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REPERCUSSIONS OF THE NATIONAL HYDROLOGICAL PLAN ON THE SPANISH MEDITERRANEAN COAST. WATER VERSUS TOURISM AND AGRICULTURE

Carlos Auernheimer, Graciela González

Department of Environmental and Earth Sciences, University of Alicante, Spain

ABSTRACT

On the 5th June 2001 the Spanish parliament approved the most ambitious project in the history of Spain and possibly Europe, namely: the National Hydrological Plan (NHP).

The plan in question involves transferring 1,050 Hm³ of water from the River Ebro to the rest of the Spanish Mediterranean Coast.

This project includes the construction of 118 reservoirs and aims to meet the water supply needs of the catchment areas of the rivers that flow into the Mediterranean (river basins of Catalunya, Júcar, Segura and Southeast Andalucia) and the Atlantic (including those of the rivers Duero, Tajo, Guadiana and Guadalquivir).

The present article focuses on transferring water from the River Ebro to the Mediterranean coast, an issue that has been especially controversial concerning the approval of the NHP.

This transfer will provide 190 Hm³ of water to the Catalan area, 315 Hm³ to the Júcar basin, 450 Hm³ will be directed towards the Segura, and the Southeast of Andalucia (Almería) will receive approximately 95 Hm³ of water. The project will have impact on 912 Km of the Spanish Mediterranean coast and will cost 4,200 million Euros (US\$ 3,654).

This ambitious hydraulic project has as its prime objective the supply of water to cities, industries and tourist installations. These sectors have been allocated 44% of the water to be transferred, whilst 56% of the total is to be reserved for use in irrigation to be used during periods of drought.

This fact will signify a radical change in recent policy, since for the first time, priority for water supply has been given to urban areas and not to the agricultural sector. Furthermore, it has been prohibited to increase the amount of cultivable land under irrigation.

This policy can be justified by the reality whereby today in Spain there is an overproduction of agricultural produce. This becomes less and less economically viable given that in order to produce a dollar of agricultural produce, 1,290 litres of water are required whilst in order to produce a dollar in the tourist sector in a hotel or restaurant, only 22.5 litres are needed; that is to say 60 times less water in an area that is notoriously dry.

The plan has caused deep controversy in all sectors (political, social, environmental and technical) in Spain and for these reasons we have decided to limit ourselves to the matter in the most objective manner possible.

1. INTRODUCTION

South-east Spain, where the province of Alicante is located, is similar in many ways to northern Morocco as regards its geology, biology and climate. Both areas have a long Mediterranean coastline, which means that they have traditionally shared some common cultural elements.

However, during the last 40 years, Alicante has changed from a predominantly farming region to a province rich in industry, services and, above all, tourism.

This transformation has involved a string of successes but has also witnessed some mistakes that can be analysed so as to avoid their reoccurrence in other similar Mediterranean regions. Factors that have

favourably influenced this change are the three S of tourism: sun, sea and sand. However, the factor that has limited the development of the Mediterranean coastline is water. Consequently, in this article we will present the main features of the Water Transfer System that runs from the River Ebro to the Mediterranean coast and that was introduced in the National Hydrological Plan. It will supply the east, south-east and south of Spain and aims to sustain current agricultural activity, encourage industrial development and strengthen tourism.

2. SOCIAL FEATURES OF SPAIN

Spain has a population of about 40 million inhabitants with a *per capita* income of 15,000 dollars, which represents 80% of the European Union average.

As regards the Spanish administration system, there is a Constitutional Monarchy with a Parliament and a democratically-elected Senate.

The country is divided into 17 autonomous communities, which are in turn divided into one or more provinces. Each of the autonomous regions has its own government and parliament.

The Valencian Autonomous Community is made up of three provinces: Alicante, Castellón and Valencia; which have an overall population of 3,953,000. Of this total, the inhabitants of the province of Alicante represent 1,351,000, who live in the city of Alicante (with 238,000 people) and the surrounding important cities and towns. (Almenar *et al.*, 1991; Auernheimer *et al.*, 1987, 1992, 1996 and 1996).

