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Drought Management Strategies in Spain

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Abstract: The ongoing debate on water policies in Spain is characterised by a traditional paradigm, dominated by the intervention on hydrological systems through the construction and management of infrastructure, which is progressively being abandoned but is currently still strong while the emergence of new management approaches. Climate change and the Water Framework Directive (WFD) are, in addition, the background to increasing challenges to traditional perspectives on drought, and important steps have been taken towards their replacement. This work analyzes the evolution of the normative structure and management models to identify recent shifts. The analysis is based on a fundamental conceptual change that places drought in the framework of risk, rather than that of crisis. I argue for the need to advance new prevention policies that can finally overcome productivist inertia and undertake essential tasks such as reallocating water flows, revising and controlling the water-concession system, and reinforcing and guaranteeing public participation.

Keywords: Water Framework Directive; water policies; risk; drought

1. Introduction

From a conceptual point of view, drought is defined in relative terms as a negative pluviometric anomaly, which is intense and of sufficient duration to generate social effects [1]. Droughts are, therefore, natural in origin and extreme in character. The complexity of the phenomenon, the geographical and temporal limits of which are hard to determine, impedes the formulation of a widely accepted definition. In addition, droughts vary according to geographical location and are clearly context-dependent [2], which makes reaching a universal definition even more difficult [3,4].

The vagueness of the term also encourages certain confusion and overlap between the concepts of drought (temporary and natural), water deficit (temporary and anthropic) and scarcity (permanent and anthropic). Water deficit may be understood as the temporary insufficiency of the water available to a certain system, which can then lead to restrictions in use, which is a situation where demand is greater than the available resources. If drought is a transitory anomaly that varies in length, it follows that the possibility of deficit would be totally erased by adequate management and the adaptation of demands to climatic characteristics at the regional level. Scarcity, finally, refers to a permanent situation of water deficit [5]; the monitoring of scarcity and drought requires specific and well-differentiated indicators [1].

In addition to the conceptual definition of drought, we must also take into consideration an operational definition, used for the development of prevention and mitigation strategies, with which we can identify the phenomenon and outline its frequency, severity and duration for a given return period [4]. Severity is also related with drought intensity (the degree of lack of water) and spatial coverage (area affected) [6].

Within a well-defined spatial and temporal framework, Wilhite and Glantz [7] propose that droughts should be divided into four categories: meteorological drought (decrease in rainfall), agricultural drought (reduction in soil humidity), hydrological drought (reduction in the availability

of surface and underground water sources) and socioeconomic drought (reduction of water availability with regard to existing demands). This classification is now widely accepted. In general, as in this work, interest in drought is linked to its socioeconomic aspects (impact, damage, loss), which is, in turn, tied to other complex concepts such as vulnerability and perception [6].

Conceptual precision is key for the adequate positioning of the debate within the framework of risk (and not of crisis), which implies anticipation and prevision. Traditional drought management models that are based on an understanding of the phenomenon as a crisis have failed to mitigate the impact and have sustained practices that have done nothing but increase the vulnerability of water systems. Only an approach oriented towards the reduction of risk can improve resilience to future episodes of drought, the frequency, intensity and duration of which may well increase as a consequence of climate change and unpredictability [8].

2. Materials and Methods

The analysis of the evolution of drought management models and strategies in Spain try to answer to the question of what are the keys to explaining the recent shifts on drought management strategies in Spain. Thus, it has applied the methodological approach of institutional analysis, which facilitates the examination of the legal, political and administrative structures and processes that affect decision making. In addition to the existing literature, it has been scrutinised in legal texts dating from 1985 (when a new Water Act passed) onwards, including the *Reales Decretos Ley* (RDL—government decree) that have been enacted since that date.

The critical review of the Spanish legal framework has been complemented with an analysis of norms and recommendations issued by the European Union since the publication of the Water Framework Directive (WFD) in 2000. Special attention has been paid to the WFD itself and to the communication on drought and water scarcity, which was issued by the Commission of the European Communities in 2007, as well as the monitoring and compliance assessment documents that followed (2008, 2010 and 2011). The analysis has been kept up-to-date with an examination of the European Commission's 2012 report on the review of European policies dealing with drought and the plan to preserve European water sources, which was published in the same year.

In addition to this, the *Planes Especiales de Actuación en Situación de Alerta y Sequía* (PES—special drought plans), the *Planes de Emergencia en Abastecimientos* (PEA—emergency supply plans) and other documents were examined to help understand planning policies, such as the guides published to facilitate the implementation of PES, PEA and other action protocols.

3. Results and Discussion

3.1. Traditional Perspectives on Drought as an Emergency Situation

According to the conceptual principles outlined above, drought must not be understood as a crisis. However, the Spanish Ministry of Agriculture, Food and the Environment points out that drought in Spain has been approached from two different angles [9], the predominant of which is to tackle drought as an emergency situation with the mobilisation of extraordinary resources. This is a “reactive” approach that is based on the implementation of measures once drought has been declared; these measures are often technically and economically inefficient, and leave little room for the evaluation of alternatives and the participation of stakeholders [5].

The second perspective—which I examine in detail further below—approaches drought within the general planning framework by taking risk assessment into consideration and including episodes of drought within the possible scenarios. This is a “preventive approach”, which aims to anticipate or minimise the effects of drought—meaning as socio-economic drought—facilitate active participation and implement a monitoring and early warning system. It is a complex approach but an efficient one because it allows for mitigation measures to be designed in advance and for the improvement of the general quality of intervention [5].

