Chapter 13
Interbasin Water Transfers in Spain: Interregional Conflicts and Governance Responses

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13.1 Changing Course in Spanish Water Policy

Water politics, water culture, and water engineering all have played a central role in shaping the Spanish landscape and society. The contemporary water geography and ecology of the country are the products of centuries of socioecological interaction. Neither the history of the country nor its present geographical layout can be understood without taking into account the radical transformations of the water landscapes.

Covering 504,030 square kilometers (km^2), Spain is roughly the size of California and home to 46 million inhabitants. The country experiences significant climatic and rainfall variability, with annual average precipitation ranging from 2,000 millimeters per year (mm/yr) in some of the more humid northern regions to 300 mm/yr in central regions and the drier Mediterranean southeast. Intensive development of water resources has allowed for the irrigation of more than 3.6 million ha (less than one-third of the total agricultural surface that produces

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more than 55 % of agricultural output), the development of a significant hydroelectric capacity that supplies nearly 10 % of all national electric needs, and an effective domestic water distribution network. Significant public and private investments in water supply infrastructure in Spain throughout the past 100 years have resulted in more than 1,200 major dams, more than 20 major desalinization plants, and several interbasin water transfers of varying capacity and regional significance.

Historically, there has been wide-ranging agreement among the main water decision makers and stakeholders on projects and plans based on technical and political criteria (del Moral 2010). Nonetheless, several factors have thrown this old system into crisis: increasing interregional conflicts and water allocation demands; the appearance of new water users who challenge the long-term privileges of large historic water holders; exponential growth in illegal water use; increasing ecological deterioration despite new European Union (EU) and international sustainability policy objectives; and a lack of understanding of water scarcity as a risk to be managed, not as a geophysical imbalance or a structural hydrological deficit.

Today, the political impasse that has delayed the publication and approval of new river basin management plans (RBMPs) in Spain and the fact that new infrastructure proposals meet with strongly organized social and often political opposition is proof that the system that had worked well in a closed water policy community is no longer operative. An important lesson that can be drawn from the Spanish case is that the long-term effects of a supply-oriented water policy approach are not free of contradictions. Beyond a certain level of water resources development, augmenting existing resources through increased river regulation or water transfers simply postpones shortages and conflicts without resolving the underlying problems.

Overestimating resources or demanding an artificially high volume of water to meet short-term management goals and appease pressure groups results in social or environmental crisis over the longer term. In Spain, this practice has resulted in the over-allocation of existing resources and a transfer into the future of politically difficult decisions to limit demand and use. New plans must deal with the absence of new supply augmentation alternatives, challenges to implement instream flow requirements, and inevitable trade-off decisions. Despite significant public and private investments in water supply infrastructure, no technical, territorial, political, or social agreement exists on how to allocate water in Spain.

13.2 Institutional Setting for Water Resources Management and Allocation in Spain

Spain's enormous investment in hydraulic infrastructure is rooted in more than a century of water legislation and planning efforts. The first comprehensive Water Act, approved in 1879, declared all surface waters as part of the public trust and

allowed for the privative use of that water through administrative permits. The early twentieth century was marked by the development of national hydraulic plans designed to promote the country's economic and social transformation. These plans called for publicly funded hydraulic public works and suggested, for the first time, the need to devise large interbasin water transfers as a means to allocate water between regions. The ideas promoting economic progress through irrigation and the development of institutions powerful enough to implement them have an irregular trajectory throughout the periods that marked the country's tumultuous twentieth century: monarchy (until 1931), the Second Spanish Republic (1931–1936), the Spanish Civil War (1936–1939), and Francisco Franco's dictatorship (1939–1975). With the establishment of democratic rule in 1978 and a new constitutional framework, Spain was divided into 17 autonomous regions. Today, these regions have broad powers in a wide range of issues, including health, education, social policy, natural resources management, environmental policy, and land use planning.

The political division of the country into these regions brought to the water negotiating table and the political arena strong regional interests that had been largely silent until that time. In this context, a new Water Act was approved in 1985 to adapt water legislation to the new social and political reality. The new law built on an existing water planning and management structure that divided Spain into river basin districts encompassing a single river basin or several smaller basins. The 1978 Constitution and the 1985 Water Act established that when a river basin crosses more than one autonomous region (interregional river basin), it is managed by a river basin authority (RBA) that is organically ascribed to the national Ministry of Agriculture, Food and the Environment. When a river basin flows entirely within the territory of an autonomous region, it can be managed by that region's government through either an autonomous water agency or by a department within the regional government. Figure 13.1 shows the current boundaries of the 25 existing basin management districts. This administrative division has resulted in the transfer of management responsibilities to regional governments in the case of interregional basins, a process that is still ongoing.

In terms of water planning, the 1985 Water Act incorporated some key features:

- It required RBAs to develop river basin management plans (RBMPs) as the central instrument for water allocation and management within the river basin district. It also required the Ministry of the Environment to develop a National Hydrological Plan (NHP) to coordinate and balance the needs of individual river basin plans and design and approve any potential interbasin water transfers.
- It established the increase in available resources through the construction of new hydraulic infrastructure (dams, canals, and water transfers) as the primary goal of water planning.
- It maintained the water use permitting system established by the 1879 Water Act, whereby individual water users, municipalities, or irrigator associations request and are granted water permits. The permits give them a right to use a certain volume of water for a specific purpose and in a specific location for a maximum renewable period of 75 years.