3. PHYSICAL FEATURES OF SPAIN

Spain has an area of 505,000 km². The Valencian Community measures 23,305 km², whilst the province of Alicante is 5,863 km² (Auernheimer, 1983 and Auernheimer *et al.*, 1983).

Geologically, Spain is a peninsula that is attached to the end of Europe and is separated from Africa by the Strait of Gibraltar. In fact, the geological materials, as well as the flora and fauna of south and south-east Spain share similar features with those found in northern Morocco. The history, cuisine and several local customs of these areas are also very alike.

However, as far as climate is concerned, there are two very different Spains: on the one hand, there is a narrow strip of land in the north with an Atlantic climate, which is characterised by an annual rainfall of between 1,000 and 2,500 mm; and, on the other hand, the rest of the Iberian Peninsula with its Mediterranean climate and an average annual rainfall of just 300 mm (as is obtained in the south-east of Spain, in the provinces of Murcia, Almería and Alicante). This average rainfall is spread out unequally between periods of severe drought (where levels of 70 mm are recorded) and others of heavy rain (400 mm).

Rain, therefore, is a decisive factor in the development of the Iberian Peninsula.

Up to the first half of the 20th century, the economy of south-east Spain was based mainly on agriculture. Not only were the dry lands exploited, but also those used for irrigated crops in the alluvial plains of the River Segura (in the provinces of Murcia and Alicante) and the River Júcar (in the province of Valencia).

The most important rivers in Spain (the Duero, the Tajo, the Guadiana and the Guadalquivir) flow into the Atlantic Ocean. Only one, the Ebro, and others with smaller catchments, the Segura and the Júcar, empty into the Mediterranean Sea. Nevertheless, the most prosperous irrigated crop farming is to be found in the Mediterranean region, where the sun provides a free supply of energy and higher yielding harvests.

4. FROM AN AGRICULTURAL SPAIN TO A TOURIST SPAIN, VIA AN INDUSTRIAL SPAIN

4.1. Agricultural Spain

As a result of the Spanish Civil War (1936-1939), there was a great food shortage which increased

during the Second World War (1939-1945). It was only eased when cereals were sent over from Argentina during General Perón's regime.

Such difficult times led the Spanish population to adopt an attitude towards farming that was based on self-sufficiency or self-supply. For the Valencian Autonomous Community, this meant the planting of immense groves of oranges, some of which could be exported in order to obtain money to purchase food products and machinery.

During the Franco years, hundreds of reservoirs were built on all of the Spanish rivers in order to guarantee a supply of water during the periods of drought, whilst at the same time providing a supply of electric power. However, when the Second World War ended, Spain was an agricultural country, with only three industrial centres: the Basque Country, Catalonia and Madrid. General Franco's regime promoted agriculture and heavy industry, which turned out to be a burden on the development of the country, as it had to be maintained by general taxes. Today, Spain still has a good number of coalmines, a product that costs ten times more than in other countries.

Therefore, it was this obsession with the food supply that was the driving force behind the construction of thousands of reservoirs in Spain so as to guarantee a supply of water for agriculture, converting Spain into the country with the second highest number of lakes, all artificial of course, after Finland.

4.2. Industrial Spain

Despite all efforts, agricultural Spain was still very poor. It recorded low yields of crops, except in the privileged regions such as the Valencian Autonomous Community and the province of Almería.

This meant that much of the rural population abandoned the countryside in favour of the cities, Central Europe (for example, Germany, France, Belgium) or South America. These emigrants would send back large amounts of money whilst some irrigated agricultural produce was exported to Europe.

This flow of money was invested in a new, lighter and more productive type of industry. An broad enterprising middle class began to emerge which backed highly productive medium-sized businesses and had links with the rest of Europe. This bonanza enabled emigrants to return to Spain.

