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Water, regulation of its shortage and its excess

Abstract
Purpose: This paper aims to analyse the effects of climate change and the public actions and regulations approved accordingly regarding with Water as essential wellbeing issue, and if possible we aim as well, to show how to improve regulations on this matter.
Methods: The methodology used in this paper is focused in analyse the main enacted laws in Spain and the ones approved by European Union Institutions to preserve Water and to give a solution to the consequences of the climate change in this scope.
Results: We have notice that the problems that involve shortage and excess of Water are two questions linked with each other, so the improvement of regulations is due to take into account this relation between them.
Discussion: Water is an essential good for animal and vegetable species subsistence on earth, and also for human beings subsistence. As a consequence of this, the regulation that is enacted to preserve it becomes a vital regulation for the human being and is part of the normative set to rule the accuracy of our environment. Currently, there are some policies on Water regulation in the European Union that take into account the effects on Water that occur as a consequence of climate change. These Water regulatory policies are extended to the effects of its shortage, which produces dramatic damages adopting the form of drought, and the effects of it excess that can wreak havoc through floods. This paper aims to analyse both sides of the effects of climate change, and the public actions and regulations approved accordingly, and the relation between them, in order to enhance them.

Keywords: water, environment, climate change, drought, aids, floods, civil protection.

1. Introduction

There are currently some public policies on Water regulation in the European Union that take into account the effects on water that occur as a consequence of climate change. This Regulation consider the Right to enjoy Water as a Human

Right as in different places on the planet it is done (Moreno Molina, 2009, p.459). These policies are extended to rule its deficiency, which produces dramatic damage adopting the form of drought and the effects of its excess that can wreak havoc through floods. In view of that, there is a need of harmonizing the regulation of the two scenarios. The research that concerns us is addressed to the incorporation of normative measures that can be considered preventive of floods, but at the same time they can be preventive of drought situations and focused on the purpose of improving the regulation of managing and planning security in dams and watersheds, avoiding floods by rupture or overflow of them, and furthermore proposing measures that preserve the surplus in this last scenario in order to preserve that legal right that is Water for situations of hypothetical future drought.

2. Research methods

The methodology used in this paper is focused in analyze the main enacted laws in Spain and the ones approved by European Union Institutions to preserve Water.

3. Water European regulation as a consequence of climate change

Climate change affects to the quality and quantity of water available for humans and species in a balanced situation of the environment. The regulation of this essential resource is necessary since Water is an essential natural good for life, which also affects economic and social activities, and the value of territories (Álvarez Fernández, 2007, p.318).

The EU Water Framework Directive does not directly rules issues related to climate change, but its consequences, and aims to protect surface, underground, coastal and transition Waters (Delgado Piqueras, 2009, p.269). Through it there is a strong legislative basis in the EU for integrated long-term Water management, including frameworks to apply Water fees (eg tariffs), and measures (eg water saving devices, educative campaigns, and awareness), in order to get its most efficient use.

Firstly, water pricing policies implemented in combination with other measures are prove to be the most effective in reducing water consumption at home. Water demand management strategies must find the right

combination of pricing instruments and mechanisms without pricing, given the essential and basic nature of water. Nevertheless, water prices continue to be a key instrument to achieve cost recovery of water services in order to guarantee the maintenance and financing of existing and future water infrastructure.

However, the Water Framework Directive (Directive 2000/60/EU) prescribes that water is not a commercial good like the others, but a heritage that must be protected, defended and treated as one of the most valuable goods. The Water Framework Directive configures it as an ecological resource and its preservation is identified with the protection of the environment (López Menudo, 2016, p.264). The regulation of water in Europe is a part of environmental regulation and it is inserted in the regulatory set that aims to serve as a guarantee of sustainable use of natural resources (Lozano Cutanda, 2016, p.411). In this sense, Water Framework Directive aims to be the framework for the protection of European waters (Bueno Hernández, 2007, p.5).

