

## LAND USE LAND COVER AND WATER RESOURCES MANAGEMENT: ASSESSING IMPACT ON DRINKING WATER

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### RESUMO

Water management is directly linked to land use and to effective territorial planning and management, performed taking into account land use change and related water pressures. Regulatory frameworks related to water and land use, at the national and European levels, have increased not only in number but also in complexity, namely when combined and applied to a specific subject or spatial area. It is therefore relevant to build an inside view on their effectiveness in addressing the prevention and reduction of water stress. This includes accounting land use changes in the last decades, understanding land use evolution, and establishing cause and effect relationships between this evolution and water stress. This task is crucial concerning land use transformations within relevant drinking water supply watersheds and is critical to address water management problems in an effective way. It further allows the establishment of a new strategy when integrated with technological innovations addressing a more efficient and financially balanced resources management. Water scarcity problems occur associated with less water quantity available for the intended use or linked to water quality decrease; the problems must be evaluated considering time and space. The relevance of the water scarcity problem is the highest, regarding drinking water supply. This is the most demanding use in terms of quality; quality decrease affects human health and life expectancy. Water quality induced stress is associated with pollution increase such as organic matter, nitrates and phosphates, often linked to human activities and land use. This work is the outcome of decades of research related to land use and land cover planning and water resources management efficiency, based on the Zêzere River, and mainly addressing the Castelo do Bode drinking water supply watershed. It is also the result of recent research developed within national and international projects (Forland, SmartOpenData, eEnvplus) and exploring CORINE and COS land cover datasets, combined with statistical datasets, integrated by location.

The relations between land use, land cover and water management efficiency are explored in detail within the Terágua and NitroPortugal projects from different perspectives, giving the most recent insights relating land use to the risk of water quality decline. Within NitroPortugal water stress is studied linked to those land use changes induced by agriculture, forestry, and livestock production; watershed pollution risk is evaluated using water sampling results. This example related to nitrogen surplus during the past decades, illustrates this relation and was built using the TerÁgua collaborative platform datasets. Under the project Terágua several other examples can be built illustrating the advantages of implementing and using a collaborative spatial data infrastructure. This platform is presented, being one of the most efficient ways to deal with effective land use change decisions and water stress prevention, inducing planning efficiency, monitoring and evaluation of each plan implementation on the fly. This collaborative platform also promotes the evaluation of each regulation, or even the consistency of combined regulations implementation. By using this platform it becomes evident, to users and decision makers, the need to readjust and optimize the regulatory framework, in order to achieve an effective preservation of resources.

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**Palavras-Chave:** Land cover, water; land use; planning; territory; information.