

**THE TAGUS-SEGURA WATER TRANSFER:
A VITAL AND SUSTAINABLE
INFRASTRUCTURE
FOR THE SOUTHEAST OF SPAIN**



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Abstract: *The Segura river basin, in the southeast of Spain, has an exceptionally mild climate, which allows the maintenance of 261,000 hectares of irrigated crops oriented towards exportation to the EU with a high level of productivity and it is an essential engine for the maintenance of its population. However, its scarce rainfall has forced us to intensively reuse all water resources in the basin itself, as well as to resort to surplus water in the upper Tagus river basin, by means of the infrastructure for interbasin water transfer of the Tagus-Segura Transfer, in order to ensure the supply of its inhabitants (2,500,000) and to offer essential resources for irrigation lands which depend on it (more than 50% of all this basin district). All this is supported by specific legislation that, since 1971, has been passed for its functioning (up to 600 hm³/year), and with all guarantees for all the uses and needs of the upper part of the Tagus, in spite of the irregularity of its rainfall, since the users of the Segura have their water provision reduced in shortage periods. Since the beginning, the beneficiaries of this water transfer have been subject to payment of all its costs, anticipating the Water Framework Directive, and part of the amount collected (412 million € until now), has been allocated to the Autonomous Regions of the transferring basin in order to carry out works in their territories, although they have never explained the final destination of these economic transfers, thus helping to create discontent among its population against this transfer. On the other hand, the Tagus Water Management Plan established a minimum environmental flow along this river so as to ensure its environmental quality. This flow is not only respected but also greatly exceeded. This transfer, which is not the only one in Spain, has other users, which makes it a cornerstone to the territory. The land owners with irrigation rights in the southeast of Spain are a global example in efficient use of water and they create 104,000 jobs, preventing rural population from emigrating, and their production implies a contribution to the GDP of Spain of about 2,364 million € a year with very few external aids. Moreover, seawater desalination is not an alternative solution to the Tagus-Segura Transfer, due to the volume it can generate, its high costs, which cannot be faced by the landowners with irrigation rights, and the phytotoxicity of the direct use of this water in the crops. For all these reasons, the Tagus-Segura Transfer is an essential infrastructure for the sustainable social and economic development of the southeast of Spain.*

I.- THE SEGURA RIVER BASIN DISTRICT:

The Segura River Basin District, with a continental area of about 19,000 km² distributed over the Autonomous Regions of Andalusia, Castilla-La Mancha, Murcia and Valencia, includes a total of 132 municipalities and is made up of a permanent population of 2,010,000 inhabitants (2012), with a population equivalent to 2,212,000 inhabitants if we take into account seasonal tourism.

In the areas where the climate is warmer, which include the cultivated irrigation lands, the average annual temperatures are close to 18°C.

According to the Water Management Plan presently in force in the river basin district, its run off is only 13% of the rainfall; since the average of this is 382 mm/year, the usable rainfall does not even amount to 50 mm/year. The high amount of sunshine, more pronounced in the period from March to October, causes an actual evapotranspiration of 339 mm/year. All this means a pronounced water deficit of cultivated fields, which therefore need an external contribution of resources in order to grow and bear fruit.

Although irrigation tradition in these lands of the southeast of Spain is millenary due to its very good climate and the quality of the soil, the wish for a better standard of living and the potentiality of these determining factors encouraged land owners with irrigation rights to improve their farm management - thus contributing to a stable and sustainable growth of population and reversing the existing immigration phenomenon - , which required a greater demand of water in order to meet their legitimate hopes. However, the low average rainfall, together with the irregularity of their own contributions, which endangered the territory threatening with its desertification, loss of biodiversity and, finally its abandonment, made it essential to carry out hydraulic works in this river basin district which allowed the hyperannual and maximum regulation of its variability without damaging the ecosystems associated with its body of water. In the Segura river basin district, this work was carried out during the 20th century to the maximum extent possible, so nowadays, with a capacity of 1,057 hm³ in its reservoirs, it is the most regulated basin in Europe, and therefore the most controlled one. At the end of the century, a very important programme of measures to protect the population against floods, true recurrent scourge in these lands, was implemented, and it has had optimal results. In addition, a widespread action was carried out with great consensus for the reuse of return urban water, perfectly adequate for its use in irrigation, which meets all the quality requirements of the European Union for this use.

