: Can DSS enhance sustainability efforts?

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Sustainability is the capacity to endure. Computerized decision support can potentially help managers and individuals make choices that are more likely to lead to sustainability. Also, data-driven DSS can help monitor sustainability efforts. Sustainability involves making many decisions over a long period of time. Potentially information and decision support technologies can help coordinate sustainability efforts.

Increasingly companies, organizations and individuals are making choices related to sustainability. Managers at Walmart "see sustainability as one of the most important opportunities for both the future of our business and the future of our world". The Walmart website is at URL http://walmartstores.com/sustainability/ .

The traditional definition of sustainability calls for policies and strategies that meet society's present needs without compromising the future, cf., URL http://www.epa.gov/sustainability/basicinfo.htm . Sustainability promotes "stewardship", "design with nature" and a focus on "carrying capacity". Quantitative models and computer software can help achieve these goals.

There are many indicators of sustainability that we can monitor in data-driven decision support systems, cf., URL http://www.sustainablemeasures.com/indicators. There are three categories of indicators: 1) measures related to the natural resource base, 2) measures related to economic and social activities, and 3) measures related to individual and community health and welfare. Monitoring sustainability by communities, states, countries or globally requires a multidimentional view of these categories of indicators. Monitoring sustainability efforts too narrowly can result in poor choices.

Many researchers have studied applying computerized decision support to sustainability questions. The following are some examples.

Schreider and Mostovaia (2001) discussed an integrated approach for designing multidisciplinary decision support systems (DSS) based on agricultural scenarios for sustainable catchment management. Problems concerning principles of
scenario formulation within the integrated approach are considered.

Manos, Papathanasiou, Bournaris and Voudouris (2010) report a decision support system (DSS) for sustainable development and environmental protection of agricultural regions. The purpose of the DSS is to "optimize the production plan of an agricultural region taking in account the available resources, the environmental parameters, and the vulnerability map of the region".

GPFARM: Great Plains Framework for Agricultural Resource Management is an ongoing DSS project. The project is conducted jointly by the Great Plains System Research Unit (GPSR), division of the U.S. Department of Agriculture and Colorado State University, Agricultural Economics Department. GPFARM is a simulation model computer application. The objective of GPFARM Decision Support System (DSS) project is to "develop a resource management decision support system (DSS) that is capable of simulating and analyzing 10-50 year farm/ranch production plans with respect to water, nutrient, and pest management along with their associated economic and environmental risks." For more details check http://www.ars.usda.gov/Business/docs.htm?docid=6345 .

There are challenges in using computerized decision support in sustainability efforts. Ekbia and Reynolds (2007) note "Decision support systems (DSS) have been extensively used in the management of natural resources for nearly two decades. However, practical difficulties with the application of DSS in real-world situations have become increasingly apparent." Bui notes the "use of computer-based decision support systems for sustainable development is a complex and delicate endeavor".

Perhaps improved computerized decision support will help us maintain global sustainability.

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