WATER RESOURCES OF THE RIO GRANDE - AN INTERDISCIPLINARY APPROACH

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The New Mexico Water Resources Research Institute has fostered interdisciplinary as well as interuniversity research from its inception. Multidisciplinary-interuniversity research has been made possible through the various agreements entered into by the Institute with federal agencies and with the University of New Mexico, the New Mexico Institute of Mining and Technology, and New Mexico State University. These types of research projects are extremely useful for two major reasons. First, a mix of highly qualified research personnel can be drawn to the project from these three New Mexico institutions of higher learning, and second, several aspects of a large and complex problem can be studied at one time with exchange of information and coordination of effort between the various investigators.

Examples of interdisciplinary-interuniversity projects are given here to indicate the range of subjects and the variety of disciplines involved. The primary purpose of the interdisciplinary-interuniversity research projects were:

1. To apply the newly developed techniques of several research disciplines in a coordinated and unified interuniversity project to the present and future management and allocation of water in New Mexico.

2. To establish a set of alternative goals and to develop and analyze alternative designs which may be used to achieve these alternative goals.
3. To determine the water use pattern which would evolve as a result of the selection of alternative goals.

Shortly after the Institute officially started in 1966, the Water Resources Research Institute sponsored a "brainstorming" session to discuss the possibilities of a Pecos Basin project. It was expected that possibly 40 interested persons might wish to attend. There were 71 participants from the three university units, together with private individuals and state and federal agency personnel. There was a brisk, sincere discussion which resulted in a project proposal entitled "A Comprehensive Water Resources Analysis of a Typical Overdrawn Basin in an Irrigated Semi-Arid Area: Pecos River Basin, New Mexico." Investigators, representing seven departments from the three universities, were as follows: Willis Ellis, Law, and Ralph D'Arge and Nathaniel Wollman, Economics, University of New Mexico; C. E. Jacob, Hydrology, and W. K. Summers, Geology, New Mexico Institute of Mining and Technology; and from New Mexico State University, John W. Hernandez, Civil Engineering; Harold Dregne, Agronomy; Robert Lansford, Agricultural Economics; and H. R. Stucky, Institute Director and Coordinator of the entire project.

The result of this "brainstorming" session was the organization of the first interdisciplinary-interuniversity project, Project

3109-102, a comprehensive study of the entire Pecos River Basin in New Mexico.

Following the completion of the Pecos River Basin Study, a group of potential investigators got together to discuss the possibility of an interdisciplinary-interuniversity study of the Rio Grande in New Mexico. The outgrowth of these meetings was the funding of a matching grant from OWRT entitled, "An Analytical Interdisciplinary Evaluation of the Utilization of the Water Resources of the Rio Grande in New Mexico." The investigators represented seven disciplines: civil engineering, industrial engineering, hydrology, architecture, law, sociology, and economics; and three universities were represented: University of New Mexico, New Mexico State University, and New Mexico Institute of Mining and Technology.

The primary objective of this study was to develop methodology and criteria which might make a major contribution to the efficient allocation, management, and consumptive use of the water supply of the Rio Grande in New Mexico and to similar arid areas of the United States and the world.

Because of the interest in and results from the above study OWRT funded one of the first regional matching grants in the nation for an interdisciplinary, comprehensive water resources analysis of the Rio Grande from Elephant Butte to Fort Quittman, Texas. The Universities involved were Texas A&M University, the University of New Mexico, and New Mexico State University.

Because of the interest generated by Los Alamos Scientific Laboratory personnel at a previous Water Conference a large group of university faculty members from the University of New Mexico, New Mexico Tech, and New Mexico State University prepared and submitted a proposal to the Board of Educational Finance through the Water Resources Research Institute to study the feasibility for the establishment of an energy-water complex in the Tularosa Basin. This study was among the first funded from the enactment of monies for research from severance tax revenues on energy resources in New Mexico.

The primary objective of this study was to prepare a preliminary evaluation of the economic feasibility for a proposed nuclear desalting complex in the Tularosa Basin of New Mexico producing 2,000 megawatts of electricity and desalting a half-million acre-feet of saline groundwater.

A more recent study funded by the Environmental Protection Agency through the Water Institute was entitled, "Demonstration of Irrigation Return Flow Salinity Control in the Upper Rio Grande." Its primary objective was to show the feasibility of alternative water management practices on the quality of drainage return flow and soil salinity in the Upper Rio Grande Basin and to test a hydro-salinity model.

This interdisciplinary study involved the use of monitoring an actual farm that many of you visited during the Water Conference a couple of years ago.

What made these large interdisciplinary studies successful? I feel two things were very important in making them successful. The first was that most of the projects described above had an advisory committee composed of state and federal agencies who met with the research staff on various technical and policy questions. The assistance from the advisory committee was very helpful. In addition, communication developed between researchers at the universities and the state and federal agencies. Appreciation and respect developed for each other's problems and possible solutions.

The second factor contributing to their success was research meetings with colleagues from other universities and disciplines which started a dialogue. It is very difficult sometimes to carry on a discussion because of the specialized jargon used by each discipline and different meanings associated with technical terms. I feel that through these interdisciplinary research projects barriers were broken and meaningful research has been carried out.