Irrigation lands in the Segura area, with an area of 261,000 hectares (2012), are highly productive, allowing several harvestings a year in horticultural crops, and with a dynamism that makes them a real economic pillar and engine for the territory in which they are and for the whole country of Spain.

On the other hand, its mild climate has turned the southeast into an attractive area for population and tourism. Nowadays, the Taibilla Canals Community, public entity in charge of supplying this region with drinking water in primary network, provides service to a total of 77 municipalities¹, which ensure drinking water to 2,500,000 inhabitants (including urban areas outside the river basin district, such as Alicante), and which are close to 3,000,000 inhabitants in the summer months.

¹ *All municipalities in Murcia, except for Jumilla and Yecla, a great part of the province of Alicante, where it supplies its most important municipalities (Alicante, Elche, Orihuela, Torrevieja, etc.), and the municipalities of Férez and Socovos in Albacete.*

II.- THE TAGUS-SEGURA TRANSFER:

A very important part of the irrigated lands of the Segura basin (more than 50%) depends on the Tagus-Segura Transfer, source of an added water supply, which is external to this river basin district. It was initially devised during the Spanish Republic (1930), and picked up again in the 1960s, finishing its construction in 1979. From then on, there has been a dramatic and revitalizing change in the social and economic structure of southeastern Spain. It was initially designed in order to achieve the maximum efficiency in the use of this resource by means of pressurized networks and local drip irrigation, systems which have evolved towards hydroponics in greenhouses of the highest technology, energy recovery systems through cogeneration, as well as remote control and management systems of irrigation scheduling. Nowadays it is a global example regarding the “know-how” about irrigated lands and supporting a whole agri-food industry highly export-oriented, towards the European Union, and with a high traceability guarantee on all its factors - including the quality of the waters used - which cannot be doubted.

The Tagus-Segura Aqueduct is probably the most important hydraulic work carried out in Spain, which allows to transfer surplus water from the headwaters of the Tagus to the only Spanish basin with a structural deficit of resources, the Segura basin, where it is used for the supply of the population and for irrigation. It was opened in 1979 and it allows to transfer water from the Tagus river to the Segura river by means of a mainly open-air canal, but where there is no lack of important aqueducts and tunnels, 292 Km long. The water intake is in the Bolarque reservoir, where the resources from the Entrepeñas-Buendía system converge, in the Tagus headwaters.

Pursuant to the 1st Additional Provision of Act 52/80 of the 16th of October, which regulates the Tagus-Segura Transfer, the annual transferable volume is 600 hm³, of which 400 are intended for irrigation, 110 for population supply, and the rest being allocated to losses. Although reality has proven that those losses are less than the amount legally foreseen, being about 10% according to Spanish official institutions (CEDEX, the Spanish Research and Experimentation Centre for Public Works).

In population supply, those resources are more than half of the water that the Taibilla Canals Community has. This entity - as we said before - supplies water in primary network to all the municipalities of the province of Murcia and most part of the province of Alicante - among which are the municipalities with highest consumption, such as the city of Alicante itself and others around it with great touristic appeal -, with a total of two million and a half inhabitants registered in the census, which are more than three million and a half during summer months. Moreover, the water from the transfer - 10 hm³ - is used for supplying different municipalities in the province of Almería - through the entity GALASA -, which supplies an added population of 100,000 people.

Regarding irrigation, the water from the transfer from the Tagus river provides the necessary supplementary resources for irrigation in 147,000 hectares in the provinces of Murcia,

Alicante and Almería, with a total of 80,000 landowners with irrigation rights and their families benefiting from this. All of them are included in 61 Communities of landowners with irrigation rights in the area of the transfer, which in turn group together in this Central Union for Irrigation of the Aqueduct Tagus-Segura, which represents all these groups. The distribution of the water from the transfer among the different Communities of landowners with irrigation rights is regulated in article 14.8.d) of the Segura River Basin Management Plan, passed by Royal Decree 1/2016 of the 8th of January.

