction of alternative uses which, due to their local nature, would have very little influence on total water demand.

1. SUMMARY OF NATIONAL POLICY AND DEVELOPMENT PLANS.

In Spain, the definition of national policy and development plans is conditioned by the liberal spirit which impregnates the Spanish Constitution of 1978, and the institutional norms of the European Union into which our country was incorporated in 1986. As a consequence of this, private enterprise has become the basic force behind economic and social development. The State performs a purely subsidiary planning function in the general activity of national economy. As a result, there are no General Development Plans currently in existence.

The agricultural policy is defined by the EU Common Agricultural Policy (CAP) and entails continuous and prolonged adaptation to the GATT agreements. CAP is constituted by a series of regulations which control the various sectors of agricultural production by means of Market Common Organisations. This endeavours to reach a commitment between two fundamental seemingly contradictory, objectives: 1) the maintenance of the farmers' income (to avoid their abandonment of the rural environment), and 2) to lower the prices of agricultural product (in order to keep them in line with international prices). Rural development is fostered by a series of policies and programs which encourage the implantation of activities, particularly food and/or any other kind of industries whether they are related or not with agricultural production, this type of actions aimed to improve the quality of life in the rural environment.

Recently, a National Irrigation Plan has been prepared, characterized for being an open document, which foresees a very limited development of new privately financed irrigation plans, whilst it presents ambitious plans for future consolidation, improvement and modernisation of existing irrigated areas.

Currently there exists a National Law for Land and Urban Order which is complemented by Regional Laws and Municipal Plans, all of them trying to adjust the urban development to the social evolution, which obviously affect the agricultural development. Municipal Urbanization Plans shall be approved by the respective Regional Government. Urban supply of drinking water is, by law, the direct responsibility of municipal authorities in both aspects, the execution of the required structures (distribution network, etc.) and their exploitation and maintenance.

There also exists a National R+D plan for the promotion of research and development, in which specific fields are included related with sectors considered as being extremely important, such as biotechnology, environment protection, efficient use of water and rural development. This R+D plan is coordinated by the Inter-ministerial Commission of Science and Technology - ICS&T, (Comision Intertnministerial de Ciencia y Tecnologia - CICYT).

The structuring element of water resources policy is hydraulic planning, which was introduced and regulated by the Water Law of 1985, the preparation of which is expressly attributed to the Central State Administration Department responsible of water issues. Presently, all Basin Hydrological Plans for all the Spanish basins have been approved by Government Royal Decree 1664/1998 of 24 July. However, there is still no National Hydrological Plan (NHP) which would homogenise the Basin Plans and also define the occasional inter-basin water transfers in the future. The National Hydrological Plan will require its approval by a Law passed by the National Parliament and legal decrees of the same rank will be needed for future inter-basin water transfers.

The hydrological planning work which was carried out during the period 1990-96 (a preliminary version of the NHP was presented in 1993) was the object of strong political opposition and lively social debate, and for this reason, the NHP was not approved. During 1999 the White Book of Water in Spain (Libro Blanco del Agua en España), dealing with the use of water in Spain has been issued. This book endeavours to clear the ground before starting on the preparation of a new version of the NHP. The White Book contains no reference to a decision regarding water transfer policy, which is to be submitted to public consensus, before including it in the NHP. As water transfer acquires a relevant (and much debated) role, hydraulic planning will not be complete until the NHP has been published, debated and approved. Finally, a specific National Sanitation and Purification Plan has been in existence since 1995 which contains details of the investments required for waste water purifying which is distributed among the four administration levels. The action to be taken which is envisaged by the National Sanitation and Purification Plan, based on the European Union Directive 271/91, will culminate in the year 2005. There is a noticeable absence of a parallel national scheme for the improvement and modernisation of municipal networks for the internal distribution of drinking water.

The various policies for the protection and conservation of the environment also entail the integration and participation of the four previously mentioned responsible levels (European, National, Regional and Local). In this case, the international agreements to which Spain has subscribed act as elements of inspiration and/or as catalysts.