Despite all, the transposition of the Water Framework Directive into the national law has encountered difficulties in some Member States, and because of that in some countries the deadline to have done the adaptation has been overpassed as it has been reflected in several judgments of the Court of Justice of the European Union. The most common difficulties had been the recovery of management costs, or the adaptation of the hydrological planning (Embid Irujo, 2007, p.21)

In addition, water supply is a service of general interest, as it is defined in the Commission Communication Services of general interest in Europe, having traditionally been considered, in Spanish law, as a public service (Valles Ferrer, 1974, p 39). But the common use by citizens is not the only application that it have, because it is used for irrigation, industry, generation of electricity, etc. (Belenguer Muía, 1997, p.188). All this requires adequate regulation, which must be sustainable, in accordance with current international criteria (García Matíes, 2016, p.96).

Effective Water regulation policies require greater integration and harmonization of the EU Member States, and collaboration mechanisms. A coherent, effective and transparent legislative framework is also necessary, which is committed to the sustainability of the management, protection and disposal of Water resources. As a consequence, European regulation is focused on the regulation of floods, or in the regulation of droughts, but separately. However, the regulation of both facets is ot absolutely independent of the other, as we will analyze.

4. The Flood Directive and its transposition into Spanish Law

Directive 2007/60/EC, of the European Parliament and of the Council, of October 23, 2007, about assessment and management of flood risks, -so called European Directive on Floods- has the purpose of increasing security in the relation with the risk of floods as a public competence that can give rise to a patrimonial liability, especially by omission of the duty of acting to remove de hazard in this scope (Fernández García, 2010, p.131). European regulation has three objectives: 1. Reduce the negative consequences of floods regarding human health, environment, cultural heritage, economic activity and infrastructure; 2. Create the necessary instruments for the proper knowledge and evaluation of the risks associated with floods; 3. Achieve coordinated action by all public administrations involved and society to reduce the negative consequences of floods.

Directive 2007/60/CE was transposed to the Spanish legal system, mainly throgh the Royal Decree 903/2010, July 9th, on assessment and management of flood risks, but also by the various reforms in the Regulation of the Public Hydraulic Domain. Lastest reform in this matter was made by Royal Decree 638/2016, of December 9, which modifies both the Regulation of the Public Hydraulic Domain approved by Royal Decree 849/1986, of April 11, and the Hydrological Planning Regulation, approved by Royal Decree 907/2007, of July 6, and other regulations on flood risk management, ecological flows, hydrological reserves and wastewater discharges. Through the reform, the current regulatory framework is updated, eliminating some gaps, as well as creating a normative substrate for the coordination of the river basin management plans and the flood risk management plans (Blasco Hedo, 2017, p.23). It is noteworthy that the approval of the hydrological plans requires citizens participation in the processes of preparation and revision (Pallarès Serrano, 2008, p.352), which serves to ensure transparency and their adaptation to their purpose to the European regulation.

The purpose of the Directive is to generate new instruments at European level to reduce the foreseeable consequences of floods through risk management, to look for the reduction of danger and risk, and to reduce the negative consequences of floods. The main instruments that can be used for achieve this goal are: 1. Clarification of the legal concepts of river channel, zone of servitude and police zone; 2. Implementation of a proper National System of Cartography; and 3. Regulation of flood zones.

In relation with the normative clarification of the legal concepts of river channel, area of servitude and police area we must emphasize that these are not fixed concepts, which are specified depending on different criteria. As a result, natural streams are considered to be continuous or discontinuous currents, the ground covered by the waters in the maximum ordinary increasing is based on geomorphological and ecological data considering the existing hydrological, hydraulic, photographic and cartographic information, as well as historical references available.

Secondly, the creation of the National Cartography System allows the Hydraulic Administration to have a management tool to act effectively against these harmful effects, highlighting the cartographic delimitation of the public hydraulic domain, the preferential flow zone, and the flood zones. National Cartography System is connected with Civil Protection activity because it is a decisive preventive element to fight against the actions that produce environmental damage caused by a flood.

