SYSTEMIC APPROACH BASED COMPUTER SUPPORT IN RESOLUTION OF CONFLICTS IN WATER RESOURCES MANAGEMENT

K. D. W. NANDALAL

Department of Civil Engineering, Faculty of Engineering, University of Peradeniya, Peradeniya

Water is an important factor in conflicts among stakeholders at the local, regional, and international level. Water conflicts have taken many forms, but they almost always arise from the fact that the freshwater resources of the world are not partitioned to match the political borders, nor are they evenly distributed in space and time. Sharing a limited water resource by several stakeholders can create conflicts among them when their requirements exceed availability. In such situations, water allocation based on a traditional optimization or simulation modeling may not resolve the dispute among them due to the lack of their participation in the solution process. Direct involvement of the stakeholders in the conflict resolution process provides for a better understanding of the conflict and offers a significant opportunity for its resolution.

A systemic approach has been taken in this work to approach resolution of conflicts over water. By helping stakeholders to explore and resolve the underlying structural causes of conflict the approach offers a significant opportunity for its resolution. Five main functional activities for assisting the conflict resolution process are: (i) communication; (ii) problem formulation; (iii) data gathering and information generation; (iv) information sharing; and (v) evaluation of consequences. A computerized technical support is developed in the form of the Conflict Resolution Support System (CRSS) for implementation of a systemic approach to water conflicts. The CRSS includes computational modules necessary to resolve conflicts resulting from water shortages in irrigation, drinking water supply, hydropower generation and floods. Its principal components include an artificial intelligence-based communication system, a database management system, and a model base management system.