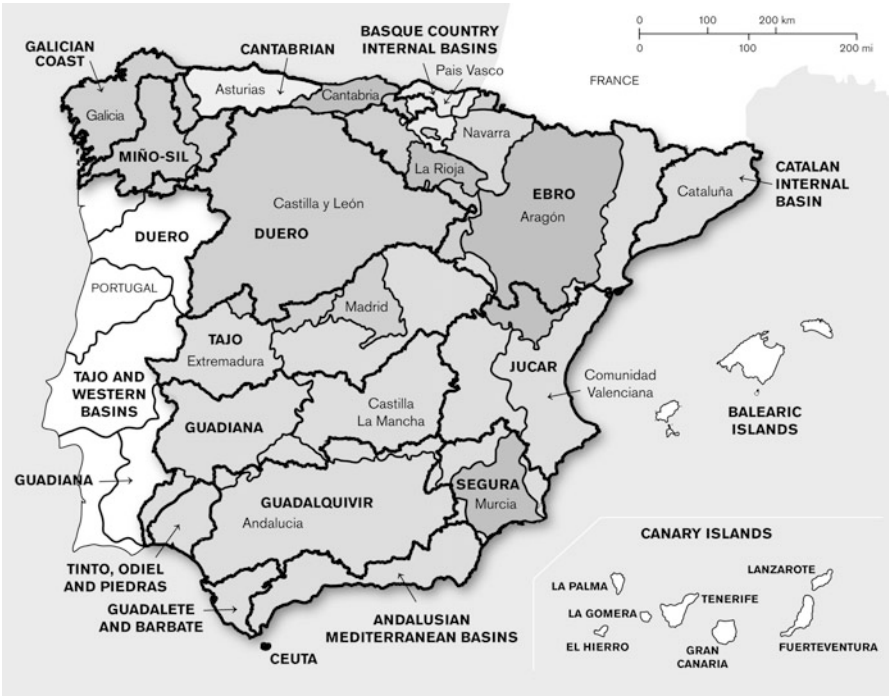

Fig. 13.1 River basin districts and autonomous regions in Spain (Source: MMA 2000)

- It modified the order of priority allocation to reflect Spain's changing socioeconomic priorities (Table 13.1). Individual RBMPs can alter this order as long as domestic water supply is maintained as the priority use.
- Groundwater resources, which had been privately owned until 1985, were incorporated into the public trust, thus bringing them under the planning and management responsibilities of RBAs and into the general calculation of allocable water resources. Any post-1985 groundwater uses in excess of 7,000 cubic meters per year (m^3/yr) require a permit.
- It consolidated a long-standing tradition of user participation in water resources management. Representatives of irrigator associations, hydroelectric companies, municipal uses, and autonomous regions are represented in RBA boards and commissions in proportion to the amount of the region's territory and population included in the river basin (in the case of autonomous regions) and to the amount of water used (in the case of consumptive users) (Varela and Hernández-Mora 2009).

The 1985 Water Act has been revised at different times in response to changing needs and priorities. The first major reform came in 1999 after the particularly severe 1992–1995 drought. In terms of water allocation, the 1999 Water Act[1]:

[1] Law 46/1999.

Table 13.1 Order of priority allocations in Spain's water legislation

1879 Water Act	1985 Water Act
1. Domestic water supply	1. Domestic water supply
2. Railroads	2. Irrigation and agriculture
3. Agriculture	3. Hydropower generation
4. Navigation canals	4. Other industrial uses
5. Water mills, crossing boats, and floating bridges	5. Aquaculture
6. Aquaculture	6. Recreational uses
	7. Navigation
	8. Other uses

Source: Authors' own elaboration

- Introduced government-supervised, market-based mechanisms as a means of either temporarily or permanently reallocating water among users and sectors. The law allowed two possible mechanisms:
  - Water permit exchange centers set up and managed by an RBA. They use public funds to buy water rights from permitted users permanently or for a specified time period (Requena 2011; Ferrer and Martín 2011).
  - Water permit seasonal sales, which allow for the voluntary sale of water use rights on a seasonal basis among users in the same river basin districts (Corominas 2008).
- Introduced environmental flows as a prior restriction to other uses, determining that minimum flows had to be calculated for different river segments. While this innovation is significant, the requirement was vague and few RBMPs actually incorporated true minimum instream flows into their planning documents.

In 2000 the EU approved the Water Framework Directive (WFD). A movement called Nueva Cultura del Agua, or New Water Culture, which was closely related to the defense of the WFD proposals, emerged in Spain, advocating for a change in water policy from large, environmentally destructive projects to more demand-side solutions and public participation. In 2003 the WFD was transposed into Spanish Law.[2] The transposition tried to balance the existing goals and practices of Spanish water policy with the new aims of the WFD, thus failing to produce real change.

[2] Law 62/2003.

13.3 History and Development of Water Allocation Decisions in Spain

Water allocation and management responsibilities constitute a multi-level, multi-agency process that operates within different institutional frameworks at different spatial and temporal scales. Table 13.2 summarizes the different spatial scales in which water allocation decisions are made and the legal and administrative instruments that enable those decisions.