III.- SURPLUS AND TRANSFERABLE WATER: We would like to highlight that **the transferred water is only surplus water from the basin of origin**, in other words water which is not necessary to meet the demands of the Tagus, including environmental ones, which are always a priority and have a guarantee of supply for two years. This is the basic rule of the transfer. The current demand of the Tagus basin to be met from the headwater supplies is 365 hm³/year and this is 100% guaranteed with the minimum annual contributions and with the previous reserve of 240 hm³ for the reservoirs of Entrepeñas and Buendía in the headwaters of the Tagus - reserve established in the 3rd additional provision of Act 10/2001 of the 5th of July, which regulates the National Water Management Plan. This has been reinforced with the regulation of a non-transferable reserve of 400 hm³ - second final provision of Act 21/2015 of the 20th of July, on forestry - with which all the effective demands are comfortably met with resources from the headwaters, with absolute guarantee for two years. This regulation also allows a stable amount of water which facilitates the social and economic development of the riverside population in Entrepeñas and Buendía, with about 13,000 inhabitants registered in the census in the 22 municipalities that make them up. This population only hope not to be forgotten and to have their fair demands dealt with, such as the guarantee of at least an adequate drinking water supply, which some still seem not to have in spite of the big amounts the final users of the transfer have paid precisely to solve this kind of problems, among others, in the Tagus river basin (412 million euro in present value).

Article 45 of the Spanish Constitution establishes that the public authorities will safeguard the rational use of all natural resources, with the purpose of protecting and improving the quality of life, based on essential collective solidarity. In addition, article 128 of the Spanish Constitution establishes that all the country's wealth - and water undoubtedly is - whatever its ownership, is subordinate to the general interest. We should also take into account that water is a state public property, belonging therefore in this case to all Spaniards and serving the general interest. It does not belong therefore to the riverside territories, but to all Spaniards. It is just like the beaches, the coast or the sea itself over which the country has the jurisdiction. In fact, one of the biggest problems that nowadays trouble our national water system is the intended territorialisation of

water². Finally, article 149.1.22 of the Spanish Constitution also establishes that in the case of intercommunity basins - that is to say the ones that lie in more than one autonomous region - the regulatory powers belong exclusively to the State.

Nowadays, the Tagus-Segura Aqueduct has become a “**cornerstone to the territory**” because it connects five river basins: Tagus, Guadiana (environmental in Tablas de Daimiel and supply), Júcar (supply and irrigation in Albacete), Segura (supply and irrigation), and Almanzora valley in the Andalusian Mediterranean basin (supply and irrigation).

The possibility to transfer water from one river basin district to another depends on two basic requirements: the existence of surplus resources and the priority of the transferring basin. This means that, in this case, the creation of surplus derives, on the one hand, from the amount of the contributions to the Entrepeñas-Buendía system, and on the other hand, from the amount of the needs of the Tagus to be covered with the resources from those reservoirs. Regarding the amount of the contributions, it is worthwhile saying that in the draft bill of the year 1968 the average amounts of contributions considered were between 1,200 and 1,300 hm³ a year, but in fact, after the so-called “80 effect” in the Tagus headwaters, those contributions have significantly decreased until now, when there is an annual average of about 770 hm³, which makes it impossible to transfer the initially foreseen amount of 600 hm³ a year. In addition, the average of the reservoir water release from Bolarque to Tagus, in order to meet all its demands with resources from the headwaters, including environmental demands, amounts to a figure of about 330-350 hm³/year, to which we should add another 50 hm³/year of evaporation in the reservoirs.

Therefore, there will be a remainder (gross contributions, minus the needs of the Tagus depending on its headwaters - Entrepeñas and Buendía reservoirs-, and minus evaporation in them) of 350 hm³ a year which could be transferred. This figure is precisely the annual average of the existing transfers between the years 1980/81 and 2012/2013, which was 353 hm³, and which increases up to 374.8 hm³ a year if we consider the average between the years 1989/90 and 2012/13. The maximum of 600 hm³ has been reached only once, to be specific in the hydrological year 2000/01. In conclusion, the present Tagus-Segura Transfer cannot meet the legal amount of

² On this matter, professor GALLEGO ANABITARTE said that with the new Autonomy Statutes, part of Spain is trying to go back to the ancient rights of the riverside people, exiled since the middle of the 19th century, and not to a system based on ownership of riverside lands, but to a “new territorial system”; he added that “Spain is more and more like real Taifas kingdoms, in which each region focus on their own interests being of no importance the national vision”². Indeed, the important thing now is not so much the river basin, not even the nation’s general interest, but the territory of the autonomous region in which water flows. GALLEGO ANABITARTE “Evolution of the Water Rights in Spain. From the riverside system based in ownership to the riverside territorial system”, within the work *Water Rights*, published by the Euromediterranean Water Institute Foundation, 2006, pages 59 and 60.