The action taken in hydrological-forest correction programmes arise from an integrated effort on the part of both the National Hydraulic Administration (responsible for basin management) and the Regional Governments (responsible for forest investments). This duplicity of responsibilities makes it difficult to carry out these programmes unless effective agreement exist between both Administrations.

2. PRESENT STATUS OF WATER

Overall, Spain can not be considered as a dry country, within a world-wide context. Mean annual rainfall is 684 mm/year, but annual rainfall varies a lot from one region to other, ranging from more than 1,600 mm over specific zones of national territory. Sometimes surpassing 2.000 mm, to some 300

mm in large south and southeastern areas of the peninsula, the lowest being 200 mm in some zones of the Canary Islands. The assessed total average run-off is some 111.000 hm³/year which, for a surface of 504.750 km², represents a specific run-off of 220 mm/year.

As for water planning, Spain is divided into 14 peninsular and 2 insular hydrographic areas or basin districts, corresponding to the 16 main watersheds.

Flows and natural regulation

If the natural environment had not been artificially changed, only a small fraction of the total natural resources - around 8 % - would be presently used to satisfy the various water needs. This means that if nothing had been modified, currently only an absolute maximum of little more than 1 Mha would be irrigated, which is comparable to the irrigated surface on the eve of the 20th century when, actually, the water resources on rivers and aquifers were practically in their natural state.

Thanks to their important underground components, the most naturally regulated basins are that of Segura and Jucar rivers (near 30 % of the total supply). This encouraged in the past intensive population settlements and the development of extensive traditional irrigation systems on their fertile plains.

Present available resources.

Nowadays, Spain has some 1,200 large dams on operation, with a total capacity of over 56.000 hm³. Table 1 shows the appreciable increase in usable volumes resulting from infrastructure regulation, which is placed around 35 % of the natural water supply as compared to the previous 8 %.

These works of regulation have been financed mainly (about 60 %) with public funds through the former Ministry of Public Works - MOP- (budgets of the General Directorate of Hydraulic Works) and the rest by the private hidro-power sector. The development of irrigation was carried out jointly by the former MOP and the Ministry of Agriculture, through the former National Institute for Colonization (later Institute for Reform and Rural Development-IRYDA- and presently evolved into the General Directorate for Rural Development). The construction and exploitation of these hydraulic infrastructures (dams and primary irrigation's canals of statal initiative) has been mainly carried out by the River Basin Authorities or Hydrographic Confederations, created from 1926 on, one for each of the main river basins; secondary irrigation network being the competence of the Ministry of Agriculture.

All users of the Hydraulic Public Domain shall compulsorily be grouped in Users Associations (UA) or Users Communities. Irrigators Communities (IC) are those where the majority of users are farmers irrigators. The establishment of the first Users-Irrigators associations may be dated back to well before the Middle Ages, their primitive ordinances and regulations being adapted throughout centuries to new social changes and requirements. It was the Water Act of 1879 the first legal body that explicitly recognizes their existence and assigns them their present legal status. They are institutions of public law that cover the relations of the farmers with the water Administration, and among the farmers themselves, their main roles being the sound allocation of water volumes granted by the Administration for equitable distribution among irrigators, as well as collection of irrigation tariffs, irrigation organization, disputes settlement by Water Juries, etc. Several UA have even intervened on the creation and exploitation of new irrigated areas. These Communities are syndicated (federated) at both basin and national levels, the National Federation of Irrigators Communities of Spain gathering the practical totality of the Irrigators Communities constituted in Spain.

Artificial Recharge

The first recharge facilities in Spain were located in the surrounding districts of Barcelona, on the alluvial fans of the rivers Besos and Llobregat. Wells located in the latter delta region are used to recharge aquifers during some years, up to a maximum of 20 hm³/year, using surplus water from a wastewater treatment plant. Other interesting experiences which although they are not comparable to

the one previously mentioned, due to the length of time it has been operating, are those performed on the island of Mallorca, in the Llano in Palma, the Boqueron experience in the Segura basin, etc.