Table 13.2 Characterization of water allocation decisions in Spain on a spatial scale

Spatial scale	Characterization	Legal/administrative instrument	Dominant allocation criteria
International	Spain shares four major river basins with Portugal (Tajo, Duero, Guadiana, and Miño)	Albufeira Convention	Guarantee hydroelectric production, supply, minimum environmental flows, and flood protection
Country	Allocation of water resources among river basin districts within the Spanish part of the Iberian Peninsula + islands	National Hydrologic Plan (approved by national law): System of National Hydrologic Equilibrium (*Sistema de Equilibrio Hidrológico Nacional*) for inter-basin transfers greater than 5 mcm	"National hydrological balance" National economic and territorial strategies
River basin district	Allocation of water resources between smaller natural river basins within the same river basin district	Basin Management Plan (approved by national or autonomous law)	Regional economic development Sectoral development
Exploitation system	Territories within a river basin district supplied by a common distribution network (natural, as in a common aquifer, or artificial, as in an irrigation system)	Basin Hydrologic Plan Water balance	Sectoral/territorial (sub-basin)
Demand unit	Cluster of users grouped by activity/use (irrigation, urban supply, hydroelectric users)	Basin Hydrologic Plan Existing uses and future demand expectations	
User	Holder of water use rights (a city, a hydroelectric company, a landowner or a water user association)	Water use permit	Existing rights

Source: Authors' own elaboration

Before the 1985 Water Act was approved, allocation of water resources had been a mostly top-down process, in which the construction of large hydraulic infrastructures was executed in response to economic development schemes designed at the national level by a powerful central government. Water management and planning, and thus allocation decisions, were dominated by a strong and largely closed water policy community made up of irrigators, hydropower companies, and developers. Often times, decisions during this period resulted in significant imbalances in water allocation and availability between regions within the same river basin and among regions in different river basins. For instance, hydraulic infrastructure was often built to supply water in other regions, regardless of local or regional needs or preferences, to further national economic development goals. Over time these inequalities have surfaced through political conflicts when autonomous regions have become more politically powerful or through the illegal use of alternative water resources, primarily groundwater.

River basin management plans allow for the allocation of water to different management systems—areas in which the basins are subdivided for management purposes—and user groups within each system based on existing uses and projected future demand. Within the parameters established in the RBMPs, RBA user-participatory boards decide annual allocation quotas[3] to individual users or groups of users depending on annual precipitation and existing reservoir and groundwater levels.

The 1985 Water Act established that any allocation of water between different river basins had to be included in the NHP. In 1993, the Socialist government presented a draft NHP without waiting for the elaboration and approval of the individual basin management plans. The draft, largely inspired by the early twentieth century ideal of spurring economic development, proposed moving large volumes of water (up to 3,350 million cubic meters (mcm) per year) from northern humid regions to more arid southeastern regions through a series of publicly funded large interbasin water transfers, namely from the Duero, Tagus, and Ebro rivers (Fig. 13.2). The 1993 plan was the subject of a strong 3-year national controversy. In addition, Portugal strongly objected, arguing that uses and environmental values in the Portuguese Tagus and Duero rivers would be negatively affected. Following its victory in the 1996 elections, the conservative Popular Party carried out a campaign promise to open national debate on water policy and planning and withdrew the draft plan.

Intense water planning and policy activity by the 1996–2000 legislature ensued. Some of the primary milestones of this period included:

- The approval of the RBMPs in 1998;
- The publication of a White Paper on Water (MMA 2000), the first comprehensive and critical analysis of the situation of water resources in Spain subject to public debate and review;

[3] Cubic meter (m^3) per hectare and type of crop or per number of inhabitants, in the case of urban water supply.

Fig. 13.2 National water grid as proposed in the 1993 draft National Hydrologic Plan (Source: MMA 2000)

- The negotiation and signing of the Albufeira Convention in 1998, which governs Spanish-Portuguese relations for the management of transboundary rivers;
- The modification of the 1985 Water Act in 1999;
- The negotiation of a new NHP, approved in 2001 during the 2000–2004 legislature.

The approval of the 1998 RBMPs was a technical process largely closed to public input and debate. While autonomous regions were represented in the RBA participatory boards, allocation decisions generally adhered to pre-1985 processes and regional interests were inadequately represented. However, some regional interests emerged, resulting in the allocation of specific volumes to different regions within a basin.

In 2000 the government proposed a new NHP that was less ambitious than the 1993 version but continued to emphasize the construction of new reservoirs and water transfers. The project's strategic objective was attaining a general water balance in Spain by distributing water resources between the so-called surplus basins and basins with so-called structural deficits. The main feature of this project was the transfer of some 1,000 mcm of water annually from the mouth of the Ebro River to Valencia, Murcia, and Almeria in the east and southeast, and to Barcelona in the north. The project again was shelved in the face of strong social and political opposition from the Ebro basin, including mass demonstrations in Madrid,

Barcelona, and Brussels; the reluctance of the European Commission to provide funds for the project due to concerns about the environmental impacts on the Ebro delta; and the Socialist victory in the Spanish national election of 2004.