600 hm³/year unless there is a dramatic change in the contributions. This way we should add this deficit to the structural deficit of the Segura, whose solution will be entrusted to a future amendment of the National Water Management Plan Act.

From the beginning of the use of the transfer and until the end of the hydrological year 2014/2015 a total amount of 12,243 hm³ of water has been transferred, of which 4,526 hm³ were for supply, 7,277 hm³ for irrigation and 238 hm³ for environmental use in the National Park of Tablas de Daimiel, in the Guadiana river basin.

IV.- EFFICIENCY IN THE USE OF WATER: We would like to emphasise that the irrigation areas of the transfer, given the shortage of water and its high cost, have the most advanced technology in irrigation and are in the vanguard in innovation and development worldwide in order to achieve the maximum water saving, being pioneers in techniques such as drip irrigation, latest generation greenhouses, hydroponics or cogeneration. The modernization is implemented in more than 95% of the irrigation lands, and more than 50% of those already have data transfer automation processes, with instant functioning and volume control and where the land owners with irrigation rights can access the services of their Irrigation Community through the Internet or via mobile phone or smart card 24/7 365 days a year. Information and control in real time of every distributed cubic metre is available.

V.- ENVIRONMENTAL FLOWS: In accordance with the new Water Management Plan of the Tagus River Basin District, a minimum flow of 6 m³/sec is guaranteed in Aranjuez and of 10 m³/sec in Toledo and Talavera de la Reina. They are minimum flows which are not a result of a whim but they meet the requirements of the river basin management plan, both by water methods and by biological methods or physical habitat of the species methods, to which effect the necessary studies and tests have been carried out in the process of drawing up the Tagus River Basin Management Plan.

Moreover, the truth is that those minimum flows are highly exceeded. In Annexes 1, 2 and 3, the curves of actual flowing waters - in blue - can be checked for the towns of Aranjuez, Toledo and Talavera de la Reina, in relation to the line of minimum flows - in red. They are flowing waters officially registered by the Tagus River Basin District, from which it can be deduced that the minimum flow has not been affected, but the reality has been exactly the opposite, since the flowing water has been much higher.

We are aware of the quality problems that - sometimes - exist in the Tagus in the city of Toledo, but these problems are not a responsibility of the Tagus-Segura Transfer, but of the contributions from

the Jarama (tributary of the Tagus), which carries the -partially treated - waste water of Madrid and of the industrial areas of Madrid and Guadalajara. It is therefore a water-treatment problem of Madrid, which they have not been able to solve yet. What is unacceptable is to release more water from the headwaters in order to dilute waste, since this is indeed contrary to Spanish law and to EU law. Moreover, it means mixing the environmental flow with waste dilution flow, which is a breach of law. In conclusion, this quality problem is the result of the aforementioned contributions from the Jarama, and its whole treatment is Madrid's responsibility. The Tagus-Segura Transfer is not involved in this issue, therefore it is unacceptable the self-interested use of this argument in order to damage this infrastructure.

VI.- THE ISSUE OF WATER TRANSFER IN SPAIN. OTHER TRANSFERS IN SPAIN AND IN THE WORLD: This issue is strongly influenced by the current unfair questioning of water transfers in Spain, which have turned from a water solution claimed by the most progressive sectors to an almost absolute rejection, when in fact aqueducts to transfer water have always existed and will always exist as one more possibility of hydraulic engineering.

This is mainly the result of the worst pollution ever suffered by the waters in Spain, which - in the words of the president of the National Federation of the Irrigation Communities in Spain (FENACORE, by its initials in Spanish) - is the political pollution and the electoral and partisan use of the same without a rational basis.

