



A Decision Support System for the Environment: Application to Morocco

A. Mourhir^{1,*}, T. Rachidi¹, M. Karim²

¹*School of Sciences & Engineering, Al Akhawayn University in Ifrane, Morocco;* ²*Faculté des Sciences Université Dhar el Mehraz, Sidi Mohammed Ben Abdellah, Morocco*

Received February 04, 2013; Accepted February 07, 2014

Abstract: The present work describes the design, implementation, deployment, and results of a Decision Support System for the Environment named D2S4E, as a major response to the increasingly complex, and equally important management and assessment of the environment. D2S4E aims to assist national decision making spheres in both environmental and sustainable development matters by answering questions like: (1) what is the current state of the environment? (2) What would be the impact of a large scale industrial project on the environment? And (3) what should be the future paths of a set of target environmental or socioeconomic indicators, in order to sustain an acceptable future state of the environment? The assessments provided by D2S4E integrate both socioeconomic and ecological indicators in order to perform deep analysis of interactions environment-development. The D2S4E activities include (i) the definition of environmental and socioeconomic indicators, together with their metadata; (ii) data collection from data providers; (iii) expert knowledge acquisition and aggregation; and (iv) modeling, analysis and evaluation of environmental issues using an expert knowledge-based approach. The core database on indicators and environmental *thematics* implements the DPSIR (Driving force – Pressure – State – Impact and Response) model. The knowledge representation method used by D2S4E is based on Fuzzy Cognitive Maps, which brings together data and expert heuristics in an attempt to tackle decision making, planning and policy formulation. D2S4E further extends to disseminate information about environmental indicators through a Geographical Information System. In addition to describing the key features of the system, the data and knowledge models used; a use case for the air pollution *thematic* for a pilot Moroccan administrative region is also presented.

Keywords: *decision support, indicators, DPSIR, fuzzy cognitive maps, web GIS*

*Corresponding: E-Mail: A.Mourhir@oui.ma, Tel: +(212) 535 86 2144, Fax: +(212)535 86 2030