BOOK REVIEW

Transactional Environmental Support System Design:
Global Solutions

Reviewed by Sotiris Karetsos, Informatics Laboratory, Agricultural University of Athens, Athens, Greece

Transactional Environmental Support System Design: Global Solutions
Jason Papathanasiou, Basil Manos, Stratos Arampatzis and Robert Kenward (Eds.)
© 2013 by IGI Global
313 pp.
$180.00
ISBN: 978-146-6628-24-3

INTRODUCTION

The pollution and the degradation of the environment either because of agricultural malpractices (e.g. extensive use of chemicals and fertilizers) or elimination of significant environmental areas (e.g. forests, lakes and rivers) are obvious around us. Moreover, intensive use of the agricultural land, lead to the cultivation of few crop species across Europe. Among the most significant side effects of these human activities is the loss of biodiversity. The Transactional Environmental Support System (TESS) project has been a Pan-European collaboration and its objective was to design a transactional environmental Decision Support System (DSS) for conserving and restoring Europe's biodiversity. The complexity of the decision making process for environmental management is more than apparent. There is strong demand of information, several central and/or local levels of administration, various stakeholders involved. Moreover, not all decisions have equal impact in the management processes and environmental practices.

Organization of the Book

The purpose of the book entitled "*Transactional Environmental Support System Design: Global Solutions*" is to present the results of the TESS project. It is a well-structured and rich book that presents several surveys contacted in the context of the project. The analysis and discussion of the results are thorough, and even though the complexity is high, the authors of the 23 chapters clarify the information demands and flows. For the design of the system, advanced modeling

(e.g. Unified Modeling Language-UML) and information management techniques (e.g. Bayesian Belief Network - BBN) are utilized and ensure system's extensibility.

The book starts with an Introduction (chapter 1) by the editors. It is concise and provides the motivation for research by explaining the impact of agricultural and other malpractices on the environment. Loss of many flora and fauna species are among the side effects. They highlight on the issue of complexity of re-diversifying land as a major constraint but also as a challenge for the design of the TESS (pp. 2-3). Finally, they provide the framework of their tackle and contribution. Four questions (p. 5) summarize the challenge for the development of the TESS in specific as well as of Internet systems in general.

In chapter 2, the authors analyze governments' information needs for Environmental Impact Assessments (EIS) and Strategic Environmental Assessments (SEA) for biodiversity conservation and sustainable development (pp. 8-9). Then they provide a systematic review of the European Union (EU) policy and legislation on EIA and SEA. However, they go one step further and they discuss in details the impact of the implementation of the related directives at EU and national levels. EIA, SEA, Land Use Planning (LUP) and the Common Agricultural Policy (CAP) are put under consideration for biodiversity aspects. The importance of the above described approach is that through a thorough analysis, information flows and decision making requirements at central level derived as main inputs for the DSS (i.e. pp. 30-31).

The 3rd chapter, following the analysis presented in the previous, goes into details and focuses on local level. More specifically, the authors present results from nine case study areas located in eight countries. The work done at this level is very demanding since, as also the authors state, much of the information accessed "was not available in a digital format and was not regularly updated" (p. 33 & p. 51). The project partners estimated this lack and followed a well-documented approach presented in details in the "Methods for Survey and Analysis" section (p. 38). Several involved stakeholders with different information demands and different impact of their decisions. Without a doubt, the results are rich and significant. The information and data collected are properly presented, evaluated and compared and, finally, define supply and demand of environmental information.

The 4th chapter acts as an umbrella study on 2nd and 3rd. It examines, the variability of decisions made across different stakeholder groups and ties of local government. Then, the authors provide the models of information flows (pp. 63-67). Such models enable a detailed visualization of data exchange between local, regional and central information sources. The models show that decision-making within the environmental sector is a highly complex process that relies on highly variable patterns of data exchange between stakeholders and local, regional and central levels of government (e.g. Figure 4-7).

The 5th chapter presents a database of 198 DSS for a wide range of environmental targets. The project partners evaluated and discussed technical, modeling and information management aspects of these DSS. Furthermore, based on the findings of the previous chapters for information requirements and complexity for biodiversity management they spot on specific DSS from various fields. InVest, DSSAT, MicroLEIS, UBC-FM and NED-2 are some of those extensively discussed. These findings are considered for the DSS under design. Additionally, by this survey the authors provide a clear evidence of the gap that they fill with the TESS project.