The Tagus-Segura Transfer was thought up during the Second Spanish Republic within the National Plan on Water Works in 1933, drafted by the Aragonese engineer Manuel Lorenzo Pardo, being the first hydraulic action conceived with a national approach. It was the cornerstone of an ambitious project for agricultural transformation and social development. It was claimed as a progressive action by the socialist minister Indalecio Prieto, who, in Alicante on the 26th of February 1933, said a terrible sentence calling all those against this work despicable traitors to Spain because it had been advocated by the republican government³. It was also defended by the poet from Orihuela Miguel Hernández, who puts these words in the mouth of a character in one of his

³ *"This work should not be carried out in a short period of days, nor months, it is a work that will last years, for which we need the help of those governing today, those who are in the opposition, those who serve the republican regime and, hear me well, those who are against it; because those who, supporting the republican regime, would deny their support and help to a work like this, would not be enemies of the regime, but despicable traitors to Spain".*

works: “Where there is no river, there will be canals of water and granite that will be crying out for the Tagus and the Ebro immediately”⁴.

In Spain, there are other water transfers between different river basin districts, which are hardly discussed, for example the Tagus-Guadiana (up to 50 hm³/year), Guadiaro-Guadalete (up to 110 hm³/year), Negratín-Almanzora (50 hm³/year), as well as the eight existing transfers from the Ebro, of which the most important ones are the one that supplies Gran Bilbao with water (Zadorra-Arratia, with 150 hm³/year), or Ebro-inner river basins of Catalonia (up to 4 m³/sec). Apart from them, we can also mention the Ter transfer to Llobregat to supply the Metropolitan Area of Barcelona of up to 8 m³/sec, or Júcar-Turia etc. Undoubtedly, they are water transfers less important than the Tagus-Segura Transfer, but the fact that there is less conflict with them is not a result of that but of the fact that in most of them the transferring zone and the recipient are within the same autonomous region.

On the other hand, there are water transfers, some of them of great importance, in almost every European country and in the five continents⁵. A few years ago, and regarding a transfer in the southeast of Brazil, the then president Lula Da Silva said: “*being against the water transfer is a kind of selfishness, since the resources of Brazil belong to all Brazilian people*”. In addition, president Nelson Mandela, who recently passed away, regarding a transfer from a river in Lesotho to Johannesburg (South Africa), praised the brotherhood of the towns which can share water.

VII.- ECONOMIC REASONS FOR THE TAGUS-SEGURA TRANSFER:

Irrigation lands of the Tagus-Segura Aqueduct are profitable and competitive in the markets, so they hardly have any subsidies. The wealth they create is not influenced by the variability and uncertainty of the future of European aids, as happens in other places, in order to maintain the population in rural areas.

These irrigation lands, dynamic and adaptable at any time to the quality and traceability requirements of international markets, together with its marketing and transformation industry,

⁴ See his book “*Pastor de la Muerte*” (Shepherd of the Death), 1937, where he puts that sentence in the mouth of Eternal, a symbolic character represented by an old man who expresses the wisdom of the town.

⁵ We can see on this regard, the web page hispagua.cedex.es, where there is a compilation of all the existing water transfers in the five continents. Also SANDOVAL MINERO, Ricardo, “*Elementos para un análisis de los trasvases bajo una perspectiva de derecho comparado*” (Elements for an analysis of water transfers from a comparative law perspective), included in the work “*La Ordenación jurídica del Traspase Tajo-Segura*” (the Tagus-Segura Transfer legal framework), coordinated by professor Antonio Fanlo Loras. Euromediterranean Water Institute Foundation, 2008, pages 99 and the following.

provided in 2012 about 2,364 million euro to the Gross Domestic Product in Spain, creating as a whole a total of 104,000 jobs. If we talk about water supply, the one from the transfer helps the tourist sector in Murcia, Alicante and Almería to provide more than 320,000 jobs. All this can be deducted from a study carried out in 2013 by the consultancy firm PwC (PricewaterhouseCoopers), of which two copies in English are attached. The aforementioned contribution to the GDP is - according to that study - similar to the extractive industry, and more than twice the one from sectors such as forestry and timber farming or fishing and aquaculture. This study can be consulted - in both languages - on the web page www.scrats.es, as well as in the pen drive we have provided.