Since 1984, a number of trials have been carried out in different areas of Spain. The results obtained are encouraging, although it must be pointed out that despite the use of artificial recharging, there is a moderate hope to achieve a significant increase in the available resources of the country. However, using artificial recharge may be possible to solve or mitigate some of the local problems, thus improving the guarantee of water supply.

Desalination

Sea water desalination has been used in Spain since 1969, for urban water supplies in Ceuta, Lanzarote, Fuerteventura and Gran Canaria, all of them having in common the very poor availability of water resources.

Overall, sea water desalination currently contributes to the hydrological cycle, with some 222 Hm³/Year, which places Spain in the leading position in Europe, owing 30% of the total desalination equipment installed in the whole continent.

Demand for water for supply to populated areas

This includes water for domestic use (homes), municipal (garden irrigation, fire services, etc.), collective (public services, such as hospitals and schools), industrial, commercial and even agricultural.

In practice, it is much more difficult to differentiate the share of water volumes consumed by industries connected to the municipal network, and those assigned to urban needs. As an indication, the volume consumed by small industries and services which are supplied by the municipal network represents approximately 25% of the total water registered by meters, and this is usually computed as a demand for urban supply.

Tourism and second homes generate a significant demand for water in Spain, frequently surpassing by far the demand of the regular population during peak periods due to the generalized use of swimming pools and other high water consuming leisure facilities.

Considering that Spain's current population is slightly more than 39 million persons, the total present water demand of populated areas is estimated to amount to some 4.700 hm³/year.

Demand for water for industrial use

Available data usually refer to large industries, which in general are self-sufficient with reference to water supply. Small and medium sized industries supplied from the urban network are usually included within the urban sector, which leads to infra-evaluation of the whole industrial demand.

Current total demand for industries not connected to the municipal network is for some 1,600 hm³/year (Table 2).

Demand for water for agricultural use

Demand for agricultural use is for some 24.000 hm³/year, out of which more than half corresponds to the great basins of the rivers Ebro, Duero and Guadalquivir.

3. PRESENT STATUS OF FOOD

The evolution of the demand for food is clearly defined on a quantitative basis, although the quality of the product is increasingly becoming the starting point for food product development.

The average Spanish diet can be considered to be correct. However, consumer's trends show a slow approximation to the eating habits of other centre and northern European countries, not forgetting some other influences due to fashion pressure, whereby some of the typical features of the Mediterranean diet are losing ground. Specifically, the following changes have been identified:

- A slow and gradual reduction in the per capita consumption of food.
- An steady decrease in the consumption of bread, rice and cereal by-products. Decrease in consumption of pulses.
- Increase in meat consumption.
- Greater use of processed products, such as the following:
 - Meat by-products, such as the traditional Spanish products (hams, salted meats and other cured products), and also newly introduced products (hamburgers and sausages).
- Consumption of dairy by-products which, in many cases, replace fruit for dessert.
- Processed fruit and vegetables, either canned or frozen.
- Industrial sweet products, biscuits and buns.

4. PRESENT STATUS OF RURAL DEVELOPMENT

Spain covers a total area of 50,479,500 ha, of which 26,025,700 ha (51 %) can be used for agricultural purposes, the remaining 49 % being unsuitable for agricultural use. Of total area suitable for agricultural purposes, 87% is used for rain-fed farming and the remaining 13 % is irrigated, this latter generating 55 % of total agricultural production, which means a production equivalence of 1 ha under irrigation to 6,5 ha of rain-fed land.

Total area equipped for irrigation in Spain, able to be supplied by irrigation networks, covers 3.76 Mha, out of which 3.345 Mha, are effectively irrigated each year. Of this actually irrigated area, 2.263 Mha are irrigated using surface waters, 0.942 Mha use underground water, 98,000 ha are supplied with water transfers, 24,000 ha with return flows, 17,000 ha with treated waste water and some 550 ha are irrigated with desalinated water, either from sea or brackish sources.

