CERIS : Civil Engineering Research and Innovation for Sustainability

Information systems for groundwater management and governance modeling of cable structures: geometric regulation

Summary

This thesis aimed at making the characterization of water information systems and its role for groundwater management and governance. For that purpose, three research lines were developed 1) Governance in the context of groundwater and current status of groundwater management in some regions of Portugal, particularly in Alentejo and Algarve; 2) Characterization and assessment of a water information system for groundwater; 3) Integration and application of groundwater and transport model results as an information system for management and support decision making.

The two main water governance approaches in the context of groundwater were described and discussed, namely the OECD Water Governance programme and the Global Environment Facilities' Groundwater Governance project. A theoretical arrangement was developed by integrating groundwater governance deficiencies in the gap categories, and by integrating the groundwater governance principles in the OECD principles for water governance. A diagnosis of the governance provision and capacity status in Alentejo and Algarve regions was made, and results were further discussed considering the Global Environment Facilities's four main components of groundwater governance.

An evaluation of the groundwater component of the web-based data sharing water information system in Portugal, SNIRH, and its present status, was made, as well as a comparison to other national relevant water information systems carried out. SNIRH gaps and problems were identified, as well as its level of sophistication and possible development directions.

Furthermore, the effectiveness and performance of SNIRH was assessed, which resulted on the respecification of the updated DeLone and McLean IS Success model towards measuring web-based WIS success in the context of groundwater governance. This method allowed quantifying relationships among variables of the success dimensions of the model to identify areas needing improvement, and its relation to the users' satisfaction/use, as well as to net benefits of SNIRH.

In order to provide a baseline for the development of a decision support system and for the definition of more integrated information systems applied to groundwater management, a groundwater flow and transport models were developed for the case study of Aveiro Quaternary aquifer system.

Keywords

Groundwater management, governance, information system, decision support system, integrated data and information.

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