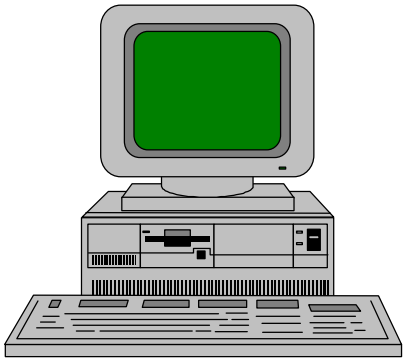
Scheme irrigation management information system: SIMIS

The importance of relevant and opportune information in decision making cannot be overemphasized. Managing irrigation systems is no exception to the rule. On the contrary, information is vital since daily decisions with regard to water deliveries and other aspects may affect the well-being of many farmers. Traditionally, managers of irrigation systems have tried to cope with this problem through the compilation of field information that was manually processed. Unfortunately, the number of users in a medium-size irrigation system runs in the order of thousands and manual processing of information becomes a lengthy and costly exercise. As a consequence, relevant information is often not available on time or is incomplete and many *ad hoc* decisions have to be made.

The generalized use of personal computers with high processing speed and large storage facilities is introducing a revolution in the processing and storage of information. This phenomenon is not restricted to industrialized countries; developing nations are moving very fast in equipping themselves with computer hardware. However, the development of software for improved management of irrigation systems has been moving very slowly compared to other sectors. One reason for this state of affairs may be that the problems of irrigation systems are very site-specific and diverse; other reasons may include the relatively small size of the market, or the complexity of the water distribution systems. Whatever the reasons, the fact remains that existing software is limited and no one addresses all the needs of an irrigation system in an integral manner.

From the above considerations, the Water Resources, Development and Management Service decided to develop a set of programs that will facilitate the management tasks of irrigation systems. Such a set should not be limited to water aspects but to all the major issues of day-to-day management activities and include also accounting, crop production, control of maintenance, water fees and other relevant tasks. A first version of the software was completed at the end of 1993 but field testing indicated several limitations. A new version (2.0) has been developed and is now being tested in several countries.



A brief description of SIMIS

SIMIS has 19 different and independent programs that have been called "modules". They have been grouped into five areas of work, which are: Projects, Project Data, Management, Set up and Quick Input which are accessed through the main menu. A brief description of them follows.

Projects

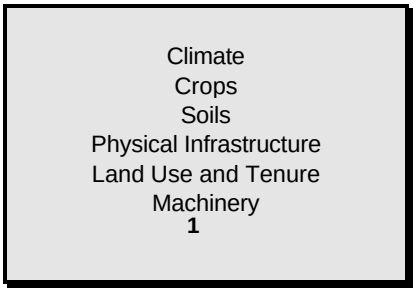
The first module is addressed to identify the characteristics of the project where all the subsequent information will be stored. SIMIS

can store information for one or several projects as needed. This is a useful feature for large projects which can be subdivided into smaller units and corresponding information entered separately so that information can be processed faster and more clearly.

All data entries are made through a *Database Manager* which allows an ample manipulation of the data.

Project data

The following six modules are utilized to store the "basic" data of the irrigation system such as:



The *Physical Infrastructure* includes a complete inventory of the following infrastructures:

The data on the irrigation network must be entered with great care as it is the basis for the calculations related to water distribution. The system provides an elaborated tree of how all the hydraulic elements are connected up to farm level.

Management

This information is shared by another seven modules that are management tools covering the main aspects of managing an irrigation system and they include:

Crop water requirements:

This module calculates the crop water requirements for all the crops selected and for all the decades during which the planting is possible. It calculates all the net irrigation requirements and provides indicatives, irrigation intervals and amount of water to be applied.

Irrigation planning:

This module permits to assess how supply and demand will match. For this purpose potential cropping patterns are entered into the system and compared with the available supply under different hypothesis (a wet, average and dry year). The calculations will indicate on a monthly basis the surplus or deficit with respect to the available water. The cropping pattern can be easily modified as well as the areas to be grown under each crop so that different alternatives can be analysed.