In 1955, 49% of the population of the Valencian Autonomous Community worked in agriculture, which represented 20% of the GDP (Gross Domestic Product). By 1985, this proportion of the population had fallen to 15%, contributing 5% to the GDP. Today, this sector represents 3% of the GDP. The population has moved from agriculture to small and medium-sized industry and services.

Although Spain was beginning a process of rapid industrialisation in the 1960s, the Government still had an obsession with food shortage and the memories of the Civil War and the Second World War. Consequently a colossal water transfer system was built from the River Tajo catchment, which flows into the Atlantic, to the River Segura, which ends in the Mediterranean. The aim of this transfer system, which was built during the 60s and 70s, was to guarantee irrigation water for the fertile lands of the River Segura valley and to even substantially increase the area of land used for irrigated crops. *Therefore, the objective was to increase the area of farming land and the amount of food available.* In other words, the Government and the Spanish population still hung on to the memories of *hunger* of the post-war years.

4.3. Tourist Spain

In 1960, nobody in Spain gave much importance to the fact that Britons began to build the "Costa del Sol" along the Málaga to Granada coastline. Nor was much attention paid when Spanish residents in Madrid began to move to Alicante to spend the summer months.

The first tourist hotel built on the "Costa del Sol", more specifically in Torremolinos, had 7 floors, which people deemed as ludicrous as it would be impossible to fill. Sunbathing and swimming in the sea were considered to be pointless activities, only to be undertaken for medicinal purposes.

However, this has become a worldwide phenomenon. Spain is now by then the third most popular tourist destination after the United States and France. It received more than 42 million tourists a year, which totalled 23,300 million dollars and contributed to 10% of the GDP, creating work for 8% of the

population. In 1998, 7.2 million international holidaymakers arrived in the province of Alicante along with 5.8 Spanish tourists. For this region of Spain, these figures represented 12% of the Gross Added Value whose average annual increase was calculated at 4%. Tourists occupied more than 50,000 hotel places, 25,000 places in campsites and 500,000 places in apartments. Meanwhile, agriculture represented a mere 3% of GAV.

5. LOCAL RESOURCES *VERSUS* AGRICULTURE AND TOURISM

In a previous article published by the CIHEAM (Auernheimer *et al.*, 2001), the lack of water resources available to south-east Spain was emphasised. There were conflicting demands on this water by traditional irrigation systems, high yielding crop irrigation (plastic-covered crops), industry and residential areas, including tourism (hotels, apartments, etc.). The Mediterranean, and Alicante in particular, has three important resources: *sea, sand and sun*; but is totally lacking in a fourth resource that is fundamental to development: water.

6. THE NATIONAL HYDROLOGICAL PLAN

The National Hydrological Plan (NHP) was approved by Parliament on 5th July 2001. This Act took up 22 pages of the Spanish *BOE* (the Official State Bulletin). This publication summarises tens of thousands of pages of studies and calculations carried out in recent years.

In brief, the Plan is a water transfer system that carries surplus water from the River Ebro to the different regions of the Mediterranean coast at a total annual rate of 1,050 cubic hectometres. The network will cross Spain from North to South over a distance of 912 km. The cost of these works is 4,200 million euros.

The River Ebro has the largest and most regular water flow of all Spanish rivers. The average volume recorded over recent years is 18,000 hm³. Once current consumption has been covered, it is believed that 5,200 hm³ of this water is surplus and is lost in the sea.

The NHP also sets out provisions for other Spanish regions such as Spain's northern catchment, the Balearic Islands, the Canary Islands, Ceuta and Melilla.

In figures, the water transfer system from the River Ebro to other Mediterranean catchments has: 190 hm³ for Catalonia, 315 hm³ for the River Júcar catchment (Valencian Autonomous Community), 450 hm³ for the River Segura catchment (Valencian Autonomous Community and Murcia, which perhaps have the greatest need for water), and 95 hm³ will go to the province of Almería (Andalucía). These amounts add up to a total of 1,050 hm³, as established in the Plan.