However, it should be noted that civil protection regulations require the identification of flood areas, through a zoning that is not necessarily coincident with the delimitation that is made according to water legislation, but must take it into account (Menéndez-Rexach, 2015, p.40).

With the regulation of floodplains as it is required in the European Floods Directive, a flood zone will be considered so determining the theoretical levels reached by flood waters with a statistical return period of 500 years, based on geomorphological, hydrological and hydraulic studies. It is referred to lakes, lagoons, reservoirs, rivers or streams. The set measures include retention or relief of the flows of water and cargo transported during floods or shelter against erosion. The regulation of flood areas has great importance in the security scope, since the consequences of floods can involve losing human lives and suffering economic damages.

Undoubtedly, one of the most important instruments that is useful to reinforce safety in the prevention of a possible flood is the Dam Emergency Plan, whose design must now be compatible with the European Flood Directive. The Floods Directive has already entered into force, the implementation of the Directive is beginning and the timetable is clearly established.

5. Public actions context in which the European Flood Directive is inserted

The European Flood Directive is not an isolated regulation, because it is part of a legal framework about Water regulation. The whole regulation is extended to

security in case on flood, and dam rupture, but also to the environment protection. In the European legislation this is a forecast consequence of climate change, but it transcends a purely environmental policy perspective, because it is also considered a regulation of public safety.

In this sense, the European regulation on flood risk is an extension of the competences assumed on the environment by the European Community in the Single European Act, which contains recommendations related to the state of the waters from an ecological perspective (Delgado Piqueras, 2009, p.288). The aggravation of the problems of Water scarcity and the virulence of floods as consequences of climate change in the current European regulation is based on the competences that the European Union assumed in relation to the common policies of the environment.

Therefore, the European Flood Directive of 2007 must be understood in relation to the Water Framework Directive -Directive 2000/60/EU- (Delgado Piqueras, 2009, p.273), and be open to some coordination between them. In fact, strategy for the common implementation of the Water Framework Directive (2000/60/EC) and the Floods Directive (2007/60/EC) needs to take into account the combined interpretation of the two of them. In particular, the following rules must be met:

- The execution of the flood risk management plans must be coordinated with the basin management plans.
- Citizens' participation when approving these plans should be foreseen, so that, by the application of the combined action of both, all the evaluations made, prepared maps and plans will be available to the public.
- Member States are due to coordinate their flood risk management practices in shared river basins, including with neighbor States.
- Member States do not perform measures that increase the risk of flooding in neighboring countries for reasons of solidarity.
- The United States took into consideration long-term developments, including climate change, as well as sustainable land use practices in the flood risk management cycle contemplated in the 2007 Directive.

6. Measures to regulate water scarcity in Spain

As starting point water parameters in Spain highlights that it is one of the world's largest water resources if we consider the number of dams, reservoirs, and lakes, but all of them are smaller than in other countries much more humid.

(García Diez and Remiro Perlado, 2014, p.4). For this reason, is vital to preserve them and to mitigate the effects of its shortage. It should be noted that drought is not a new or extraordinary situation derived from climate change (López Piñeiro, 2006, p.47), although this phenomenon has exacerbated its effects.

Spanish Law number 1/2018, of March 6th, amended the Water Law of 2001 to mitigate the effects produced by drought, in a context of emergency technical situation of some watersheds in Spain, establishing economic aid to some productive sectors.

