SANREM CRSP Southeast Asia

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Boerboom, L. "A Soft Systems Approach to Implicit Water Resources Conflicts in a Philippine Watershed: Stakeholder Analysis and Development of a Group Decision Support System for Land Use Optimization." University of Georgia, Athens, 1999.

Water resources conflicts are often implicit due to distance between stakeholders and the distributed nature of decision making. Physical distance and time separate downstream effects from upstream human activity. In addition, farmers and other interest groups manage upstream lands with different strategies. System state requirements of complex water systems, driven by purposeful activity, are difficult to define in advance and variable over time. Stakeholders constantly learn to adopt to a changing environment. Soft systems analysis, emphasizing learning inhuman related systems, provided a framework to analyze stakeholders and define design criteria for a group decision support system for land use optimization.

A 50,000 ha watershed case study of the Philippine island of Mindanao focused on sediment load as the water quality variable level of interest. A cognitive stakeholder analysis method, consensus-guided cluster analysis, was used to differentiate farmers with respect to crop selection and allocation, decisions which determine sediment load. This analysis, applied to ten crop selection and allocation issues, identified groups of similar decision-makers on individual issues. However, as decision-makers associated themselves with different groups on every issue, no overall grouping could be detected. Therefore, to select stakeholder representatives for participating in a group decision support system (GDSS), a filtering method was applied to find key-informants who represented the spectrum of decision maker ideas, instead of groups.

Furthermore, the Interdisciplinary Tool for Optimization of Productivity and erosion (ITOPE) was developed. ITOPE, a highly interactive GDSS game, facilitates cognitive qualitative input from players, allows each player to develop individual optimization problems at run time, and functions as a learning system. GDSS participants play watershed planning games in monthly time steps, negotiating among each other and with other stakeholders about their farm and watershed optimum profit, soil loss, and qualitative considerations associated with crop allocation decisions. An example illustrates player's negotiation by assessing on-farm trade-offs, trade-offs between players, and quantitative farm management practices. Allocation of decision making too the landscape is an important area of future research.

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