After 2004, Spanish water policy appeared to relegate large hydraulic works in rivers and focused instead on the promotion of desalination as the new supply alternative. The AGUA Program,[4] approved by the Socialist government in 2005, envisaged the construction of some 20 desalination plants along the Mediterranean coast to provide the water that otherwise would have come through the Ebro transfer. The new emphasis coincided with the beginning of the new hydrologic planning cycle under WFD guidelines, which started in earnest in 2004. In accordance with WFD requirements, new RBMPs had to be approved by December 2009 for a 6-year planning cycle (La-Roca and Ferrer 2010). However, interregional conflicts and political confrontations have significantly delayed the process.

Unresolved conflicts between different autonomous regions regarding water allocation decisions are hindering the current river basin planning process. This is the case, for instance, of the Tajo and Segura RBMPs, two basins connected by the country's largest interbasin water transfer. As of late 2013 the plans were deadlocked over conflicts regarding the viability of the Tajo-Segura water transfer in the context of current ecological requirements in the Tajo basin, and legal challenges from the Castilla-La Mancha autonomous region to an infrastructure that was approved in pre-democratic Spain.

The political interplay between the different autonomous regional governments and the central government in terms of water planning and management has been further complicated by the parallel process of updating several Statutes of Autonomy, the basic laws that define the institutional make up and responsibilities of each autonomous region. The most recent wave of reforms occurred during the 2004–2008 legislature and have included new references to water in the form of reserves or priority rights over water flows of rivers that cross more than one autonomous region. This break in the status quo between regions has further fueled interregional conflicts over water and has resulted in several appeals of the reformed statutes to the Constitutional Court.

13.4 Interbasin Water Transfers

The need to balance the uneven natural distribution of water resources availability in Spain through interbasin water transfers has been a central part of Spanish water management since the first hydraulic works plans of the early twentieth century. Furthermore, the historical socioeconomic significance of irrigated

[4] AGUA: Actuaciones para la Gestión y la Utilización del Agua, or Actions for Water Management and Utilization.

agriculture along the Mediterranean coast, particularly in the Valencia and Murcia autonomous regions, justified the need to augment water resources in a region where water scarcity was seen as the only impediment to the development of a thriving agricultural and tourism-based economy.

Two primary criteria have been used to allocate resources among river basins:

- The so-called hydrologic deficit, also called structural deficit, of the recipient basin. The deficit is determined within the RBMP when available resources are insufficient to meet existing and expected future demands. However, demands are considered inelastic variables, economically, socially, and politically unquestionable and independent of planning and management decisions. The unit costs (per m^3) of the water transfers are usually undervalued when compared to other alternatives such as desalination or regenerated water. Also, demand management alternatives are typically not rigorously considered.
- The so-called excess resources in the donor basin. By law, there are excess water resources when existing natural or renewable resources exceed present and future economic and social demands in the donor basin. Since 1992, and particularly since 1999, environmental flows have been considered as reserves in potential donor basins through the estimation of minimum instream flows. If present and future demands (and minimum flows) are guaranteed in the basin, the leftover water is considered excess that can be transferred. However, existing resources have systematically been overestimated and environmental flow requirements underestimated.

As Fig. 13.3 shows, a number of interbasin water transfers are operational in Spain. Tajo-Guadiana is under construction and several others were proposed at one time but never built, though they continue to be part of the regional political discourse (Ródano-Ebro, Segre-Llobregat, Ebro water transfer, Tarragona-Barcelona).

13.4.1 Tajo-Segura Interbasin Water Transfer

The Tajo-Segura (ATS[5]) is the most significant water transfer in operation today. While it was conceived in the earlier part of the twentieth century, construction began in 1971 and the transfer became fully operational in 1980. The ATS allows for a maximum transfer of 600 mcm/yr over 1,000 km from the Entrepeñas and Buendía dams in the Tajo River headwaters to the Júcar, Segura, and Mediterranean river basin districts in the southeast for urban water supply and irrigation (Fig. 13.3). According to the 1971 enabling legislation, only excess water from the Tajo River Basin can be transferred. However, the law failed to determine

[5] Acueducto Tajo-Segura.

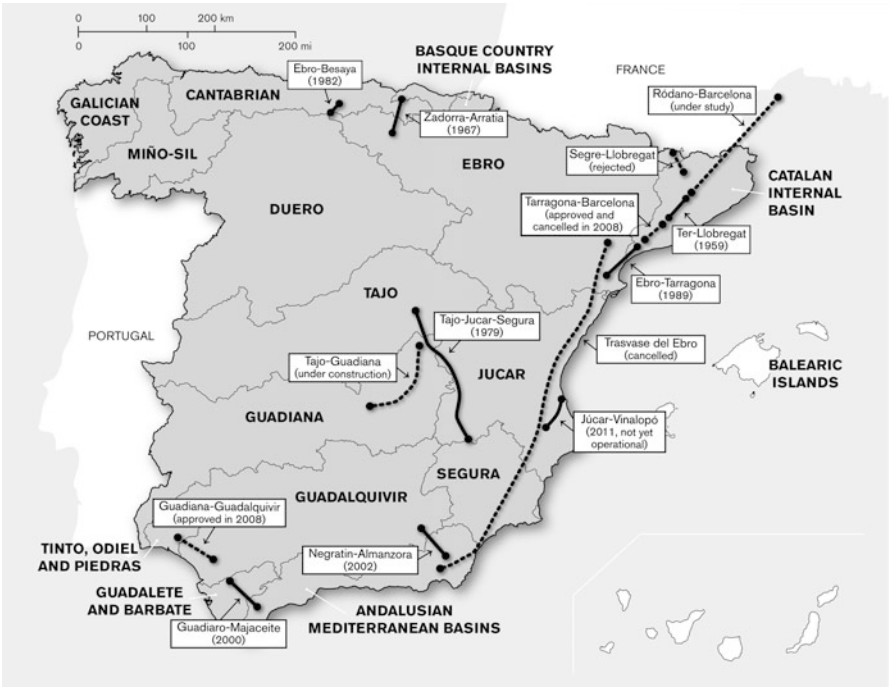

Fig. 13.3 Existing and proposed interbasin water transfers in Spain (Source: Authors)