Only 1.521 Mha of the total surface under irrigation are considered as having been adequately or over-irrigated, whilst 1.824 Mha are insufficiently supplied.

As for the application methods, 1.98 Mha use gravity, 0.80 Mha sprinkler and 0.563 Mha micro-irrigation systems.

Due to the long tradition of Spain in irrigation, many of the infrastructures still used are very old; prior to 1900, 1.077 Mha were under irrigation, which increased to 1.81 Mha by 1960, this meaning that more than half of irrigation systems operating today are more than 40 years old, and quite a lot of them even more than one century old. This has led the present National Irrigation Plan (NIP) to consider the need to carry out improvements and consolidation works on some 2.33 Mha of irrigated areas for a 20 years period, and 1.11 Mha before the year 2008. These works would include repairs on infrastructures and modifications on distribution and application systems.

At present there are more than 2.5 Mha protected areas, even though more than 5 Mha are considered to be areas of outstanding environmental value. River banks reach a length of some 1 00.000 kms.

With regards to Spanish soils, some areas at the Lower Guadalquivir Basin are affected by some salinity problems and others, at the Segura and Ebro Basins suffer from hydromorphic processes due to poor water drainage conditions.

The general quality of surface water is good with only localised problems caused by salinity in the upper Guadiana region, in the Guadalquivir and Segura areas, and also in the coastal regions of the Júcar Basin, the Eastern Pyrennees and in the South of Spain.

As for the quality of underground waters, 28 % of Spanish aquifers are subject to a high risk of pollution, 34 % to a medium risk and 38 % have low pollution hazards.

At the present time, Spanish agriculture is very strongly conditioned by the European Union CAP and by the aids received within this framework from the EU, although there are certain limitations with regard to areas and crops which deserve to receiving aids.

In 1997 the total Spanish active population was around 16 Mpers, out of which 1,254,000 persons (7,8 %) were directly related with agriculture, 81 % of them had a job and 19 % were unemployed. The latest employment assessments say that irrigation gives employment to some 550,000 workers (about the-half of the rural man-power), the remaining 466,000 persons being absorbed by dry fanning. From these figures it can be observed that irrigation and dry farming provide employment to almost 15 pers/100 ha, and to 2.4 pers/100 ha, respectively.

Anyway, over the last few years a trend to reduce the agricultural work-force has been observed, and percentages have approached those of the more industrialised countries like, for instance, the United States. It shall be emphasized that due to the Spanish topography, in addition to the land ownership infrastructure whereby properties are usually divided into very small fields - Spain's average 2.5 ha/owner - there will not be easy to equal or even to approximate the US percentages,

it is foreseeable that competitive foreign markets will lead Spanish agriculture to take maximum advantage of its climatic conditions, in order to obtain high value products which require substantial labour-force supply. Even though percentages of agricultural population have not decreased in relation to the overall active population, it could happen that many of the dry farming workers who are about to abandon rain-fed areas because of their unprofitability, will go over to certain irrigated areas where cultivation of extra intensive, high value crops makes them highly profitable.

The known decrease of natality in Spain (lowest world-wide) force to consider a realistic labour scenario where the lack of Spanish workers to carry out intensive, high labour demanding agricultural tasks, in top profitable farming systems, shall be covered in the near future by immigrants from other countries, in order to maintain the present productivity of the tremendous investments made by entrepreneurs.

5. FUTURE SCENARIOS AND AIMS

Availability of water resources

The present situation and the conditioning factors described in previous paragraphs (especially those concerning availability and localisation of water resources, climatic conditions, the influence of tradition in hydraulic work, the extensive of the irrigated land, European Water Directives, evolution forecast for agricultural markets, population monopolies, industrial policies, environmental policies, etc.) as well as the agreements reached with Portugal in 1998, will condition the evolution of the water sector in Spain in the future. Any analysis for the future is based on the current, relatively stable, situation in agricultural production, which is characterised by the balanced situation of foreign agricultural trade. This situation ensures that a reasonable degree self-sufficiency in food production will be maintained.

