Chapter 3.6

Building Capacity for Better Water Decision Making through Internet-Based Decision Support Systems

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ABSTRACT

Decision making processes for developing water resources systems infrastructure and operational policies have ceased to be the exclusive domain of just a few, privileged persons making decisions. Now, more and more groups of the society at both the international and national levels are demanding opportunities to participate in decision making, as well as information about potential consequences of policy decisions. In some countries, public participation in the decision making process has been already sanctioned by law, for example through Environmental Impact Assessment (EIA), public permitting processes, and notice and comment rulemaking procedures. However, in many developing countries, public participation remains unfulfilled despite growing awareness and pressure exercised by various interest groups. To be effective, public participation – either active or passive (through access to knowledge and information concerning the decisions and their impact) – needs appropriate political and legal regulations, in addition to technical means to disseminate objective, complete, and comprehensive information about nature of the decisions to be made, potential alternatives, feasibility of solutions, impact of the potential decisions, etc. Among plethora of the available methods and means for providing the information to the broad circles of the society, the Internet already plays a special and powerful role. This chapter presents the concepts and notions underlying formal approaches to decision making processes, as well as providing a

review of the possibilities offered by the Internet to enable access to various sources and types of information that can directly or indirectly support the decision making processes in complex water resources systems.

INTRODUCTION

The creation of the Internet world-wide network of hundreds thousands of computers and computer networks has revolutionized the communications world like no other invention or technical development before. Earlier inventions of the telegraph, telephone, radio and computer allowed for gradual increase of communication capabilities, but the Internet offers an unprecedented integration of capabilities and provides the world-wide mechanism for information dissemination and a medium for collaboration and interaction between individuals, organizations and their computers without regard for the distance between them and their geographic location.

Simple Google search for the word "*Internet*" performed by one of the authors of this chapter on February 13, 2009 resulted in 2.050.000.000 hits, which shows how common and broadly the term "*Internet*" is used. The literature dealing with Internet underlying technology, design, and operational principles is vast and includes popularly written bestseller books (Gralla, 1999), concise Internet-published White Papers (Shuler, 2005) and comprehensive encyclopedia publications (Sheldon, 2001).

The range of Internet applications had grown since its beginnings enormously: from the initial effort to connect in 1969 four major computers at universities in the southwestern U.S. (Howe, 2009); through various initially user-unfriendly early deployments for computer experts, engineers, scientists and librarians; up to plethora of user-friendly and highly effective communication possibilities, business applications, educational programs, etc. used these days by millions of people around the globe. Such features of Internet as fast communication capabilities, access to data and various sources of information, effective mechanisms for exchange of information and its global availability provide scientists and analysts involved with the development and implementation of Decision Support Systems (DSS) in the field of water resources management with unique opportunities and capabilities to enhance the process of building DSS by taking advantage of technological and methodological advances associated with creation of Internet. Major merit of Internet is its ability to enable and facilitate fast and efficient access to and exchange of information (knowledge, facts, data, figures, statistics) used during decision making process and necessary to make any sound decisions.

Due to its role primarily as an efficient and broad information exchange platform, the Internet appears to be particularly suitable to provide various stakeholders involved in the management of natural resources in general and water resources in particular with the means to access, exchange and enhance the information base used during decision making processes. The complexity of phenomena taking place in the natural resources systems is enormous. The decision-making processes associated with the utilization of water resources are complex, requiring very thorough consideration and analysis due to highly sophisticated nature of interactions taking place between physical, chemical, economic and social factors influencing water resources. Therefore the needs for information necessary to manage the natural resources systems in responsible, sustainable and rational way can be described as unlimited, which in turn causes that timely and efficient access to various sorts and sources of information is of vital importance. In our considerations we will focus out attention on water resources management.

In very general terms water resources management is concerned with conceptualizing, designing and implementing strategies for delivering water of sufficient quality and quantity to meet social

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