The agricultural profitability in m³ of water from the transfer is between 0.60 and 1.00 euro/m³, while in greenhouses it can be of up to 3 euro/m³. This is several times more than the one for irrigation crops of cereal in inland Spain, which have a gross output of between 0.12 and 0.18 euro/m³.⁶

Regarding exportation, Spain is a pioneer country in production and exportation of fruits and vegetables. The three provinces receiving the water from the transfer (Murcia, Alicante and Almería) represent about 70% of the national exportation of vegetables (3,421,329 tons in 2014 of a national total of 5,006,240). Just Murcia represents 24.4% of the national exportation of vegetables. Moreover, regarding fruits, the three provinces together represent 29% of the national total of exportations. The total amount of vegetable exportation (3,039 million euro), and fruit exportation (1,636 million) raised in 2014 to 4,675 million euros. There are horticultural products such as artichokes, lettuce, peppers or celery, for which the three provinces represent more than 90% of national exportation, and just Murcia produces 70% of national exportations of lettuce, celery, cabbage, broccoli or spinaches. Moreover, regarding fruit, the three provinces produce more than 70% of melons or watermelons, whereas only Murcia produces more than 60% of the total of national exportations in lemons and table grapes and more than 50% in melons or grapefruits. A summary table with all the data mentioned whose source is FEPEX (Spanish Federation of Producers exporting fruits, vegetables, flowers and plants) is attached as annex No 5.⁷

Obviously, the water from the transfer has meant a **great economic and social transformation**. During this evolution, we have turned from the traditional farmer to the agricultural entrepreneur, from the peasant to the agricultural engineer and from tradition to technical farm

⁶ Sancho Marco, Tomás: "Acueducto Tajo-Segura: Matices para una actuación con lógica hidráulica y económica"(Tagus-Segura Aqueduct: Nuances for a solution with water and economic logic) *Revista de Obras Públicas (magazine of Public Works)* 160(3544), 2013, pages 21 to 36.

⁷ Source: FEPEX (Spanish Federation of Producers exporting fruits, vegetables, flowers and plants). www.fepex.es. Data corresponding to 2013.

management. A reality that wants to continue being transformed so that we can still talk about growth, development, innovation and employment.

On the other hand, the landowners with irrigation rights are used to a timely payment of the corresponding fees from the beginning, the highest ones in peninsular irrigation lands, anticipating in more than 20 years to the "cost recovery principle" supported by the Water Framework Directive. As the White Book of Water recognises⁸, the fee for the transfer is a peculiarity within the water fee framework, since not only is it an amount several times higher than the regulation fees or the water-use fees existing in the rest of Spain, but also 100% of its turnover is paid, an amount which represents 20% of all the income in all River Basin Districts in Spain for all fees and taxes in force, although the water from the transfer is not even 3% of the total of water used in Spain for irrigation.

To obtain a comprehensive view of the difference existing in Spain in the cost of water, we can say that the amount payable in the traditional river basins of Ebro, Duero, Tagus, etc is not by used cubic metre but by hectares, and that the volume of water per hectare is about 8,000 m³. So applying these figures, we can deduct that in these river basins the average price of the cubic metre is about 2 thousandths of euro (0.002 euro/m³), which means a great difference with the current price of the water conveyance fee for the Tagus-Segura Aqueduct for irrigation purposes, which is 9.73 cents of euro/m³ (0.0973 euro/m³), of which 1.53 are for repayment of the costs of the works, 1.21 for fixed costs and 6.99 to variable costs of functioning.

Part of the amounts collected with this fee, in particular the ones corresponding to repayment of the works, are transferred to the Autonomous Regions of the transferring basin. This way, Madrid, Castilla-La Mancha and Extremadura have received, until present, more than 412 million euro (in present value) to carry out hydraulic and sanitary engineering works in their territories, of which 180.15 million have been for Castilla-La Mancha, 135.11 for Madrid and 90.07 for Extremadura. The truth is that the final destination of these transfers is unknown, which has caused the resulting disappointment of the landowners with irrigation rights and the municipalities of the upper part of the Tagus, because they have not been told that this solidarity money flow was precisely aimed at providing a solution for their needs regarding water resources.

