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Water resources and land use planning systems in Portugal—Exploring better synergies through Ria de Aveiro☆

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ABSTRACT

The paper discusses the relevance of a stronger articulation between land use and water resources systems to enhance the success of the Water Framework Directive. Using article 11 of the WFD, this paper assess (i) how the Spatial Planning and Urban Development Law as well as the Portuguese Water Law converge to promote better integration of water resources into spatial planning, (ii) how their prospects are developed at the regional basis, namely through the Regional Spatial Development Plan and River Basin Management Plan, and (iii) how these are prepared to inform other planning instruments at the local level. It shows through a spatial analysis of the regional land-use plan and the river basin plan as applied over the Ria de Aveiro estuary area, the conflicts and opportunities for stronger synergies. The paper concludes with a critical analysis of the integration of the spatial planning and water resources planning systems in Portugal, and reveals new insights and challenges for more productive synergies between these systems.

Introduction

The concept of "integrated water resources management" has been used as a paradigm for good practice in the water sector. It is defined as "a process which promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems" (GWP, 2000). It is a broad definition, able to be accepted by a wide range of perspectives and stakeholders. It includes, however, a critical aspect hardly apprehended in its full length by the society and by the related policy and planning arrangements – i.e. the reference to "land and related resources". Biswas (2008) questions the wideness of what could be integrated in such expression and the related consequences. The "land and related resources", indeed, do suggest all the resources, ecosystem functions (see Garmendia et al., 2012), human activities and stakeholders associated to a territory as well as the policies, plans and institutional systems created to control them in order to adjust their likely impacts to the limits of existing water resources carrying capacity. To attain such a demanding challenge, multiple cross policies and cross arrangements are required.

Integrated in the spatial related challenges is the need to take into account the spatial variability of water resources, the associated infrastructures, the different interests and conflicts, the priorities, policies and planning instruments, which need to be tackled by decision-makers and governance institutions. Conceptually, however, water resources and land use planning approaches have been conceived out of different scientific contexts. While water resources modelling approaches have been developed to relate the location of land use and associated bio-physical conditions to water and nutrient balances (see Hormann et al., 2005), land use modelling approaches have been developed to assess the multiple impacts of land use change and planning (Becker and Dewulf, 1989; Bouman et al., 2000; Van Paassen, 2004). Increasingly, these approaches are combined – providing recognized added value to integrated land use and water resources planning. Nevertheless, they are still far from being comprehensively used by real current planning systems.

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The adoption of integrated approaches for the management of water resources has required significant reforms in many countries, leading to adjustments in water policy, water legislation and water resources planning (Iza and Stein, 2009; Liefferink et al., 2011; OECD, 2011; UNEP, 2012). The water governance challenges address the 'vertical' integration problem of how best to integrate water policy between different levels of government. They also address the 'horizontal' problem of how best to integrate different sectorial policies, such as urban, agriculture, industry, energy or ecosystem protection. They all interfere with water use and their location is, ultimately, considered under the spatial planning and related decision-making process.

In the European context it has also been recognized that the main pressures on Europe's waters, namely diffuse pollution, hydro morphological alterations and over extraction, are mainly associated with the impacts of land use and location options, such as those associated to agriculture, energy, transport and urbanization (EEA, 2012a). In 2000, the EU Water Framework Directive (WFD) addressed in a comprehensive manner all the challenges faced by EU waters, making it clear that water management is much more than just water distribution and treatment. It also involves land use and management that affect both water quality and quantity. Water management requires coordination with spatial planning and integration into funding priorities must be set out by member States in plans for river basins. In spite of the progresses achieved in the EU, however, the Blueprint for Water (EU, 2012) still stresses that improvement in the water ecological status and reduction of pressures over water resources requires a stronger integration of water resources and land use planning.