For decades, a reactive attitude has dominated Spanish drought management policies within a context (the “traditional hydraulic paradigm”) of consolidated, productivism-dominated values on water management which set much in store by intervening on hydrological systems through the construction and management of infrastructure [10–12]. Traditional water policies, which are generally favourable to agriculture, have created a significant inertia which impedes the implementation of conservation-oriented resource management policies, preventive management and adaptation to the characteristically Mediterranean conditions of scarcity.

What the Spanish ministry refers to as the “first approach” was made into law in the 1985 Water Act (*Ley 29/1985, de 2 de agosto*), which defines drought as an extraordinary and anomalous event that generates shortcomings which need to be tackled urgently. Article 56 allows the government to “adopt whatever measures are deemed necessary concerning the public property of water, even to the detriment of previous concessions”. This paves the way for the implementation of exceptional measures, which do not need to be justified in detail or systematically studied.

According to Brufao [13], since the passing of the 1985 Water Act, Spanish legislation has been tackling drought in opposition to scientific evidence. The gap between scientific knowledge and the normative structure was consolidated by following legal texts, which did not abandon traditional approaches despite the evidence provided by the 1992–5 drought. *Ley 9/1996, de 15 de enero*, which put forward “extraordinary, exceptional and urgent measures to be undertaken in the field of water supply in order to respond to the persistent drought”, introduced changes concerning water-use efficiency (lack of efficiency could result in the revision of concessions) and harsher punishment for non-compliance with urgent drought-related measures including the revocation of concessions. Similarly, *Ley 46/1999, de 13 de diciembre*, which modifies the 1985 Water Act, expressly mentions drought in order to justify the construction of water infrastructure that was built in order to mitigate catastrophic conditions [14].

This “first approach”, which deals with drought as an emergency situation, is maintained in the *Texto Refundido de la Ley de Aguas (RDL 1/2001, de 20 de julio)*. This text refers to droughts as “catastrophic events” which justify the construction of hydraulic works “in the interest of the general public” (Article 46.1.b), the modification of spillage conditions and the concession of rights over underground water sources. The latter provision opens the door to concessions being granted for water sources which have been declared overexploited (*Disposición adicional séptima*).

Specifically, Article 58, which refers to exceptional conditions, allows for the possibility of “implementing whatever measures over the public ownership of water are deemed necessary, even to the detriment of previous concessions”; these measures take the shape of decrees approved by the cabinet after the report is issued by the authority of the affected river basin. Implicitly, this article states that works, soundings and studies conducive to the implementation of said measures, which include the forced and urgent expropriation of property and rights, will be considered to be “for the general interest”.

3.2. Drought Decrees: the Materialisation of the Reactive Approach

The consolidation of the reactive approach to drought in Spain in recent decades is crystallised in the publication of drought decrees by the national government. Since the passing of the 1985 Water Act, 15 RDLs have been enacted. Essentially, these RDLs concern the construction of hydraulic infrastructures, the exploitation of underground water resources, the improvement of irrigation, the regulation of transactions involving water rights, and the implementation of a public loan policy. Especially relevant is the temporary modification of the environmental requirements contained in river basin plans, of which more shortly. The government has also enacted a number of lesser decrees concerning territorially-specific issues and administrative procedures; for their part, different regional governments have also published a number of decrees (Figure 1).

The RDLs are characterised by the use of alarmist language which supports the adoption of exceptional measures, as well as a lack of concrete justification for such measures. In some cases,

mention of scarce precipitation is made: “the hydrological year 2004/2005 was the driest in most of Peninsular Spain in a historical series that goes back over a century. The current hydrological year has seen, in general, more rainfall but can still be regarded as dry (16% below average)” (RDL 9/2006); “the current hydrological year is the driest since systematic measurement of rainfall began in 1947; precipitations have been 40% below average” (RDL 8/2008). In any case, it is important to stress that RDLs focus on the climatic nature of droughts, neglecting their socioeconomic dimensions—argued as the key in terms of conflict—and follow the evaluation of demands and management strategies.

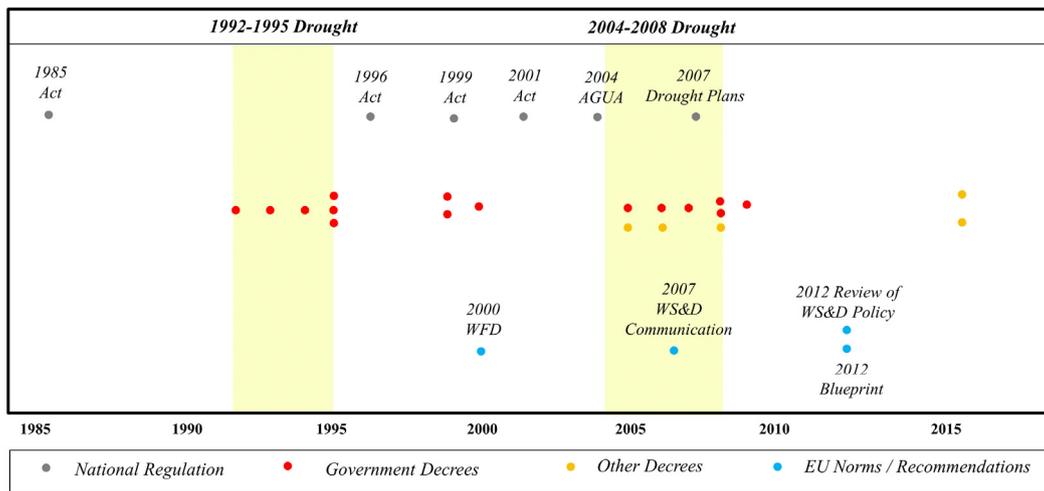


Figure 1. Timeline of legal and normative framework. Source: Own elaboration.