Given the extreme climatic conditions that the Spanish agrarian sector currently presents in some areas, which threaten the economic viability of many farms and their own life as productive units, the reform starts from the base of the existing Plan of agricultural insurance, subsidized by the Ministry of Agriculture and Fisheries, Food and the Environment, which represents the obligatory reference tool in the fight against climatic adversities. As it only contemplates the meteorological drought and not the hydrological one, it is, the former measures only could be proper to deal with shortage of atmospheric water and not in case of scarcity of water in the hydrological system (Brufao Curiel, 2012, pp. 203-204), some complementary measures have been adopted in the situation of drought of extraordinary incidence. These exceptional measures that are implemented with the legal reform of 2018 are the following:

- Exemption from charges related to water availability.
- Labor and Social Security measures such as suspension of contracts and reductions in working hours and collective dismissals that have their direct origin in the damages caused by the drought.
- Special tax reductions for agricultural activities, especially in relation to personal income tax and value added tax.
- Actions in relation to the Common Agricultural Policy of the European Union and the financing of guarantees. In this sense, it is expected that the authorizations of the advance payment of the aid provided in this framework will be requested up to the maximum allowed for its payment.
- The Government will upgrade the definition of the Combined Agricultural Insurance Plan.
- Exemption from property tax payments corresponding to 2017 and 2018 that affect farms, dwellings, work premises and the like, of a rustic nature, owned by farmers and ranchers affected by the drought, will be granted.
- Mediation loans from the Official Credit Institute.
- Extraordinary fund to fight against drought.

7. Conclusions

The European Flood Directive creates a regulatory framework to harmonize regulations of all the Member States of the European Union regarding the system to cope with the risk of both continental and coastal floods. This action must be interpreted and executed in a coordinated manner with other actions contained in the legislation that includes the same package of other environmental protection policies in this sectorial scope. It is a protection of water resources and a protection against the risks caused by it excess thereof.

In Spain, Royal Decree number 903/2010 is the regulation that has been used to transpose the European Flood Directive in terms of safety against the risk of flooding caused by inland (non-coastal) waters. This norm is inserted in the normative set of the National System of Civil Protection in a similar way to a basic norm (special and sectorial) that allows to design the emergency plans for dams and reservoirs linked to the regulation of self-protection in relation to the regulation contained in the Basic Civil Protection Directive to deal with the risk of flooding (Búrdalo, 2003, p.27), but which may be completed with the rest of the Civil Protection regulations that are subsidiary.

However, at the same time that we are implementing an improvement of the Dam Plans in the face of flood risk, we are also witnessing the adoption of other measures, such as the problem of the adverse effects of droughts, which is the other side of the coin. But both are phenomenon sharped by climate change.

The enacted regulation needs a coordinated public action performed by the State and territorial governments (*Comunidades Autónomas*) since all of them share competences about Civil Protection and Environment protection (Fanlo Loras, 2010, p.331). The key goal is to adopt measures so that in the phases of exceedance of Water the solution to prevent fracture of the dam or reservoir is implement mechanisms to save water. This Water would be needed in the future to mitigate the effects of the droughts, being at the same time, a measure of prevention of overflow or breakage of dams, and avoiding floods. The basis of this regulatory harmonization is found in the joint interpretation of the Directives, the Water Framework Directive of 2000 and the Floods Directive of 2007, so that the principles in the implementation of flood risk safety measures require that water resources are not squandered and implies to be preserved. For this reason, some system should be planned to save excess water in a case of torrential rain that threatens the rupture as a consequence of the pressure. To save Water for the future building backups in the dams and reservoir is the better choice to prevent

a foreseeable drought and is a measure that prevents the scarcity of this valuable resource and at the same time is a measure that avoids the possibility of a fracture of the dam or the reservoir.

These measures have not been foreseen in Spain: nor in the reform of the Regulation of the Hydraulic Public Domain nor in the adaptation of the Flood Directive made by the Royal Decree of 2010. The European flood legislation does not contemplate this relationship between these two scenarios either. It can be said that there has been a missed opportunity to solve with a single preventive measure some problems of floods and drought as effects exacerbated by climate change.

As a normative proposal for the future, it could be recommended that the next reforms of this matter in the regulatory context of the European Union, provide that Member States are due to introduce mechanisms for coordinating security measures against flood risk, through savings systems and preservation of surplus water resources, with measures to mitigate the effects of drought, considering adequate, the regulation of a state water reserve.

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