The NHP led to the introduction of the Act, which states that "*water is a natural resource, its availability should be planned carefully so that it is used rationally and in harmony with the environment*".

This Act stems from another that was introduced on 2nd August 1985 and which was established as a rationalisation tool in a bid to achieve ecologically sound waters. As far as this issue is concerned, the current act recognises that water is a scarce resource which is unequally distributed around Spain. It also states that regulation of its use will be "*an extremely controversial issue*". Based on the already approved Hydrological Plans for water catchments, the idea behind this plan is to transfer water from catchments with surplus resources to the inadequate catchments, "*after having carried out studies of the various alternatives, such as a cost-benefit analysis, a technical environmental analysis and socio-economic analysis and also after having offered the Act to extensive public debate.*"

It also sets out plans for a large number of plants for purifying wastewater and desalinating salt and saline water. As for measures for Environmental Protection, Article 31 of this Act deals specifically with the protection of wetlands and an Integral Protection Plan for the Ebro Delta, which aims to prevent contamination of the delta from the intrusion of seawater.

6.1. The use of transferred water

Under Article 17, the following order of priorities is to be given to the use of water:

- a. To feed or complement existing supply systems, as well as to guarantee current and future usage for urban supply.
- b. To improve the environmental conditions of those ecosystems which are currently undergoing severe deterioration.
- c. To strengthen the existing supply to irrigated land.
- d. To stop over-exploitation of aquifers (underground waters).

However, *under no circumstances may the transferred water be used for the creation of new irrigation systems or for the extension of existing ones.*

The forecasts indicate that 44% of the water transferred will be used for urban consumption, whilst the remaining 56% will be used for strengthening the supply to irrigated land (as a precautionary measure for water shortage).

6.2. Some facts about the NHP

The Plan mentions 898 different forms of action to be taken, 182 of which will be carried out in the Ebro catchment. The overall works include 118 regulatory reservoirs, as well as 22 desalination plants, 12 of which will be built in the Balearic Islands and the Canary Islands. A large number of Waste Water Purification Plants (EDAR) are also planned for recovering water for irrigation.

The total cost of the Plan still needs finalising, although some experts estimate it at 16,148 million dollars (18,148 million euros). The amortisation of this cost is forecast at 25 years for some projects and at 50 years for others.

The Plan establishes a “tariff” or price per cubic metre of transferred water. This tariff has two elements:

- a. an “environmental levy”, set at 0.03 euros per cubic metre of water, which is to be used to compensate for adverse environmental impacts;
- b. a “usage charge”, which depends on several factors and which the experts estimate at 0.32 euros per cubic metre if amortisation is at 50 years and at 0.38 euros if amortisation is at 25 years.

The cost of the water will not, however, be the same for everyone. Agriculture will pay much less than industry and services.

6.3. Where is the water going?

The main aim of this ambitious Act is urban supply, which involves, although not expressly, supplies to industry, services and, of course, tourist amenities.

This new list of priorities marks a radical change in the history of water use in Spain. Until now, reservoirs had been built to provide a reserve of water for new irrigated land that would increase the area cultivated under this system. In other words, the transformation from crops for dry farming to irrigated crops.

Secondly, the reservoirs were used to produce electric power.

Why has this change in priorities occurred?

In a previous article (Auernheimer *et al.*, 2001), we mentioned that 80% of the Valencian Autonomous Community's water is used for crop irrigation, about 15% in industry and 5% in residential areas (domestic population and tourist population).

At the same time, Europe has a surplus of farming produce. 50% of the European Union's budget is destined to subsidising this production in order to maintain reasonable prices and a decent standard of living for farmers.