In addition, some of the measures implemented by RDLs, such as the modernisation of irrigation and desalination have no immediate effect, and their efficiency in mitigating the impact of drought can only be assessed in the mid-term, once the episode that necessitated their implementation has passed [15].

In conclusion, RDLs become a justification for the implementation of measures that aim to increase resources, which perpetuates the perspective that drought is an emergency situation. A good example of this is the first of the RDLs mentioned (3/1992), which is also known as the “meta-drought decree”. Over two decades after its publication, it was proved that it played no part in mitigating the effects of drought but rather supported the continuation of infrastructure-based policies, including the construction of the water reservoirs of Itoiz, Melonares and Biscarrués [13], despite the heavy criticism of social agents and the scientific community [16–18].

3.3. Drought Management after the Publication of the WFD

Since the publication in 2000 of the WFD (Directive 2000/60/CE), which aims to preserve the ecological balance of bodies of water in Europe, nobody has challenged its valuable contributions to drought prevention. The directive incorporates the principle of caution in the management and preservation of water resources as a way to reduce environmental and social vulnerability. The WFD—transposed to the Spanish legislation through *Ley 62/2003, de 30 de noviembre*—mandates the consolidation of the preventive approach and creates mechanisms and tools to supersede traditional water-management policies and, therefore, water-related risk.

Specific references to drought appear in Article 1, which defines the general objectives of the WFD—the improvement of water ecosystems, the promotion of the sustainable use of water, the protection and improvement of aquatic environments, the reduction of contamination levels in subterranean water sources and the prevention of new cases of pollution, and the alleviation of the effects of floods and drought—and Article 4, which defines the environmental objectives.

This reference to drought in Article 4 is especially significant. In fact, the article totally reshapes the debate on drought management. The key fact is that the objectives set out in Article 4 are not considered absolutely obligatory, and drought is one of the key exceptions for compliance. We must keep in mind that, as previously noted, drought decrees can justify the temporary modification of the environmental criteria included in river basin plans. Some exceptional circumstances (Article 4, Sections 4–7) permit the extension of deadlines in order for compliance to be achieved, targets limited and some acts of non-compliance to be excluded from the list of infractions [14,19].

For instance, the WFD establishes that the temporary deterioration in the status of bodies of water will not be regarded as an infraction if there are natural or *cause majeure* causes which are exceptional or could not reasonably have been foreseen, in particular severe floods and prolonged droughts or the result of circumstances due to accidents which could not reasonably have been foreseen when all of the following conditions have been met (Article 4, Section 6):

- all practicable steps are taken to prevent further deterioration in status and in order not to compromise the achievement of the objectives of this directive in other bodies of water not affected by those circumstances;
- the conditions under which circumstances that are exceptional or that could not reasonably have been foreseen may be declared, including the adoption of the appropriate indicators, are stated in the river basin management plan;
- the measures to be taken under such exceptional circumstances are included in the programme of measures and will not compromise the recovery of the quality of the body of water once the circumstances are over;
- the effects of the circumstances that are exceptional or that could not reasonably have been foreseen are reviewed annually and subject to the reasons set out in paragraph 4(a), all practicable measures are taken with the aim of restoring the body of water to its status prior to the effects of those circumstances as soon as reasonably practicable;
- a summary of the effects of the circumstances and of such measures taken or to be taken in accordance with paragraphs (a) and (d) are included in the next update of the river basin management plan.

Therefore, the first condition for the exceptions to be applicable is for drought to have “natural or *cause majeure*” causes, excluding human-induced drought. Differentiating between human and natural causes, however, is tricky from a legal point of view and requires the definition of a set of indicators which are unrelated to anthropic action. The directive also states that drought must be “prolonged”, but it does not specify what this means in terms of actual time, as well as “exceptional or that could not reasonably have been foreseen” [18].

As it was aware of the transcendence of the issue, the European Commission published the guidance on *Exemptions to the Environmental Objectives* as part of a series of guides that aimed to facilitate the WFD’s Common Implementation Strategy. This document states that the definition of drought as a natural phenomenon—which is clearly distinguished from “scarcity”—refers to events which give rise to situations that cause us to make use of the water environment in ways that result in the deterioration of its status. Concerning the definition of drought as “exceptional or that could not reasonably have been foreseen”, the guide mandates that the measures implemented will not compromise the recovery of the quality of the body of water once the circumstances are over; that the effects of the circumstances that are exceptional are reviewed annually and all practicable measures are taken with the aim of restoring the body of water to its status prior to the effects of those circumstances as soon as reasonably practicable; and that the effects of the circumstances and of such measures taken are included in the next update of the river basin management plan [20].

Similarly, the WFD declared that, in order for exceptions to be acceptable, drought must be “prolonged”. The guidance document also made some advances in this regard, although a precise temporal definition is lacking due to the fact that drought conditions can vary significantly and,

therefore, finding valid European-wide common indicators is a very difficult task. It is, however, clearly stated that “managing prolonged droughts implies making decisions on the allocation of reduced resources”, including environmental uses; in all circumstances, “high priority” should be given to maintaining “an ecological minimum flow” [20].