how that excess was to be calculated. Typically, the Segura RBA representatives and end users, mainly irrigators, ask for maximum volumes to be transferred. These volumes are usually granted, except when the Tajo is suffering extraordinary drought conditions.

Different pieces of legislation and judicial decisions have aimed to establish a concrete operational rule for the water transfer. In 1980, a new law determined the water use fees (per m^3) to be paid by end users. It also created the Commission for the Exploitation of the Tajo-Segura Transfer, which meets quarterly to determine transfer volumes. Over the years, the government of Castilla-La Mancha has questioned the availability of excess resources, arguing that the commission has allowed for the transfer of too much water, making it difficult for the donor region to meet its own existing water needs. These repeated legal challenges to the transfer decisions of the commission have resulted in a judicial determination of excess (and therefore transferrable) water resources. Excess is broadly defined as the difference between the water in the Entrepeñas and Buendía dams plus the minimum expected runoff, minus the volume of water needed to cover all consumptive uses in the Tagus River Basin, including minimum flows required at a specified measuring point in the Tajo River downstream from the transfer canal.

The 1998 Tagus RBMP established a clear exploitation rule for the transfer system that tried to deal with mounting regional conflicts between Castilla-La Mancha and Murcia and the ongoing legal battle. The rule established:

- No transfers are allowed when storage in the Entrepeñas and Buendía dams falls below 240 mcm/yr.
- Under drought circumstances, when the water stored in the Entrepeñas and Buendía dams falls below certain monthly volumes, the water transfer decisions have to be approved by the national Council of Ministers.

Since the 1999 Water Act reform, irrigators in the Tajo River Basin have been allowed to sell water rights to irrigators in the Segura River Basin using the transfer infrastructure under drought circumstances and when enabling legislation is approved. This was the case during the 2005–2008 drought. The volumes sold are included in overall calculations of total volumes transferred.

In spite of the rules, conflict has continued to escalate between donor and recipient regions, and the courts have continued to intervene. Several reasons help explain this situation. First, original calculations of natural renewable and excess resources in the Tajo River were inflated. In addition, since the 1980s, available resources in the upper Tajo basin, where the transfer originates, have decreased by an estimated 47.5 % (Estevan et al. 2007). Meanwhile, political and public pressure from the recipient regions has forced the commission to allow maximum transfer volumes to the environmental detriment of the Tajo River. Furthermore, the transfer commission operates in a completely opaque fashion, with no public or stakeholder input or transparency in its negotiations, which are confidential.

In the summer of 2006, the middle stretches of the Tajo River dried up while significant volumes of water were being transferred through the ATS. This resulted in a strong social outcry in the Tajo basin that demanded, for the first time in an organized fashion, the cancellation of the ATS. Shortly thereafter, the government of Castilla La Mancha included a closing date of 2015 for the ATS in its Draft Statute of Autonomy but removed this provision after the central government rejected the proposal.

A new draft RBMP for the Tajo River proposes an increase in minimum instream flows for the river, an increase in the amount of Tajo water allocated to both Madrid and Castilla-La Mancha, and changes to the operational rules for the ATS. Under these new guidelines, the viability of the ATS is, at the very least, questionable. Political opposition from Murcia and Valencia to this draft delayed its publication and submission to public review. The central government has actively sought to broker an agreement between donor and recipient regions in order to avoid sanctions from the EU for delaying the implementation of the WFD.

13.4.2 The Ebro-Tarragona (Catalan Internal Basins) Water Transfer

The Ebro-Tarragona water transfer was approved in 1981[6] and allows for the transfer of up to 121.6 mcm/yr from the lower Ebro River to the Francolí River Basin—both in the autonomous region of Catalonia, but in different river basin districts—through a pipeline that stretches 80 km. The water is used for industrial and urban municipal supply in the Campo de Tarragona region. The transfer was justified by the high water stress index in the Francolí River Basin, which supplied a thriving chemical industrial complex, and the availability of potential volumes of water that could be obtained through increases in irrigation efficiency in the lower Ebro basin.

As part of the 1981 transfer agreement, industrial users in Tarragona would financially compensate farmers for the lost water rights. Farmers actually suffered no real loss, as the transferred volumes resulted from agricultural modernization plans that were publicly funded, and the transfer has endured with no social or political conflict. The transfer became operational in 1989 and has never reached the maximum volume allowed. While it originally supplied water to 21 municipalities and 21 industries, those numbers had jumped to 70 municipalities and 30 industries by 2007. In 2008 industrial users proposed to the Catalan RBA the alternative of using regenerated water from surrounding sewage treatment plants to reduce water use costs. Those plans are under consideration.