In general thanks to the huge efforts made in the field of hydraulic civil works field, Spain can now count on the sufficient number of water resources and infrastructures needed to cover its needs for food and to allow a high rate of development on most part of its territory, thus enabling sustained advantage to be taken of its resources. The achievement of this objective enabled the substantial efforts made during the 20 century which were mostly financed by the public sector. Currently, Spain counts on more than 1,200 dams, which ensure water supply to the population and allow irrigation to take place on more than 3.5 Mha. Aquifers are extensively used in the wide open spaces over the whole country. The Mediterranean and Southern Atlantic Coastal Basins would be excluded from a quantitative resource/demand balance, since in these areas, demands exert pressure on available resources, thereby fulfilling socio-economic development.

Presently the main threat to agriculture are extreme phenomena such as droughts and floods which constitute a permanent source of concern, because of the frequent occurrence of this type of phenomena in Spain,

In order to provide demands for the future, various basic scenarios can be established from a perspective focused on an analysis of water demand, but always within two extremes or limits. First of all, it seems a good idea to set forth the subject of the scenario of the consolidation of the present demand, (because this takes first place and also because it is very close to the probable foreseeable situation) which would contemplate reduction of increased demands which would always be located outside the areas with heavy pressures on existing resources. In an extreme scenario, the envisaged increased demand would always be reduced, and would stem from public acts with specific social objectives (such as the fight against population migration, environment protection, income policies, etc.) and they would be located in areas rich in water resources (basins on the upper half of the Atlantic coast, and the river Ebro basin). The limitations of state investment proposals strengthen the possibility of future evolution on this scenario. The main efforts and activities of the Administration with regards to hydraulic matters will be directed towards the quality of water offered to satisfy demands, and even looking at increasing the supply guarantee. Public investment will also centre on waste water treatment, keeping in mind the principle that "polluter pays", so that the entailed costs will be charged to the responsible of the pollution.

As opposed to the previous scenario, another one is that based on a substantial increase in demand (a developing scenario) for the primary sector (mainly for irrigation). The increase would be centred on Spanish coastal territory (Mediterranean and South Atlantic), where climatic conditions allow crops of fruits and vegetables to be produced for acquisition by foreign markets. The relevant water demand generated by this production would have to be satisfied with resources from other basins (water transfers), since these coastal areas suffer from structural water deficit, because of having already been severely exploited their own resources. The cost of these water transfers would be substantial, and would have to be borne almost totally by the user, with no type of subsidy. It would also have other effects of a social, political and environmental nature, which would also have to be accepted by the general public.

One third different scenario could be envisaged. In this case, the relevant increase of the demand would be localised in other parts of Spain (inland territory), where water supply could be covered with local supplies. Due to the climatic condition of these inland areas, the crops would be of the continental type, which are not easily accepted by foreign markets. In addition to this, in economic terms, the reduced profitability of this type of investment, within a scenario of progressive decrease of aids from the EU-CAP, render improbable any hypothesis like this one.

In any case, in the Mediterranean and the South Atlantic coastal areas, a process which is presently being planned will be put into operation. This plans to use non-conventional resources (re-use of treated waste water, desalination and savings produced by infrastructure improvement). The intensity and scope of this process will depend mainly on the evolution of the cost of these technologies, and on economic and financial feasibility of the use of these resources. Various hypothesis and scenarios can be contemplated in order to increase the use of these non-conventional water resources. It is very probable that there will be a considerable increase in the areas served by these water resources provided that modern irrigation techniques (sprinkler, micro-irrigation) are used and water will be handled more efficiently.

Financing of this sector should cease to have priority in the public budget. Water users should support a larger absolute and relative load, and financial assets which are not involved with this sector could also participate in the financing of specific projects, concentrating on those projects (not too many) which are profitable enough to allow investment recovery such as, for instance, those related to drinking water supply.