In addition to these explicit references to drought and its exceptionality, the WFD includes other relevant articles as far as the management of this form of risk is concerned. Kampragou, *et al.* [21] have pointed out the importance of the articles that refer to: the characterisation and monitoring of bodies of water (5 and 8) for the incorporation of vulnerability analysis and drought indicators; the recovery of costs (9) and the evaluation of costs and benefits, not only in financial terms, of mitigation measures; the programme of measures (11), which includes the incorporation of specific drought-related measures as well as those aimed at conserving and saving water; the river basin management plans (13), which may be supplemented by drought plans; and public participation (14).

3.4. Drought Planning in Spain after the Enactment of the Ley del Plan Hidrológico Nacional (LPHN- National Hydrological Plan Act)

As previously noted in Spain, drought has predominantly been defined as an emergency situation, which is in agreement with an overall traditional approach to water policies. It is also true that more or less at the same time as the WFD was published, a new, albeit still limited in scope, trend started emerging. This new approach integrates drought into planning policies, incorporates risk assessment and conceptualises drought simply as one possible scenario.

The context within which this new approach developed was no longer characterised only by the traditional water-policy paradigm reflected in the LPHN (*Ley 10/2001, de 5 de julio*), the most emblematic infrastructure of which was the so-called “Ebro water transfer”. During the late 1990s, a regionalist paradigm—characterised by the political use of water resources by different regional governments—and a new water culture paradigm—which aimed to change traditional policies—also emerged [22,23], facilitating a change in the general direction of water policy, as represented by the publication of the programme AGUA in 2004. Without abandoning the traditional objective—the generation of new resources—the programme stresses the importance of water treatment, reuse and the construction of large desalination plants, instead of large hydraulic infrastructure that promoted inter-regional conflict.

In order to improve drought prediction, the LPHN mandated the publication of PESs and of PEAs for towns and cities with a population of 20,000 or above: “For inter-regional basins, and in order to minimize the environmental, economic and social impact of drought, the Ministry of the Environment will establish a global standard of indicators to facilitate the declaration of conditions of alert and drought by basin authorities” (Article 27.1, LPHN). This finally brought together the planning process and drought management, which responded, at least partially, to the recommendations posed by international experts, who proposed the implementation of drought plans that include monitoring, early warning and prediction, risk and impact assessment, and mitigation and response [24,25]. It is important to point out that the implementation of PESs has been considered as a good practice to address drought risks by the Commission of the European Communities [26].

PESs should have been published by the basin authorities in 2003, but they were delayed. In order to try to accelerate the process, two years later the Spanish Ministry of the Environment published a guide for the production of these documents [27]. It is remarkable that the reason given for the publication of this guide was not the delay in the publication of PESs—sadly, this is hardly news in Spanish water planning—but the need to “unify the methodology used for the characterisation of hydrological drought in Spain and for the preparation of PESs and thus, define homogeneous criteria for the declaration of drought and the measures to be undertaken for its mitigation” [27]. Due to the delay, in 2005 some basins published temporary and simplified action protocols inspired by their experiences during the 1990-1995 drought.

The publication of PEAs for the supply of towns and cities with more than 20,000 inhabitants, which was also mandated by the LPHN and, which according to this same act, should consider the regulations and measures proposed by PESs was also heavily delayed. These plans should have been published in 2005, but the Spanish Association of Water Supply and Sewerage, with the cooperation of the Ministry of the Environment, did not issue them until 2007 [28].

In addition, the PESs for inter-regional basins were not published until 2007 (*Orden MAM/698/2007*), and those for intraregional basins were published even later; this is the reason that a large number of PEAs are still pending completion. To make matters worse, PESs—still in force despite being obsolete—and general basin planning documents, which were enacted later, are not coordinated.

3.5. Implementation of European Water Policies and of Directives on Scarcity and Drought

As a result of the EU's increasing concern regarding water availability, the Commission of the European Communities published the communication *Addressing the Challenge of Water Scarcity and Droughts in the European Union* [26], which sets forth seven basic guidelines for the development of policies towards the full implementation of the WFD. These include the setting of “the right prices for water, notably via a water pricing policy that is based on a consistent economic assessment of water uses and water value and by introducing compulsory water metering programs”, while “water allocation and water-related funding” must be made more efficient and “improve land-use planning”.

The level of implementation of these guidelines has been assessed on three occasions [29–31] with poor results. The need for the member states to fully implement the WFD has thus been stressed on the understanding that only the adoption of river basin plans and measurement programs will allow for a detailed analysis of the actions that are necessary to improve water management.

In 2012, the European Commission published the *Report on the Review of the European Water Scarcity and Droughts Policy*, which analyzes how the instruments set forth in the 2007 communication and the WFD contribute “to revert the trends of water scarcity and the vulnerability to droughts”. This communication acknowledges the existence of conceptual errors in the differentiation between drought and scarcity (already clarified in the introduction) and “the causal relationships between drivers, pressures, states and impacts”. As a consequence, “indicators to illustrate the two phenomena have so far been insufficient”; also, it directs attention towards gaps in the information on demands, measures, costs and impact, as well as political, governance and implementation gaps (of which more shortly).

This report insists on the importance of “putting the right price tag on water”, “allocating water and water-related funding more efficiently”, integrating drought and river basin plans, “fostering the emergence of a water-saving culture in Europe” and “improving knowledge and data collection”. Also, the report stresses that new river basin plans advance the construction of major infrastructure before the potential of water-saving measures has been exploited to the full.