13.4.3 The Negratín-Almanzora Transfer

Located in the Andalusian autonomous region, the Negratín-Almanzora transfer was approved in 1998 to strengthen supply guarantees for irrigation and municipal water supply in the province of Almería. It transfers a maximum of 50 mcm/yr from the Negratín Dam in the Guadalquivir headwaters to the Cuevas de Almanzora Dam, 120 km away in the Mediterranean Andalusian Internal Basin. An exceptional feature of the project is that its funding legislation[7] explicitly recognizes that the Guadalquivir River Basin has no excess water and that the water transfer will aggravate the basin's water deficit. It therefore establishes strict conditions under which transfers can take place:

- Transfers will only be allowed when reserves in the Negratin Dam exceed 210 mcm.
- Transfers will only be allowed when overall reserves in all of the dams in the Guadalquivir River Basin's general regulation system exceed 30 % of total capacity (around 5,000 mcm).

[6] Law 18/1981.

[7] Law 55/1999.

- A maximum of 50 mcm can be transferred annually.
- Final users must pay the cost of new infrastructure in the Guadalquivir basin necessary to compensate for the additional deficit caused by the water transfer.

The Negratín-Almanzora water transfer is managed by a Technical Management Commission, which determines the transferrable amounts on an annual basis. It is made up of representatives of the Andalusian Water Agency, the Guadalquivir RBA, and users of both the donor and recipient basins.

The transfer provides resources for highly productive irrigation and for urban and tourist development on the eastern coast of Almería. The inputs from the Guadalquivir River Basin help reduce the pressure on the conflictive ATS that also supplies the region. On the other hand, the Negratín-Almanzora transfer connects two river basins within the same autonomous region, whose government supports the idea of more efficient water distribution for economic and employment reasons. These two factors help explain the project's relatively low level of conflict and the support it receives from both the central and regional governments.

Social protest has come in the form of the Federation of Irrigator Communities (FERAGUA), the main irrigators' organization in the Guadalquivir basin, which opposed the water transfer (FERAGUA 2000). The group's aim was to accelerate the construction of new dams to increase the regulation capacity in the Guadalquivir River Basin. In fact, Guadalquivir irrigators belonging to FERAGUA have taken advantage of the transfer facilities to sell water to users in Almería.[8] Other farmer organizations in the Guadalquivir River Basin, such as the Union of Small Farmers and the Irrigation Association of Andalusia, explicitly supported the transfer. Their close links to the ruling Socialist party in Andalusia and the fact that they have members in both basins help explain their support. Environmental organizations opposed the transfer but were unable to organize significant social protest.

13.4.4 The Ebro Water Transfer and the 2001 NHP

Perhaps the most significant public debate over interbasin water transfers is the debate over the proposed Ebro River Basin transfer, which was the central element of the 2001 NHP. The NHP proposed a large-scale water transfer from the Ebro River through two canals that would transfer a total of 1,050 mcm/yr over 900 km: 190 mcm to Barcelona in Catalonia and 860 mcm to the Mediterranean southeast (Valencia, Murcia, and Almería provinces) (Fig. 13.4). The estimated cost of the project was 4 billion euros during a 10- to 15-year construction period. The water transferred would be used for irrigation (650 mcm) and urban water supply (400 mcm). While the transfer was the central proposal of the NHP, it also foresaw

[8] At 0.18 euros/m^3.

Fig. 13.4 The Ebro transfer proposed in the 2001 National Water Plan (Source: MMA 2001)

the building of more than 100 large hydraulic infrastructures in different river basins with an additional budget of 2 billion euros.

The NHP was approved by the Spanish parliament in June 2001 after a long and intense controversy over economic, ecological, social, cultural, and political issues. Different ideas about the physical and political structure of the country, interregional cohesion, efficiency and equity issues, and land use and spatial development models were involved. The role the extensive continental irrigated agricultural sector played in the Spanish economy and rural areas, as well as the traditional and new intensive coastal irrigated agriculture; the effects of the EU's Common Agrarian Policy; the evolution of the labor market; and new immigration trends were also discussed. The pattern of residential and tourism development in coastal areas emerged as either a justification for or criticism of the project. Water economics and the water pricing system, the role of public subsidies on water development and management, and the environmental costs of the traditional water policies were subject to public debate in Spain, just as they had been throughout Europe with the drafting of the WFD.

In November 2003, a new left-wing coalition government was elected to govern Catalonia's autonomous region. Many of the social conflicts surrounding the NHP proposal focused on the impacts on the lower Ebro and the river's delta, located in Catalonia. As a result, the new autonomous government refused water from the

Ebro River transfer for Barcelona's water supply, thus breaking historical political alliances in support of hydraulic development policies. In response to the Spanish government's request for EU financial support for the project, the EU released its unofficial technical position in spring 2004, casting serious doubts on the supply guarantee, water quality, and environmental and economic aspects of the proposal: "DG ENV has strong reservations concerning the net environmental benefit and hence the eligibility of the financing request. We have numerous concerns in relation to the cost benefit assessment carried out by the Spanish authorities and we are doubtful as to the financial viability of the proposed transfer. We continue to have reservations concerning the environmental impact of the proposed transfer and its coherence with EU environmental legislation and policies."[9] The EU position also stated the "project's financial sustainability is very unclear [. . .] even assuming that the national capital will have no financial returns, it is very difficult to understand (considering also the result of economic analysis) how such a use of public money may be consistent with the objective of economic development."[10]

In March 2004 the Socialist party surprisingly won national elections and halted the transfer construction that was underway. Through legislative action, the government modified the NHP law by eliminating the Ebro transfer from the plan while maintaining the other proposed infrastructure. In its place, the government proposed a series of alternatives to increase water availability in the receiving basins, including constructing desalination plants and instituting efficiency measures and environmental restoration programs. These measures were incorporated into the AGUA Program.

