Irrigation Rehab: A computer aided learning tool for system rehabilitation

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Abstract. Irrigation Rehab is intended to produce an understanding of irrigation system rehabilitation by simulating the many tasks and problems likely to be encountered during a rehabilitation effort. Using the Rehab software and the accompanying slide set, participants are challenged to formulate a rehabilitation plan considering changes that have occurred in a community since its irrigation system was constructed. African and Asian versions are available.

Introduction

The achievement of improved management and more efficient operation of irrigation schemes is a major issue facing all funding agencies. Rehabilitation in particular is viewed as a cost-effective means to improve and sustain agricultural productivity and rural well-being. As the number of older schemes requiring rehabilitation increases, planners must ask how best to accomplish this task.

Until recently rehabilitation was considered to be the domain of the civil engineer because it was equated with restoration (preferably according to the original blueprints, if available). Yet the act of rehabilitation is clearly different from the initial creation of a system (Levine 1987). First, factors that determine the system design are usually not fully clear when the system is first created. Second, it is unlikely that the human-land-water environment will remain unchanged through time. Thus, design assumptions or operational considerations that are initially correct may not remain valid 25, 35, or 50 years later. The human experience accumulated over years of system operation should also be incorporated into every rehabilitation activity.

The design and completion of a system rehabilitation requires close cooperation among engineers, agronomists, farmers, social scientists and economists.
However, because design team members pursue strategies that minimize the risk of individual failure, cooperative efforts are difficult to coordinate. Games such as these help team members to practice coordinated work without personal risk.

Keller (1980) separates irrigation design into three phases: creation in which an overall plan is formulated; technical in which details are worked out by a technician; and finally actual construction. Games such as Rehab can aid in teaching how to approach the creative phase. The technical phase is purposefully deemphasized to discourage cookbook solution. Only general data are given and are not sufficient to allow detailed design. Therefore, there is no single correct answer or solution to Rehab problems because in reality there is no perfect rehabilitation plan.

Using games to teach water management is not a new concept. Carruthers (1981) was the first to develop an irrigation game called River Wadu Irrigation Project Planning Exercise. This game draws together theoretical and practical aspects of project identification, planning, and appraisal methodology. Another successful game is that developed by Burton. The objective of the game is to teach managers about crop water requirements and the problems of allocation among the head, middle, and tail sections of a scheme. These and other games, such as the Juba Sugar Estate Game, the Sarala Simulation, the Sukkar Barrage, and the Computer Aided Management and Simulation of Irrigation Systems are described by Smith (1986) in the ODI-IMMI Irrigation Management Network publication.

Objectives

The Irrigation Rehab game was developed with the overall objective of providing a non-threatening environment in which engineers, social scientists, planners, and others can practice developing rehabilitation plans for a hypothetical irrigation system. Specifically Rehab

- promotes understanding about the interaction among various disciplines in the procurement and use of planning data;
- teaches design skills under the conditions of limited and non-precise design data;
- aids game-players in recognizing that farmers, engineers, and management personnel need to pool their expertise to arrive at a satisfactory plan in an evolving irrigation project.

History and development of Rehab

Rehab was originally created in June 1981 by Cornell University consultants and their Agrarian Research and Training Institute colleagues as a special