The concept of security in the supply of food based on self-sufficiency on a national level, has gradually evolved over the last few years due to both the development of communication and means of

transport, and also the market globalisation. These factors have helped people to gain more confidence in commerce than in the maintenance of expensive storage reserves.

World projections have estimated that population figures for the year 2025 will reach the 8.000 million mark, with a very uneven population growth in different geographical areas. The increase in food production however (mainly cereals), will be placed between 1.5-1.7 %. Other forecasts are more pessimistic, considering that demographic increase will be practically null and the only hope will lie in the possibility of improving efficiency in food distribution.

With regards to Spain, a minimum variation in population levels is foreseen, and it is estimated that this will remain stable at around the 40 million people or even decrease a little.

Agricultural production will probably remain as it is, due to the confluence of two opposed trends: on the one hand, intensification of crop production, improvement in yield and slight increase in irrigated areas, which will hardly surpass the barrier of 3,8 Mha; on the other hand, the reduction of cropped areas, mainly rain-fed fanning zones along with the adoption of measures to protect the environment such as reduced amounts of manure in vulnerable areas, restriction in the use of agri-chemicals, and the so-called ecological agriculture, will all serve to reduce commodities considerably.

At the same time, commercial trading will be intensified. Foreign commerce is undergoing constant growth. During the period 1987-1997, imports have increased by 256% and exports by 285%, representing 52% of total final agrarian production in the year 1997.

6. CHALLENGES FOR THE FUTURE

The entire Spanish society is committed to the task of consolidating and improving systems to be applied in order to achieve a sustainable and efficient exploitation of the country available water resources. This generic commitment is manifest in various challenges which have to be overcome; challenges which extend to political, organisational, institutional, financial, social, etc. sectorial levels.

Over recent years, an improvement has been observed in the traditional policy of public offer of water resources by the Spanish public sector. This policy emerged at the beginning of the twentieth century, as a response to transformation processes and has been one of the pillars of national development. It was based on the construction of regulating hydraulic (dams), conveyance (channels) and irrigation structures by the public sector, and also on their exploitation and maintenance (although with very heavily subsidised prices). This new policy which has already been at the establishment stage for some years, is much more complex and flexible, its main feature being that the public sector now places more emphasis on management, and this is to be developed with the aims of increased users participation.

Water management should be wise, global and integral (holistic). Management will extend not only to resources, but also to demand. Additionally, it will be responsible for managing hydraulic structures of the public domain and also infrastructures which are of public ownership. User participation should impregnate all aspects of water management. Public activity should concentrate on taking environmental hydraulic action, thus assuming a subsidiary role. This applies especially when action has to be taken in the wake of substantial swelling of water levels, since in these cases there is no direct or individual beneficiary to bear the cost. The public sector will also be responsible for improving the quality of water in the river beds, by reducing specific kind of pollution (but always transferring the costs to the responsible agent) and by promoting improvements in agricultural practice, in order to reduce the origin of non-point pollution. Finally, it is up to the public sector to inform users of the new and complex technologies, This information should be extended to all levels of the general public, to encourage the rational and efficient use of this resource.

The limitation of the functions covered by the public sector is a corollary of social and economic development in Spain, and any efforts to play the leading role on the part of the state would be totally superfluous. Hydraulic administration should limit its actions to those absolutely essential cases

mentioned previously, by limiting its vocation as constructors and by concentrating its efforts on management functions. The hydraulic public administration faces a far reaching challenge: to assume this change in its functions and to fulfil its new role of organisational management. The private sector (mainly user associations) should gradually take over the tasks presently performed by the public administration, such as operating and maintenance of existing infrastructures. The users should face the challenge of assuming the leading role in the field of operation and maintenance of infrastructures, even in their promotion and execution. To do this, they should update their own means, by elevating their technical patrimony to a degree similar to those demonstrated in legal matters. The users (irrigable land, municipalities, etc.) can not ignore the challenge of a rational use of a very scarce resource, and should maintain their networks in a good condition.