Agricultural activities:

This provides information on the land occupation by the different crops grown as well as the returns obtained at the system and farm levels. Inputs on planting dates of crops in any given plot of the irrigation system, unit crop prices and unit production costs should be given.

Irrigation scheduling

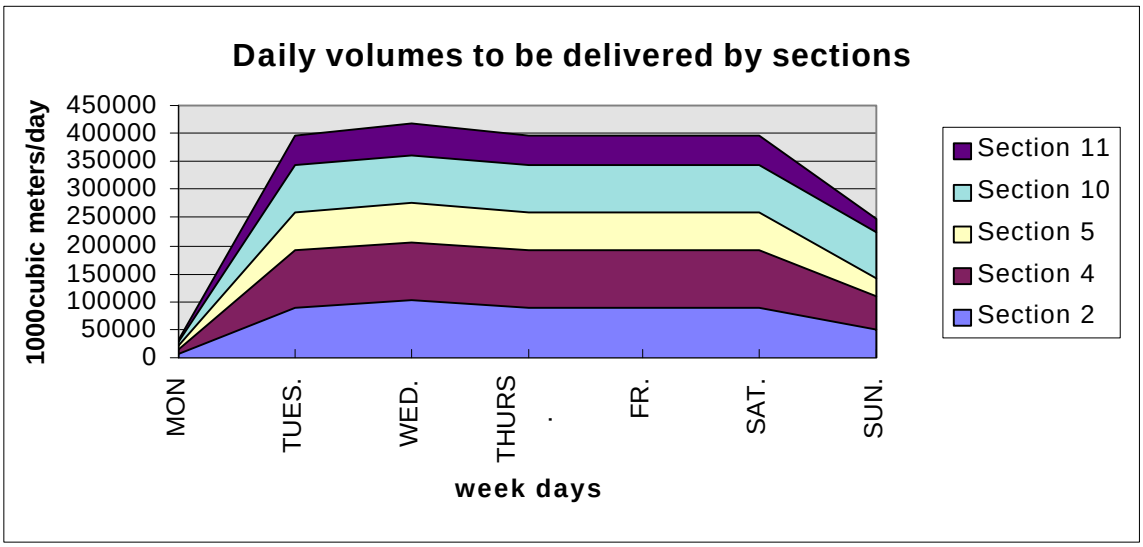
This is one of the most important modules of SIMIS. It permits simulation of the distribution scheduled under three different methods of water distribution namely: proportional supply, fixed rotation, and semi demand. The calculation can be made for periods of given duration The system provides three types of outputs: the first one is the opening and closing time of farm gates with relative flows, the second one gives similar information for section and sectors and the last one gives a summary table with the flows and their duration at any point of the irrigation network.

Water consumption:

This is a simple module that permits recording of how much water has been actually delivered to each farm. If the water is billed by cubic meter it permits the calculation of the corresponding bills

Accounting/O&M activities:

By recording all the financial activities of the system this module determines how much has been spent on any activity for the period in consideration (weekly, monthly, etc.). It also can control the where, by who and machinery used in maintenance work.



Water fees

This module determines how much every user will have to pay according to the parameters adopted and entered by the manager of the system. It will print the bills for every farmer according to a pre-set form. It also keeps a record of the payments and debts of every user.

Set-up

The last four modules are for setting the work environment and include: output setting, password, reindexing and reconfiguration of files when required.

Output Setting
Passwords
Reindexing
Reconfiguration

Quick input

This is an option for advanced users. It permits entering information directly in the database without going though the entry screens. This method is fast but entries are not verified for consistency .

Testing and verification of SIMIS

During 1995/96 testing of the new version 2.0 of the program will be completed and it is expected that by the end of the year a wide distribution will be possible.