Hence, the question emerges how water resources planning can be articulated with spatial planning. How does national legislation deal with this challenge and create opportunities for stronger ties between the two planning systems, conceptually and procedurally? How do the systems communicate and strengthen objectives, priorities and land use strategies with regards to water resources protection? This paper focuses on the Portuguese land use and water resources planning systems, further extending the work presented by Fidélis and Roebeling (2013). It questions how the Spatial Planning and Urban Development Law (Law n° 48/98 of 11 August and related alterations) establishes the main features of the spatial planning procedures and plan contents regarding water resources. In addition, it analyses how the Portuguese Water Law (Law No. 58/2005 of 29 December and related alterations) has introduced new challenges for the integration of water resources management concerns into spatial planning. The paper uses Ria de Aveiro as a case study to assess how these two systems complement each other in real water resources and spatial plans.

The remainder of this paper is structured as follows. In the next section the current challenges emerging from the requirements of the Water Framework Directive, as well as, the way the most recent specific literature is referring to the potentials and mismatches regarding the articulation between land use and water resources planning systems are presented. The third section provides a conceptual overview of water resources and land use planning approaches as well as, recent, integrated planning approaches able to reinforce the articulation between land use and water resources planning. In the fourth section the Portuguese land use and water resources planning systems are described, highlighting how the respective laws foresee their articulation. Finally, the fifth section analyses how these two systems deal, at the regional level, with a complex system such as the Ria de Aveiro estuary area, where environmental, land use and water resources values and associated conflicts are at stake. Through a brief spatial analysis of the regional land use development model and the river basin management plan implementation programme, we are able to show not only conflicting planning schemes but also opportunities to explore better synergies.

Spatial planning and water resources planning systems – why searching for ties

The EU Water Framework Directive (WFD; Directive 2000/60/EC of 23 October) establishes a framework for Community action in the field of water policy and is said to have a strong territorial context as it establishes its implementation through river basin management plans based on natural water resources systems and associated boundaries, instead of on administrative boundaries (EEA, 2012b). The main purpose of the WFD is, according to article 1 of the WFD, to establish a framework for the protection of inland surface, transitional, coastal and ground waters which "(a) prevents further deterioration and protects and enhances the status of aquatic ecosystems and, with regard to their water needs, terrestrial ecosystems and wetlands directly depending on the aquatic ecosystems; (b) promotes sustainable water use based on a long-term protection of available water resources; (c) aims at enhanced protection and improvement of the aquatic environment, inter alia, through specific measures for the progressive reduction of discharges, emissions and losses of priority substances and the cessation or phasing-out of discharges, emissions and losses of the priority hazardous substances; (d) ensures the progressive reduction of pollution of groundwater and prevents its further pollution; and (e) contributes to mitigating the effects of floods and droughts" (Directive 2000/60/EC of 23 October, article 1).

In article 11 of the WFD it is defined that each Member State shall ensure the establishment of a programme of measures for each river basin district, aiming to achieve the quality objectives of water resources. Each programme of measures, to be developed through River Basin Management Plans, must include basic and supplementary measures. Taking into account the content of article 11, Table 1 summarizes the main types of basic measures, as considered in the paper.

The formulation, design and effective implementation of many of these measures are intrinsically dependent on the decision-making process adopted by land use plans, like major instruments to define development priorities and related location and density of human activities and infrastructures. In addition, such decision-making processes are highly influenced by stakeholders, associated interests and governance structures. If spatial issues are of utmost relevance for water resources protection, articulation with spatial decision-making is, then, crucial.

Table 1
Main basic measures foreseen in the WFD (based on: Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000).

(a) to implement Community legislation for the protection of water;
(b) to promote efficient and sustainable water use as to avoid compromising the achievement of Directive objectives;
(c) to safeguard water quality as to reduce the level of purification treatment required in the production of drinking water;
(d) to control the abstraction of fresh surface and groundwater as well as impoundment of fresh surface water;
(e) to control artificial recharge or augmentation of groundwater bodies;
(f) to control point source discharges liable to cause pollution;
(g) to prevent or control the input of pollutants from diffuse sources liable to cause pollution;
(h) to ensure that the hydromorphological conditions of water bodies are consistent with the achievement of the required ecological status or good ecological potential for water bodies designated as artificial or heavily modified;
(i) to prohibit direct discharges of pollutants into groundwater;
(j) to prevent losses of pollutants from installations, impact of accidental pollution incidents and risks to aquatic ecosystems.