In the 6th chapter, the authors present a survey used to examine which environmental protection and conservation systems are in use at the European level. The methodology of the survey is thorough and the appendix of this chapter (p. 109) provides a complete view of the resulting database of 65 variables across 31 countries.

Chapter 7 goes deeper in the analysis of the previous collected information and data. It is based on the fact noted by the authors that

"the variation in cultural history and governance processes across Europe provides a rich field for analysis of associations between social institutions and impacts on the environment" (p. 121). This analysis provides significant and comparable results that prove among others high variability between countries in some factors relevant to governance of environmental decisions. These results are finely depicted in the 14 figures of the chapter.

Chapter 8 examines the survey presented in chapter 6 in terms of comparison of trends in policies on land uses and economic activity, with trends in ecosystem services and biodiversity in cultivated areas as well as in protected areas. The meaningfulness of this study is the exploration of the relationships and correlations of capacity, priority and process variables with socio-economic and ecological impact variables.

The case studies part of the book starts with chapter nine. This chapter presents an overview of the nine case studies that took place during the TESS project, and afterwards, from chapter 10 to 19 each one of the case studies is presented in detail. In specific, the case studies took place in eight countries: Estonia (Ch. 10), Germany (Ch. 11), Greece (Ch. 12), Hungary (Ch. 13), Poland (Ch. 14), Portugal (Ch. 15), Romania (Ch. 16), Turkey (Ch. 17, 18), and United Kingdom (Ch. 19). All studies consisted of a socioeconomic project and a mapping project, except that there was mapping alone in Germany. Their quality (i.e. socioeconomic and mapping projects) is high and each one of the case studies presents special interest (e.g. bicyclists, walkers, flora and fauna, hunting, local associations). Table 1 of the chapter 9 (pp. 156-157) summarizes the work done in the areas under study.

Chapter 20 presents the most important part of the TESS project. The system design is based on the results presented in the previous chapters. More specifically, this chapter discusses the supply and demand of the information needed in the system. The analysis is thorough. The aspects that refer to the sources of information or the piece of information itself are analyzed in order to gain the maximum exploitation of

them in the system. The discussion leads to the "recommendations for the TESS decision model" (p. 228) which describes the BBN that the project partners adopted in order to explore ecosystem management options. For this BBN the authors note that "differing criteria may be used for optimization, including neural networks and fuzzy logic, and so they link well between environmental and societal models" (p. 228) which provides significant value to the system. The UML is used to design and to depict the functionalities of the system (i.e. fig.12, 13, 14). Moreover, in this chapter two surveys are presented (i.e. "Survey of Organizations" and "Survey of Individuals") that deepen in the knowledge regarding information retrieval. Additionally, the Naturalliance portal (www.naturalliance.eu) presenting best-practice examples resulted from these surveys.

Chapter 21 provides guidelines and recommendations derived from direct or indirect surveys in the context of TESS project. These recommendations vary from issues that concern SEA and EIA, to coordination of information and policy support among stakeholders as well as to those referring to the design and implementation of an effective environmental decision support system. Moreover, the intension to develop the decision support system as a Web tool ensures wide access.

Chapter 22 provides the assessment of the TESS project. The authors answer the evaluation questions; spot the drawbacks and the limitations. These finding are sufficiently presented in Table 5.

The last chapter (Ch. 23) summarizes and concludes the book. Also the authors provide some directions for future research and development for the TESS project.

SUMMARY

Recommended: Overall, this book presents the TESS project and provides an extended and thorough analysis for the design of the DSS targeted to environmental and land use management for biodiversity maintenance and

restoration. The primary and secondary results of the several studies contacted at various levels of administration are properly presented and discussed in the 23 chapters. The design of the DSS follows appropriate modeling techniques and information management processes. This book could be useful for figuring out the environmental administration in Europe, and also, how this information is interpreted and incorporated in a multifaceted DSS.

Sotiris Karetsos received his B.Sc. and an M.Sc. degree from the Agricultural University of Athens, an M.Sc. degree from National Technical University of Athens, and a Ph.D. from the Informatics Laboratory of the Agricultural University of Athens. His research focuses on advanced electronic services implemented mainly for the agricultural sector. Among the fields of interest are included electronic government, electronic commerce, Web services, semantic Web, decision support systems, portal technologies and mobile services. He has also participated in numerous research and development projects. He served as an assistant professor at the Technological Education Institute of Larissa and is associated with the Informatics Laboratory of the Agricultural University of Athens. He has published more than 40 scientific articles in journals, books and conferences in his field of expertise.