13.5 Challenges to interregional Water Allocation: Where Are We Today?

Decisions about the distribution of water resources between different regions within the same river basin district typically have not followed explicitly defined allocation criteria. However, in the new WFD planning cycle, explicit regional deal making has become more common. In general, the distribution of water between regions belonging to different river basin districts, where allocation criteria are more explicit, usually responds to regional or national development goals. A clear difference in hydrological stress levels between donor and recipient river basins is necessary. However, once this surplus/deficit formula has been taken into account, the strong potential for economic development in the recipient regions and associated influential pressure groups (irrigators, developers, utilities, etc.)

[9] Note of February 20, 2004, from Directorate General for the Environment to Directorate General for Regional Policy of the European Commission.

[10] Internal note of March 3, 2004, from Unit A3 to Unit D.01 of Directorate General for Regional Policy of the European Commission.

determine the final decision. Environmental, social and, more recently, economic considerations have been secondary and not rigorously analyzed. In fact, the focus on sectoral plans and strategies over ecological considerations was preserved in the transposition of the WFD to Spanish law in 2003.

The goal of transferring water from the northern humid regions to the southeastern Mediterranean coast reflected a national strategy to reinforce the productive capacity of regions where a better climate permitted higher yields and more profitable crops. The Tagus-Segura transfer and the 2001 Ebro water transfer proposal are the most recent manifestations of proposals and plans that date back to the first half of the twentieth century. More recently, an additional goal is to sustain and promote urban development and the tourism and recreational industry, the primary economic sector in Spain today, which is largely concentrated on the Mediterranean coast. As a result, in addition to impacts on the aquatic ecosystems and uncertain economic viability of these projects, such water transfers promote an unbalanced regional development model: the concentration of population and economic development in degraded coastal areas and demographic decline in central rural areas from where water is transferred.

Water transfers have promoted the growth of the intended economic activities in the recipient basins—irrigation and later tourism in the Segura basin or industrial development in Tarragona, for instance. However, problems have arisen. A primary one is the erosion of objectives phenomenon, whereby initial estimates of growth in water uses are quickly exceeded, exacerbating the situation of hydrological stress or deficit that the transfer was meant to alleviate. In addition, when interbasin transfers occur between different autonomous regions, a sense of historical and territorial injustice often emerges in the donor basins, resulting in growing interregional conflict that is less apparent when transfers occur within the same region.

The RBMP is the legal instrument in which the sharing agreements are registered. Nevertheless, only the NHP can provide coherence for the whole process. An iterative adjustment process takes place involving the initial interbasin transfer requests, the basin planning process, and the national aggregation and balancing of individual basin proposals. RBMPs build on existing water rights and strive to increase availability for new users (new rights). Because large areas in Spain have a semiarid climate and users pay low prices for water, demand is always growing and planning objectives have traditionally focused on new storage and transport infrastructure to increase water availability. The basin plans allocate water to current rights holders and create reserves for future demand. Future demand in a basin can be established in different regions, presenting opportunities for interregional sharing problems to arise. The allocation agreements therefore build on three levels.

The first level is determined by existing water rights, which enjoy great stability despite the theoretical possibility of revising them. Water rights can be seen as the product of previous agreements. The courts resolve potential disagreements at this level.

Secondly, RBMPs constitute the framework for new water rights allocation among users and regions in a basin. Allocation decisions have a significant

technical component. Natural or renewable resources are estimated on the basis of existing hydrological information, using models and extrapolating. Water shares are expressed as annual volumes of available resources and are assigned to exploitation subsystems within the basin. They are then allocated to different user or demand units within the exploitation system—for instance, an irrigator community—either because of a preexisting right or through the creation of a new one by administrative permit.

Detailed norms are set for the allocation of water among users. Some are established by law. Others, which determine the final share of water in its details, such as the monthly flow, are agreed upon by users in the context of the RBA participatory boards under the supervision of the water administration. For drought periods and in compliance with the 2001 NHP, special drought management plans have been prepared in each river basin to guarantee priority uses.

Finally, sharing water between basins is the function of the NHP. Its approval is a competence of the Spanish parliament, and therefore the possibility of an agreement is purely political. Furthermore, given the existence of increasingly powerful autonomous regions and that river basin planning district boundaries do not coincide with regional delimitations, allocation decisions have a double dimension, often determined by political or regional interests. This political complexity has resulted in the failed attempts in 1993 and 2001 at a general interbasin sharing agreement and continues to fuel social conflict.

13.6 Future Challenges for Spanish Water Management

From a legal standpoint, the basin planning process and the NHP is meant to reflect the overall consensus on water allocation between basins, between regions, and between users. The Spanish government historically has sought to minimize conflict among users by making more resources available at the expense of the environment. However, with the establishment of democracy in Spain, and particularly since the 1990s, the construction of many of the new hydraulic infrastructure projects has resulted in intense social conflict. The delay in the approval of the RBMPs and the strong conflicts over water allocation decisions reflect the breakup of the traditional hydraulic policy community and the need to build a new consensus. Increasing openness and transparency, and the incorporation of new stakeholders in the implementation of today's RBMPs and the next planning cycle may help move the process forward.