Alterations will also be made to the present situation of the financial and economic scope, giving rise to other challenges. When performing new functions, the users will observe a certain increase in the tariffs obtained from the use of water. However, they should have no fear of the possibility that irrigation will be abandoned in general (mass), since the cost of water represents a low percentage with respect to the amount of the gross production.

The financing of new infrastructures will stem from previous direct participation by the beneficiaries. They should finance themselves with private funds (with some public incentives due to the fact that this will have a positive effect on the environment) in order to carry out new improvement and modernising of irrigation projects. Non- conventional resources should also be mobilised (mainly) with private funds, which will probably act as a discouraging factor.

In the future, and thanks to the Agreement reached with Portugal no water conflicts of an international nature are envisaged. The good relations with Portugal will be kept in order to maintain the sustainable exploitation and protection of the transboundaries basins shared by the two countries. The co-operation procedures agreed upon in this Agreement, will be established in these common basins, in addition to those allocated by way of new community or international directives. Planning and coordinated management will be the objectives to be attained in these shared basins in the very near future.

The possibility of a climatic change (which although not demonstrated can not be ignored) constitutes a risk which can not be overlooked. Although climatic change should be another reason for anxiety, it should not become a paralysing element.

On the other hand, the numerous types of specific internal conflicts which have arisen in our country should be faced up to and resolved. These conflicts, caused by specific matters and topics, could get worse if they are not resolved with the pertinent agreements. Future commitments will be a basic element in the definition of the future of the sector.

Firstly, in the next century Spaniards should work out the means of achieving a consensus on matters of economic use versus environmental values. In other words, a feasible commitment should be reached (with feasible aspects and with no contradictions) between the matter of the application of water for economic reasons (essential for our development and welfare) and the effects of environmental improvement (fundamental element in the quality of life). In countries with a Mediterranean climate, it is neither easy nor cheap to achieve compatibility between economic development and the conservation of the water related environment. The full repercussion (internalisation) of environmental costs on the present users is unthinkable, and for this reason, these costs should be borne to a great extent by the public. In any case, the wastewater treatment plants should be the object of special attention, in order to improve the water quality of flowing streams.

In the second place, an agreement should be reached by the social institutions regarding the sharing out of economic water costs. Users should be committed to this agreement, by accepting the concept of water as an additional production factor.

On the other hand, in those areas which suffer periodic droughts, the various user associations and the hydraulic Administration should endeavour to resolve the conflicts caused by this structural shortage. At its present stage, technology offers various alternative solutions to eradicate this periodic shortage (not forgetting previous agreements reached for temporary reassignment of rights of use during droughts).

Finally, a solution must be found to the existing profound conflicts of a regional nature, by trying to reach a balance between territories regarding the water sector. In the event new lines of actions are planned for water resource transfer, a previous agreement should be reached with mutual acceptance between the donor and the receiving basins. The agreement, which should be legalised by a National Parliament law, should contain a definition of the basic norms for the planned exploitation and eventual compensation payments and the way in which they are to be paid should be agreed upon in the contract.

First of all and in order to overcome these conflicts, it would be desirable to reach a consensus with the adequate social and regional scope, since in Spain matters connected with water reach emotional levels which override economical aspect, and for this reason it may not be easy to reach a consensus. Solutions are always easier to find to conflicts of this type outside the drought periods, when tension created by the lack of water hinders constructive dialogue which is essential to reach a consensus. Once the consensus has been reached, the agreements are raised to a political level so that specific norms may be included, resulting in the corresponding modification of the Spanish water legislation.

Consequently, both hydrological planning and hydraulic policies should be based on wide, stable and lasting agreements in both national and regional Administrations, as this is the only way to make productive progress in the elaboration and the procurement of legal approval of the NHP. It would be very negative if the water policy remained in the same field as everyday fierce political controversy, and on the contrary, it would be very positive if this matter emerged from this field when it could be adapted to solid agreement parameters.

Overcoming these conflicts quickly and efficiently is the main challenge to be faced by the Spanish society in the coming years.