Also, the European Commission states that the water savings achieved with the increasingly water-efficient irrigation agriculture methods are still insufficient and “modernization has led to intensification or more area being cultivated rather than a decrease in water use”. This led the Commission to insist once more on the need to coordinate river basin plans and land-use planning [32].

The *Blueprint to Safeguard Europe's Waters*, the target of which is to determine the necessary strategies, measures and tools for promoting the sustainable use of water in the mid- and long-term [33], also recognises the lack of progress achieved by implementing the Commission's plans. For this reason, the document sets out a set of additional measures which aim to improve the quantitative aspect of water management and efficiency in water-use, and thus contribute to the quality objectives. Experts from the New Water Culture Foundation [34] have stressed the flaws in the plan's proposals, especially the fact that it does not present a strategy for the implementation of the WFD that forces member states to update their demand forecasts in relation to the predicted

reduction in available resources due to climate change. In addition, the need to adopt a common implementation strategy regarding droughts has also been underlined, including the definition of risk areas, the publication of drought plans and the implementation of water-saving measures and land-use planning.

In Spain, the adoption of new management models is still being resisted and substantial inertia exists. For example, demands for the construction of major infrastructure and irrigation are growing. However, important advances have been registered in the river basin plans [35], and Spain is the only country where trading water-use rights has been possible and where water markets emerged with a diversity of informal and formal trading mechanisms [32].

3.6. Drought Management and Mitigation Measures

In Spain, the experience accumulated in the management and planning of drought makes it clear that the measures currently in force need to be revised and a preventive approach adopted. With climate change in the background, the WFD and other European directives, as well as the experts of the New Water Culture Foundation [34], have pointed out the need to revise the operational availability of water flows. Average flows should no longer be used as the reference parameter for evaluating volume availability: planning should use dry years as a reference point, instead of average years [36].

Using realistic calculations which incorporate the uncertainty in precipitation regimes and climate variability should allow for the implementation of the appropriate measures—which are still a long way from what the PESs in force are proposing—that set as priorities the recovery of the ecological status of bodies of water, water-saving strategies, efficiency, demand management and public participation in the planning process, which it has been examined in detail in the following section.

Among the measures that can be enacted to manage and mitigate the effect of socio-economic drought, we may distinguish, on the one hand, those that are carried out from the perspective of hydrological planning: the integrated management of underground and surface water sources, modernisation plans aimed at fostering the efficient use of water, the revision and updating of concessions, plans to reconvert irrigation agriculture, tighter control over the public property of water that aims to detect spillage and illegal water extraction, the revision of prices and the application of the cost-recovery principle, the introduction of clauses of eco-conditionality in agricultural subventions, the adaptation of urban and territorial development to water availability, the regeneration and reuse of return flows, the management of rainwater, information and dissemination programs, and the active participation of stakeholders and the public. On the other hand, there are the specific measures that must be implemented in drought conditions: the creation of clear alert thresholds (pre-alert, alert and emergency), the participative design of gradual strategies, the promotion of public water banks, the adequate regulation of the exchange of rights between users, and the creation of an appropriate insurance system.

The exchange of rights between users is probably the most interesting, and controversial, of these matters. In Spain, the exchange of rights over the use of water are regulated by a drought-motivated RDL (*RDL 15/2005*), which increases the possibility of exchanging water rights already mentioned in the 1999 Water Act [37]. The RDL says that “the current situation has made it essential to allow transactions involving rights over the use of water. Although it is not likely that these transactions will affect a large volume of water, their importance may be critical due to the chronic insufficiency suffered by the receptor regions over the last few months”. Thus, during the 2005–2008 drought in Spain, water market exchanges alleviated the conditions of those basins where water scarcity was most severe [32].

At present, exchanges are a reality in the basins of Júcar, Segura, Tajo, Alto Guadiana, Trasvase Tajo-Segura and Negratín-Almanzora [38]. However, despite the prevailing consensus of the benefits of adopting a more flexible approach to concessions, which is coupled with a strongly critical

appraisal of the current system, there is still great reluctance to introduce market principles in water allocation systems; there is a fear that resources will become concentrated in the most productive areas and sectors, environmental damage and privatisation will occur and a public resource will be used *de facto* [39].

3.7. Public Participation

As previously noted, the European Commission [32] has detected some governance gaps concerning drought management and planning. In Spain, this is an important obstacle for the consolidation of a new water-management paradigm, which aimed to change traditional policies and to reinforce the preventive approach. Article 14 of the WFD mandates the promotion of active public participation in the design of water policies and therefore, also of drought policies. Espluga and Subirats claim that the WFD “has revolutionised water management, opening the door for its democratisation with the introduction of several levels of public participation” [40].

In the 1990s, the National Drought Mitigation Centre (US) published a guide for drought planning processes based on the risk-oriented perspective, which ought to drive drought planning. These recommendations can be adapted to different countries and territories, depending on their institutional and technical resources. Apart from encouraging the production of drought plans, this proposal stressed the need to encourage public participation, which is the easiest way to define and solve conflicts, generate social consensus and raise public awareness [8,24,25,41].

In order to achieve this objective, participation must be active and real so that “the citizen participates in decision-making processes” and “the authorities open an ethical and effective dialogue, staying loyal to all their commitments, guarantees and the legislation” [42]. However, public administration plays the leading role and must also rely on the experience and specialisation of the task forces in charge of the design, management and promotion of active participation tools [43].