Large and expensive hydraulic infrastructure projects strongly condition water management, establishing institutional and political inertia to justify their construction in response to strong pressure from benefitting social groups. These factors greatly reduce the possibility of introducing efficiency criteria or economic or environmental rationality in management decisions, even if ultimately only the needs of a minority are met.

New situations of stress, scarcity, and conflict arise in new territorial and socioeconomic contexts of demographic growth; urban, infrastructure, and technological expansion; agricultural development through the expansion and intensification of irrigation; and industrial and tourism growth. While the global territorial (socioecological) system is transformed, its physical and natural (ecological) basis is weakened, thus reducing the adaptability of the system as a whole and increasing its vulnerability. In this context, the primary challenge is to define viable limits to growth, thus avoiding the erosion of the objective phenomenon.

The Spanish case, with a strong tradition of river basin-based water planning and management, highlights the conflicts inherent to interregional transfer decisions. This is particularly true when these transfers move water from one river basin to another, and even more so when the water transfers affect regions with different political and administrative structures. Conflict is directly related to a collective sense of inequity in the allocation decisions and, increasingly, with the defense of environmental and patrimonial values in the donor basins. When authoritative allocation decisions lead to regional imbalances, conflict invariably arises. The lack of effective control of existing water demands can seriously hinder management and alter allocation decisions through the illegal actions of individual users.

A central piece in the development of Spanish water policy has been the early constitution of a solid policy community, integrated by irrigators, hydroelectric power companies, and concrete and building firms. These interested parties have hindered the adaptation of water policy to evolving social demands. It is thus important to design institutional arrangements that combine long- and short-term decision making without compromising the ability to adapt and change. Public participation should be a key element in such an institutional design. However, the Spanish case shows that the demand for increased social participation is difficult to meet. It requires changes in mentalities and power structures and the necessary convergence of national interests with management perspectives that take into account and defend regional territorial interests.

References

Corominas Masip J (2008) Modernización o reconversión del regadío? Dimensiones socioeconómicas, ambientales y territoriales, VI Congreso Ibérico sobre Gestión y Planificación del Agua, Vitoria-Gasteiz, December 2008. Available in http://www.fnca.eu/congresoiberico/documentos/p0302.pdf

del Moral Ituarte L (2010) The hydraulic paradigm and the production of a new geography in Spain: origins and historical evolution between the sixteenth and twentieth centuries. In: Tvedt T, Coopey R (eds) A history of water. Series II, volume 2 Rivers and society from early civilizations to modern times. I.B. Tauris, Londres, pp 440–462

Estevan A, La Calle A, Naredo JM (2007) Las series hidrológicas en la instrucción de Planificación Hidrológica. Available in http://www.unizar.es/fnca/docu/docu172.pdf

FERAGUA (2007, 2003, 2000) FERAGUA Informa, issues 2, 13, 14 and 28. Available in http://www.feragua.com/downloads/Feragua-Informa_t9876.html

Ferrer G, Martín M (2011) Los instrumentos de mercado y la recuperación del estado cuantitativo de las masas de agua subterráneas. Experiencias comparadas en las cuencas del Júcar y del Guadiana, VII Congreso Ibérico sobre Gestión y Planificación del Agua "Ríos Ibéricos +10. Mirando al futuro tras 10 años de DMA" 16/19 Feb 2011, Talavera de la Reina. Available in http://www.fnca.eu/wp-content/uploads/2011/08/11-Ferrer.pdf

La-Roca F, Ferrer G (2010) The water framework directive observatory: an assessment of the WFD implementation process in Spain, Ambientalia, Special issue on the water framework directive, pp 1–26. Available in http://www.ugr.es/~ambientalia/articulos/art_categorias/wfd/PUBLIC%20PARTICIPATION/SPI_8_LaRoca_Ferrer%282010%29_Ambientalia_en.pdf

MMA (2000) Libro Blanco del Agua en España (White Paper on Water in Spain). Secretaría de Estado de Aguas y Costas. Dirección General de Obras Hidráulicas y Calidad de las Aguas. Ministerio de Medio Ambiente. Madrid, 637 p. Available in www.mma.es/portal/secciones/fondo_docu_descargas/libro_blanco/

MMA (2001) Plan Hidrológico Nacional (National Water Plan). Secretaría de Estado de Aguas y Costas. Dirección General de Obras Hidráulicas y Calidad de las Aguas. Ministerio de Medio Ambiente

Requena R (2011) Plan Especial del Alto Guadiana. VII Congreso Ibérico sobre Gestión y Planificación del Agua "Ríos Ibéricos +10. Mirando al futuro tras 10 años de DMA" 16/19 Feb 2011, Talavera de la Reina. Available in http://www.fnca.eu/wp-content/uploads/2011/08/18-Requena.pdf

Varela C, Hernández-Mora N (2009) Institutions and institutional reform in the Spanish water sector: a historical perspective? In Garrido A, Llamas MR (eds) Water policy in Spain. CRC Press/Balkema, Leiden