Availability of SIMIS

For the time being, the program is only distributed to a few institutions under restricted conditions which include the sponsoring of a training course for interested professionals and testing and verification of the system in a pilot area. The system is being tested in Thailand, Egypt, Jamaica and Mexico.

Main features of SIMIS

Adaptability:

The program has been developed in DBase IV to facilitate the transfer of information already collected in this Database system and others that are compatible with it. However SIMIS is a DOS application that cannot be run under Windows.

Modularity:

The Project Management modules are independent - although they share the same basic information - and therefore concerned staff may opt to use the modules that are relevant to them leaving aside those that are not of direct interest. In case of need, new modules can be added to deal with a specific local application.

Simplicity of use:

Users do not need to know database systems. SIMIS operates on the basis of menus and descriptive screens for the entry of data.

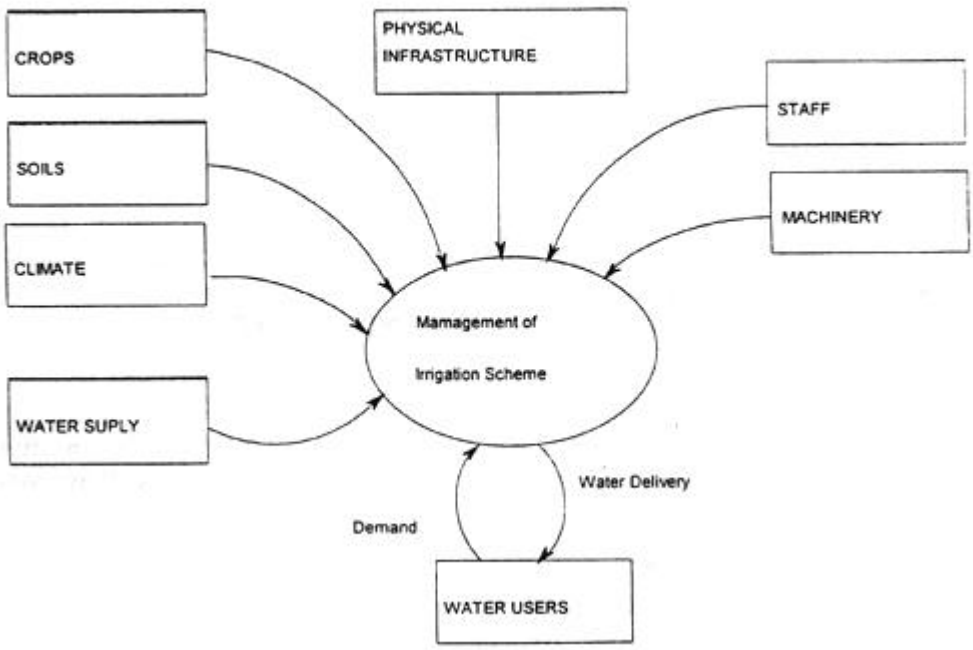
Multilingual:

The texts of the program are stored in separate databases permitting their translation with only minor changes in the program. At present the English and Spanish versions are available and the French will be added in the course of the present biennium.

Data safety:
Accidental or intentional loss of valuable data can represent heavy economic damage and loss of confidence in the system. To minimize this problem SIMIS permits the access of authorized users through a system of passwords with different degrees of access to the information.

System requirements:
SIMIS installation requires 12 Mbytes of the hard disk and to run the applications it is convenient to have another 10 Mbytes free. A 386 PC running at 25 or 33 MHz is the minimum configuration required. A mini-mum of 580 Kbytes of free conventional memory are needed to run the system.

SIMIS Context Diagram



For additional information, contact:
Chief, Water Resources, Development and Management Service
FAO/AGLW
Viale delle Terme di Caracalla
00100 Rome, Italy
Tel: 6-52254702, Fax: 6-52256275
E-mail: Land-and-water@fao.org
http:/www.fao.org/waicent/faoinfo/agricult/AGL/aglhomep.htm
Or FAO Regional or Sub-regional Offices