Challenging land use through water resources planning
- assessing the formulation of the programmes of measures under the WFD first and second planning cycles in Portugal

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The river basin management plans (RBMP)

- aim to play a major role in implementing the European water policy objectives at national and river basin scale

- set a program of measures to improve water quality and quantity and to implement the objectives of the Water Framework Directive (WFD)
objective

to analyse and compare the programmes of measures of the RBMP prepared in Portugal for the WFD first and the second planning cycles

• to analyse the references to land, land use, agriculture, industry and urbanization in the measures adopted
• to characterize the evolution from the first to the second cycle
contents

1. Theoretical approach
2. Contextual features
3. Methodology
4. Results and discussion
5. Conclusions and recommendations
1. Theoretical approach

The use of the territory, by the most diverse human activities, influences the quality and quantity of water resources, resulting from the impacts of soil transformation by agriculture, urbanization, industry, transport, etc. (EEA, 2012)

It is important and necessary to strength the articulation between land use development policies and water policies and to promote synergies between water resource planning and land use planning. (Carter, 2007)
Effective articulation between water resources and land use planning systems may contribute to maintain and restore water quality in streams, lakes, wetlands, estuaries or aquifers and to prevent associated risks. (Fidélis and Roebeling, 2014)

The definition of measures to manage anthropogenic pressures in order to ensure and protect the water body and the associated ecosystems, is of extremely importance. (European Commission, 2000)

River basin management plans, through theirs programmes of measures, play a key role in offering guidance for spatial development plans, including local master plans. (Smith et al., 2014)
2. Contextual features

WFD adopted in 2000

• objectives
  o achieve good status by 2015
  o prevent further deterioration, protects and enhances the status of waters
  o promote articulation between land use and water resources systems

• RBMP in 6 year cycles
• each Member State shall ensure the establishment, for each river basin district, or for the part of an international river basin district within its territory, of programmes of measures in order to achieve the quality objectives of water resources

• each programmes of measures to be developed through RBMP and reviewed in 6 year cycles, must include basic and supplementary measures

• their formulation, design should consider territorial strategies at local level

minimum requirements

additional measures necessary to achieve environmental objectives
Hydrographic regions (HR) in Portugal

- Minho and Lima – HR1*
- Cávado, Ave and Leça – HR2
- Douro – HR3*
- Vouga, Mondego and Lis – HR4
- Tejo – HR5*
- Sado and Mira – HR6
- Guadiana – HR7*
- Streams of Algarve – HR8
- Açores – HR9
- Madeira – HR10

(*) are international watersheds
3. Methodology

- Identification of the keywords for analysis
- Analysis of the frequency in the measures in total and in each river basin management plan
- Comparative analysis between the two planning cycles
4. Results and discussion

References to “soil” and “land use”, “agriculture”, “industry” and “urban”

- they all increased between cycles except the “urban”
- “agriculture” registered the highest increase, following by “soil and land use”
References to "soil" and "land use" by hydrographic region

- The frequency of soil and land use increased in every HR.
- Highest increase in HR1 and HR8.
- The increase is mainly associated to supplementary measures.
References to "agriculture" by hydrographic region

- Reference to agriculture has a global increase in all HR.
- HR4 and HR6 have the highest frequency.
- The increase slightly occurs through the supplementary measures.
References to "industry" by hydrographic region

- a slight increase, especially on the HRs on the south of the country;
- the higher number on HR3 and HR5 which have stronger industrial activities;
- the increase is mainly at the expense of basic measures
References to "urban" areas or activities by hydrographic region

- Reference to urban decreases in almost all HR (the HR4 registered the highest decrease)
- Less interventions in WWT infrastructures
- Urban context mainly targeted with municipalities
- Variations occur at the expense of basic measures
5. Conclusions and recommendations

- The frequency of particular keywords in the programmes
  - increased (except the urban)
  - a significant increase in the references to “agriculture”, “soil” and “land use”
  - in the 2nd cycle the results show a higher balance between the northern and the southern basins
  - consistency with the Portuguese territorial reality

- Despite the increase in the frequency of references to the types of land use, there is still room to reinforce its introduction, since it facilitates the translation of the RBMP guidelines into the local master plans

- This is an exploratory and preliminary work

- Recommended,
  - an additional effort to increase attention on the different types of land use in the formulation of RBMP measures
  - to ensure a more integrated vision (RBMP vs. local master plans) on urban issues
  - to develop comparative studies with other EU countries.
References


Rodrigues C., Fidélis T., 2016. Dos planos de Gestão de bacia hidrográfica aos planos directores municipais – sinergias par a promover a sustentabilidade dos recursos hídricos. 13 CNA. Lisboa, Portugal


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We can use our scientific knowledge to improve and beautify the earth, or we can use it to ...poison the air, corrupt the waters, blacken the face of the country, and harass our souls with loud and discordant noises, [or]...we can use it to mitigate or abolish all these things

John Burroughs

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