However, figures leave no room for doubt as to where water use is most profitable. From the information set out in the environmental input-output tables for the Valencian Autonomous Community, (Almenar *et al.*, 1998), it can be seen that to obtain a dollar's worth of farming produce, 1,290 litres of water

are needed. However, to make a dollar in a tourist hotel or restaurant, only 22.5 litres of water are used, that is 60 times less.

Regional farming needs 2,650 hm³ a year, whilst tourism only requires 77 hm³ per year. However, the price of water for agriculture is 0.34 euros (0.3 dollars), 0.25 euros per cubic metre (0.22 dollars) for domestic consumption and 0.22 euros (0.20 dollars) for industry and services.

In order for water to be used rationally, it has to prioritise for those sectors where it is most profitable. This is the maxim that the National Hydrological Plan reflects, favouring specific industrial, residential and tourist sectors and blocking the extension of new irrigated land which would produce further farming surplus.

7. THE POLITICAL, SOCIAL AND ENVIRONMENTAL ISSUES OF THE NHP

Approval of the NHP by Parliament was preceded by strong mixed feelings throughout Spain's social sectors.

The conservative political party, the Partido Popular (PP), gave its absolute majority vote in Parliament in order to obtain approval of the text and received the support of some of the regional and nationalist parties.

In the social sectors, those in favour were businessmen, farmers and the general public, who felt they would benefit, especially in Andalusia, the Valencian Autonomous Community, Catalonia, Castile-La Mancha and Murcia.

On the other hand, the socialist opposition party, the Partido Socialista Obrero Español (PSOE), was against approval of the Plan. This seems a strange attitude for them to adopt given that years before the socialist government had proposed and presented a National Hydrological Plan that was three times larger in terms of the volume of water to be transferred. In the same way, the Aragon Autonomous Community (governed by the PSOE), through which the River Ebro flows, strongly opposed the Plan and organised mass public demonstrations. This reflects a split in the PSOE, as socialist leaders in Castile-La Mancha and Andalusia expressed their approval.

Paradoxically, in the Valencian Autonomous Community, as the opposing party, the PSOE is against the Plan despite this being one of the regions which is set to benefit the most. Such an attitude has been hard for the citizens of this autonomous community to accept.

The various ecologist groups have expressed their disapproval, although without proposing any alternative solutions, as they dismiss the plan proposed by some experts to install desalination plants as polluting. Ecologists maintain that people emigrate to wherever the water is, apparently forgetting that although water can be transferred, the sun and the beaches cannot.

Farmers from the Ebro Delta are also in opposition to the Plan, as they are afraid that the intrusion of seawater will ruin their crops.

As for the experts, many are in favour whilst many are also against.

Those who are against propose ways for making savings and the installation of desalination plants for seawater or saline land water. They argue that new technology can produce water at a price per cubic metre that is competitive with that forecast in the NHP.

8. CONCLUSIONS

1. Spain has a shortage of water in the south-east and south of the country (the Mediterranean basin) and a surplus in the north.
2. The River Ebro also as a surplus of water. For this reason, the NHP plans to transfer 1050 hm³ of water per year to the different catchments in the Mediterranean region from the said river.
3. The priority of this transfer system will be, for the first time in the history of Spain, to guarantee the supply of water to residential areas, industries and tourist resorts.
4. The Plan expressly forbids increasing the area used for the cultivation of irrigated crops.

5. The yield of 1 m³ of water is sixty times more profitable when used in services (including tourism) than when destined for use in agriculture.
6. This plan considers, for the first time, environmental protection measures. Among these are ecological flows and the maintenance of wetlands.
7. Over recent years, political parties have maintained contradictory postures, which are incomprehensible to the general public, as regards the successive plans presented.
8. National debate will continue on this issue in the foreseeable future.
9. Ecologist groups lack any type of approach to the problem and have therefore been unable to offer any form of alternative. This has discredited them considerably in the public eye.
10. There is a chance that the development of new and more efficient technology in the desalination processes of seawater and saline inland water could change the way the plan evolves in the future, if prices are competitive.

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