In addition, it is important to foster the participation of stakeholders and the general public alike. The general public is composed of persons or legal entities, and the associations, organisations and societies thereof, and stakeholders are those members of the general public who can or could be affected by, or have a vested interest in, a given decision-making process [44]. In our case, stakeholders include those in possession of water concessions, as well as agriculturalists, urban supply companies and their customers, the industrial and tourist sectors, the public agencies, insurance companies, banks, researchers and NGOs [5].

As drought conditions become more intense, competition over available resources increases and conflicts often arise. These conflicts should never be tackled during a crisis; potential sources of conflict must be resolved during normal periods. By engaging stakeholders early on, the different conflicting interests and values will be better understood by everyone, and collaborative solutions will be more easily forthcoming. Raising awareness requires the effective collaboration of the media [8].

Concerning the media, their role in the construction of a drought discourse must be stressed; these discourses are reflected in the formation of coalitions of stakeholders and their impact on public opinion [45,46]. Many authors have pointed out the importance of the discursive contexts in slow-forming phenomena such as drought, especially if these phenomena have diffuse geographical and chronological limits, and are, thus, open to different interpretations and diagnoses [3,47,48]. It must also be kept in mind that discourses are an indirect source of power [7] and, therefore, that the transformation of hegemonic discourses can help to change values and beliefs concerning the use of water. Thus, the construction of new discourses is a key to finally overcome productivist inertia in Spain.

Active and real participation and the transformation of the predominant discourse are hampered by the consolidation of the “hydraulic policy community” [49], which argues for the continuation of the traditional approach. In this regard, the agricultural sector, which enjoys ample social support [50], electric companies and engineering-oriented disciplines currently control information,

decision-making processes and participative bodies. Civil organizations are clearly at a disadvantage concerning social and media support, which negatively affects their ability to influence policies. In addition, new disciplinary profiles (sociology, political scientists) enter the debate only very rarely.

4. Conclusions

In recent decades, the so-called “traditional hydraulic paradigm” has guided Spanish water policies, which has resulted in the construction of major infrastructure which aims to satisfy the growing demand, and the consolidation of a productivist perspective. In this context, drought management has fallen mainly into the framework of crisis management instead of risk management. Preventive and mitigation-oriented approaches have thus not been implemented, despite scientific recommendations voiced from the 1980s onwards. The consideration of drought as an emergency situation has contributed to maintaining—with the support of interested stakeholders—management practices that have increased the vulnerability of water-management systems.

However, the last two decades have witnessed very cautiously a new legal framework, a preventive approach, and the emergence of new water-management paradigms that have sparked a debate on the key problems behind water scarcity and socio-economic drought: a lack of control in the water-concession system and a lack of real and active participation mechanisms.

The slow abandonment of reactive approaches and the adoption of preventive strategies which are, nevertheless, not totally being incorporated into the Spanish legislation, demonstrate an ingrained unwillingness to incorporate scientific evidence. The inclusion of drought within an extraordinary and anomalous framework justifies the undertaking of drastic measures—especially the construction of major hydraulic works—which are deemed to be “for the common good” and are thus carried out without due attention to impact-assessment studies. Drought decrees demonstrate the support which these infrastructure-based solutions have had from the public bodies, which have resulted in large public expenditure.

The publication of the WFD in 2000 was a key milestone. This directive introduced the principle of caution, which is aimed at guaranteeing reserves in order to reduce the social vulnerability of hydraulic systems. Apart from making the preservation and improvement of bodies of water the main objective, the WFD also set out several concepts which are key for both resource and risk management (recovery of costs, coordination of plans, public participation) which should be incorporated into planning and drought-management policies. At any rate, according to the WFD, meeting the environmental targets is not obligatory because drought, among other contingencies, can be used in order to change environmental requirements. Hence, drought could be used as a justification for non-sustainable practices to the detriment to both the quantity and the quality of water.

Soon after European water policies were transposed into Spanish legislation (2003), Spanish domestic policies underwent a change of direction with the publication of the programme AGUA (2004). This year saw also the beginning of PESs and PEAs, which was another important step towards the assumption of a preventive approach. However, the EU has repeatedly pointed out that key notions for the management of scarce water resources and drought are being poorly implemented, especially concerning water tariffs and prices, concession policies, land-use policies and improvements in governance. Special mention is made of the insistence on the construction of major infrastructure and on the increase in land surface under cultivation, which has resulted from the modernisation of irrigation systems.

In conclusion, although the situation has notably improved, major obstacles for the implementation of a risk-based approach are still in place. Today, now that river basin and drought plans are under review, it is time to highlight the presence of these obstacles, especially the large gap that exists between legislation and scientific knowledge, the difficulties associated with overcoming hegemonic discourses and introducing new values in public-participation mechanisms, and the fact that climate change-related uncertainty is barely being taken into consideration.