Therefore a general opinion against the transfer has been fostered and is more evident in Castilla-La Mancha, where all problems suffered in the area of the Tagus river from Aranjuez to Talavera de la Reina, and which are derived from the poor quality of the water caused by the more or less treated waste from Madrid, are blamed on the Tagus-Segura Transfer. It is argued that the removal of water towards the southeast through the Tagus-Segura Aqueduct, prevents the flowing water from increasing in the area of the Tagus past Aranjuez, which would result in the improvement of the quality of its water, by means of dilution with the water from the Jarama river. The Framework Directive, however, rejects the possibility of resorting to methods based on the

⁸*Libro Blanco del Agua (White Book of Water), Year 2000. Ministry of Environment.*

dilution of pollutants in order to get a good condition of water, and on the contrary, it supports the achievement of a good ecological condition in the mass of pollutants itself by adopting the adequate corrective measures and under the principle “who pollutes pays”.

VIII.- SEA WATER DESALINATION: Seawater desalination is not an alternative to the Tagus-Segura Transfer. It can be a complement of its resources but never a real alternative allowing its replacement.

The desalination plants built in the areas of the transfer which are worth mentioning are the ones in Torrevieja (40 Hm³), Valdelentisco (37 Hm³) and Águilas (30 Hm³). If we remember that the net annual transfer volume legally foreseen is 400 Hm³ for irrigation and another 110 Hm³ for supply, we can deduct that the available volume of salt water is not enough, to which we have to add that its use for irrigation is impossible unless a competitive price is established.

The advantages of seawater desalination are its endless condition and that it does not depend on weather changes, but it also has the following disadvantages:

- High energy consumption associated to its production (3.70-4.30 kWh/m³).
- A greenhouse gas emission level incompatible with climate change policies.
- High concentration of boron, which can cause phytotoxicity problems in the crops. For example, the lemon tree can be damaged when the level of boron is higher than 0.3 mg/l and the rest of the crops can be affected if it is between 0.5 and 0.75 mg/l.
- Deficiencies and imbalance in its composition, since it has a minimum content of calcium, magnesium and sulphate and therefore needs an aftertreatment for remineralisation.
- High acidity and corrosive power, which causes problems to pipes.
- And most of all, a very high cost of water, between 0.60 and 0.80 €/m³. If we compare this with the transfer fee - 0.097 €/m³ -, one of the most expensive ones in Spain, the difference is clear.

These problems could be palliated if this water could be mixed with the water from the transfer (which makes the latter an irreplaceable resource) with a rate of salt water of no more than 30-35%, but the problem would still be its price. The landowners with irrigation rights consider that the price should never be more than 0.30 €/m³, because in the plots it would cost at least 10 more cents - 0.40 €/m³-. A higher price would make it impracticable to use this water for irrigation.

IX.- CONCLUSION: The Tagus-Segura Transfer is vital for the supply and irrigation in the southeast of Spain, provinces of Murcia, Alicante and Almería. The disappearance of the same would mean a real cataclysm because it would cause the disappearance of their two main

economic resources, which are tourism and irrigated agriculture, with very high economic loss and unemployment. This land will never renounce that water.

The chronic under-resourcing of crops related to the Tagus-Segura transfer means a systematic breach of the guarantee criteria established in the Spanish Water Management Plan to that end. This situation is even worse in drought periods in the headwaters of the Tagus, years in which, respecting the needs of this flow, the transfers for irrigation received in the southeast are drastically decreased, being even less than 100 hm³/year, causing very important economic problems to the irrigation lands and to the employment depending on them.

This uncertainty regarding the supply for irrigation in the irrigation lands of the transfer makes it very difficult to plan crop management, since the land owners with irrigation rights do not know the volume of water they have available in order to plan the season. This causes a big tension in the business network associated to this crops, since its purely exportation purpose means that they must assure the markets, sufficiently in advance, that the products agreed upon will arrive with all the guarantees in the dates agreed upon. Otherwise, the markets would turn to third countries in order to meet their demands, and in the future, it would be very difficult to enter this business dynamics again due to the existing strong competition.

Finally, the structural deficit, if it remains unsolved, will cause very serious threats to the country, because, if it continues, it will cause the irretrievable loss of the social and economic fabric created by irrigation in the southeast of the peninsula, the increase in the trade deficit of the Spanish balance of payments, the forced emigration of population in search of a better future in an environment of a strong economic crisis and high unemployment rates, as well as the abandonment of the countryside and its resulting desertification, already irretrievable, of the territory.

Water is life. The Tagus-Segura transfer is vital for the social, economic and environmental maintenance of the southeast of Spain.

The President

José Manuel Claver Valderas