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References

1. Pita, M.F. Recomendaciones para el establecimiento de un sistema de indicadores para la previsión, el seguimiento y la gestión de la sequía. In *La sequía en España. Directrices para minimizar su impacto*; Comité de Expertos en Sequía; Ministerio de Medio Ambiente: Madrid, Spain, 1997.
2. Quiring, S.M. Development objective operational definitions for monitoring drought. *J. Appl. Meteorol. Climatol.* **2009**, *48*, 1217–1229. [[CrossRef](#)]
3. Wilhite, D.A.; Buchanan-Smith, M. Drought as hazard: Understanding the natural and social context. In *Drought and Water Crisis: Science, Technology, and Management Issues*; Wilhite, D.A., Ed.; Taylor & Francis: Boca Raton, LA, USA, 2005.
4. Mishra, A.K.; Singh, V.P. A review of drought concepts. *J. Hydrol.* **2010**, *391*, 202–216. [[CrossRef](#)]
5. Iglesias, A.; Cancelliere, A.; Gabiña, D.; López-Francos, A.; Moneo, M.; Rossi, G. *Drought Management Guidelines*; European Commission–EuropeAid Co-operation Office: Brussels, Belgium, 2007.
6. Kallis, G. Droughts. *Ann. Rev. Environ. Resour.* **2008**, *33*, 85–118. [[CrossRef](#)]
7. Wilhite, D.A.; Glantz, M.H. Understanding the drought phenomenon: The role of definitions. *Water Int.* **1985**, *10*, 111–120. [[CrossRef](#)]
8. World Meteorological Organization (WMO) & Global Water Partnership (GWP). *National Drought Management Policy Guidelines. A Template for Action*; WMO & GWP: Geneva, Switzerland, 2014.
9. Ministerio de Agricultura, Alimentación y Medio Ambiente. *Agua. Legislación*, Available online: http://www.magrama.gob.es/es/agua/legislacion/Observatorio_Nacional_Sequia_2_legislacion.aspx (accessed on 20 July 2015).
10. Saurí, D.; del Moral, L. Recent developments in Spanish water policy. Alternatives and conflicts at the end of the hydraulic age. *Geoforum* **2001**, *32*, 351–362. [[CrossRef](#)]
11. Swyngedouw, E. Modernity and hybridity: Regeneracionismo, the production of nature and the spanish waterscape, 1890–1930. *Ann. Assoc. Am. Geogr.* **1999**, *89*, 443–465. [[CrossRef](#)]
12. Swyngedouw, E. Technonatural revolutions: The scalar politics of Franco’s hydro-social dream for Spain, 1939–1975. *Trans. Inst. Br. Geogr.* **2007**, *32*, 9–28. [[CrossRef](#)]
13. Brufao, P. El régimen jurídico de las sequías: Crítica a la regulación extraordinaria y urgente de un fenómeno natural y cíclico propio del clima. *Rev. Adm. Pública* **2012**, *187*, 199–239.
14. La Calle, A. Sequía y adaptación de la Directiva Marco del Agua. In *La Sequía en España. Directrices para Minimizar su Impacto*; Comité de Expertos en Sequía; Ministerio de Medio Ambiente: Madrid, Spain, 1997.
15. Urquijo, J.; De Stefano, L.; La Calle, A. Drought and exceptional laws in Spain: The official water discourse. *Int. Environ. Agreem. Politics Law Econ.* **2015**, *15*. [[CrossRef](#)]
16. Arrojo, P.; La Calle, A.; Casas, A.; Cid, N.; García, J.J.; Ollero, A.; Prat, N. *Informe sobre Proyecto 20070589GPR “Embalse de Biscarrués en el Río Gállego”*; Fundación Nueva Cultura del Agua: Zaragoza, Spain, 2011.
17. Beaumont, M.J.; Beaumont, J.L.; Arrojo, P.; Bernal, E. *El Embalse de Itoiz, la Razón o el Poder*; Bakeaz: Bilbao, Spain, 1997.
18. Del Moral, L. *El Sistema de Abastecimiento de Agua de Sevilla: Análisis de Situación y Alternativas al Embalse de Melonares*; Fundación Nueva Cultura del Agua: Zaragoza, Spain, 1998.
19. La Calle, A. *Análisis de las excepciones de los objetivos ambientales en los planes hidrológicos de Cuenca*; Fundación Nueva Cultura del Agua, Colección Cuadernos Prácticos del Observatorio de la Directiva Marco del Agua: Zaragoza, Spain, 2011.
20. European Communities. *Common Implementation Strategy for the Water Framework Directive (2000/60/EC)*; Office for Official Publications of the European Communities: Luxembourg City, Luxembourg, 2009.

21. Kampragou, E.; Apostolaki, S.; Manoli, E.; Froebrich, J.; Assimacopoulos, D. Towards the harmonization of water-related policies for managing drought risks across the EU. *Environ. Sci. Policy* **2011**, *14*, 815–824. [[CrossRef](#)]
22. López-Gunn, E. Agua para todos: A new regionalist hydraulic paradigm in Spain. *Water Altern.* **2009**, *2*, 370–394.
23. López Gunn, E.; De Stefano, L. Between a rock and a hard place: Re-defining water security, decentralisation and the elusive “Water Pact” in Spain. In *Federal Rivers. Managing Water in Multi-Layered Political Systems*; Garrick, D.E., Ed.; Eduard Elgar: Northampton, UK, 2014.
24. Wilhite, D.A. Drought planning: A process for state government. *Water Resour. Bull.* **1991**, *27*, 29–38. [[CrossRef](#)]
25. Wilhite, D.A.; Hayes, M.J.; Knutson, C.; Smith, K.H. Planning for drought: Moving from crisis to risk management. *J. Am. Water Resour. Assoc.* **2000**, *36*, 697–710. [[CrossRef](#)]
26. European Commission. *Communication from the Commission to the European Parliament and the Council—Addressing the Challenge of Water Scarcity and Droughts in the European Union*; European Commission: Brussels, Belgium, 2007.
27. Ministerio de Medio Ambiente. *Guía para la redacción de planes especiales de actuación en situación de alerta y eventual sequía*; Ministerio de Medio Ambiente: Madrid, Spain, 2005.
28. Asociación Española de Abastecimiento de Agua y Saneamiento y Ministerio de Medio Ambiente. *Guía para la elaboración de planes de emergencia por sequía en sistemas de abastecimiento urbano*; AEAS y MMA: Madrid, Spain, 2007.
29. European Commission. *Report from the Commission to the Council and the European Parliament—Follow up Report to the Communication on Water Scarcity and Droughts in the European Union (COM 414 final)*; COM 875 final 19/12/2008; European Commission: Brussels, Belgium, 2008.
30. European Commission. *Second Follow-up Report to the Communication on Water Scarcity and Droughts in the European Union (COM 414 final)*; COM 228 final 18/05/2010; European Commission: Brussels, Belgium, 2010.
31. European Commission. *Third Follow up Report to the Communication on Water Scarcity and Droughts in the European Union (COM 414 final)*; COM 133 final 21/03/2011; European Commission: Brussels, Belgium, 2011.
32. European Commission. *Report on the Review of the European Water Scarcity and Droughts Policy*; COM 672 final 2012; European Commission: Brussels, Belgium, 2012.
33. European Commission. *A Blueprint to Safeguard Europe’s Water Resources*; COM 673 final 14/11/2012; European Commission: Brussels, Belgium, 2012.
34. Fundación Nueva Cultura del Agua. *Documento de reflexión sobre la política del agua en la Unión Europea*; Fundación Nueva Cultura del Agua: Zaragoza, Spain, 2013.
35. Estrela, T.; Vargas, E. Drought management plans in the European Union. The case of Spain. *Water Resour. Manag.* **2012**, *26*, 1537–1553. [[CrossRef](#)]
36. Arrojo, P. Bases para un Documento de Directrices en Materia de Prevención y Gestión de Sequías en la Planificación Hidrológica. In *La sequía en España. Directrices para minimizar su impacto*; Ministerio de Medio Ambiente: Madrid, Spain, 1997.
37. Estevan, A.; La Calle, A. *Transferencias de Derechos de Agua entre Demandas Urbanas y Agrarias. El caso de la Comunidad de Madrid*; Cuadernos de I+D+I: Madrid, Spain, 2007.
38. Paneque, P.; Beltrán, M.J. Towards a more flexible water concession system in Spain: Public water banks in Andalusia. *Int. J. Water Resour. Dev.* **2014**, *31*. [[CrossRef](#)]
39. Del Moral, L.; Silva, R. Grandes zonas regables y reparto del agua en España. El caso de la cuenca del Guadalquivir. *Mélanges de la Casa de Velázquez* **2006**, *36*, 125–148.
40. Espluga, J.; Subirats, J. Participación ciudadana en las políticas de agua en España. In *Panel Científico-Técnico de Seguimiento de la Política de Aguas*; Fundación Nueva Cultura del Agua: Zaragoza, Spain, 2008.
41. Wilhite, D.A.; Hayes, M.J.; Knutson, C.L. Drought preparedness planning: Building institutional capacity. In *Drought and Water Crises: Science, Technology, and Management Issues*; Wilhite, D.A., Ed.; Taylor & Francis: Boca Raton, LA, USA, 2005.
42. La Calle, A. La participación pública activa y real en la política del agua: Necesidad y deber. *Andal. Rev. Andal. Cienc. Soc.* **2009**, *8*, 67–82.

43. Ballester, A.; Barbé, D.; Broekman, A. *La crisis de la sequía en 2008 en Barcelona: Claves, escenarios y gestión*; Universidad de Zaragoza: Zaragoza, Spain, 2008.
44. Ballester, A.; La Calle, A. *Gobernanza del Agua. Participación Pública en la Planificación Hidrológica*; Fundación Nueva Cultura del Agua, Observatorio de Políticas de Agua, Cuadernos Prácticos, 5: Zaragoza, Spain, 2015.
45. Del Moral, L. *Análisis de los Discursos Relacionados con los Procesos Territoriales que Condicionan la Presión Sobre el Agua en la Cuenca del Segura*; Secretaría General para el Territorio y la Biodiversidad y Colegio de Geógrafos: Sevilla, Spain, 2007.
46. Paneque, P.; Vargas, J. Drought, social agents and the construction of discourse in Andalusia. *Environ. Hazard.* **2015**, *14*. [[CrossRef](#)]
47. Wilkins, L.; Patterson, P. Risky business: Covering slow-onset hazards as rapidly developing news. *Polit. Commun. Persuas.* **1990**, *7*, 11–23. [[CrossRef](#)]
48. Sonnett, J.; Morehouse, B.J.; Finger, T.D.; Garfin, G.; Rattray, N. Drought and declining reservoirs: Comparing media discourse in Arizona and New Mexico, 2002–2004. *Glob. Environ. Chang.* **2006**, *16*, 95–113. [[CrossRef](#)]
49. Pérez Díaz, V.; Mezo, J.; Álvarez-Miranda, B. *Política y Economía del Agua en España. Criterios, Alternativas y Procesos de Aprendizaje*; Círculo de Empresarios: Madrid, Spain, 1996.
50. Del Moral, L.; Amilibia, L.B.; Giansante, C. Actores, normas, prácticas y discursos en la asignación del agua en sequías. Aplicación al Guadalquivir. *Rev. Real Acad. Cienc. Exactas Fís. Nat.* **2000**, *94*, 287–301.



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