IRRIGATION DISTRICT DATABASE ANALYSIS
CAMERON COUNTY IRRIGATION DISTRICT NO.2

Rio Grande Basin Initiative
Irrigation Technology Center
Texas Water Resources Institute
Texas AgriLife Extension Service
Irrigation District Database Analysis

A report prepared for

Cameron County Irrigation District No. 2

November 22, 2002

by

David Flahive and Guy Fipps, P.E.

---

1A portion of this study was funded by Texas Cooperative Extension through the Rio Grande Basin Initiative administered by the Texas Water Resources Institute of the Texas A&M University System with funds provided through a grant from Cooperative State Research, Education, and Extension Service, U.S. Department of Agriculture, under Agreement No. 2001-001-45049-01149.

2System Analyst, and Professor and Extension Agricultural Engineer, respectively, Biological and Agricultural Engineering Department, Texas A&M University, College Station, Texas 77843-2117.
Irrigation District Database Analysis  
Cameron County Irrigation District No. 2

Problem

The district’s existing database and water ordering process have no method to relate irrigation water orders to individual fields.

Causes

Water orders are placed by name, account number and block number. When using the “Water Ticket” data entry form (see Chart 1), once a water account is selected, a list of available blocks and subdivisions are shown for that account. With this information, the canal rider can deliver the water to the correct canal and block.

![Chart 1: Water Ticket Software](image)

Each water ticket includes name, account, subdivision, and block, but no field ID.

However, a block may have more than one field. Thus it is impossible to relate the water order to an individual field. Chart 2 and 3 illustrate this in more detail. Chart 2 shows the Water Ticket Database Table. There is no column for the field identification.

Chart 3 shows the Property Database Table. Highlighted is account 1045 which has two fields in block 122. The PID (field ID) in this table does not appear in the Water Ticket Database Table; thus there is no way to tie the water order to an individual field.

This same problem is also illustrated in Charts 4 and 5 which show blocks with more than one field. Charts 6 and 7 illustrate how when water is only related to an account number, it is impossible to know which field is receiving the water.
Chart 2: Water Ticket Database Table

Using the ticket number we can find the account number and block to which the water was delivered. We cannot determine which field was irrigated from the database due to the lack of a field ID.

Chart 3: Property Database Table

Here we see the property table of the database. A field ID (PID) has been implemented here; however it is not fully useful. There is no way to cross reference the field ID to the water ticket, because one account can own several fields in the same block.
Chart 4: 
Block ordering
(current system)

Water is delivered to the correct block, but which field receives the water? In this case there are four fields located in this single forty acre block.

Chart 5: 
Field ID ordering
(proposed solution)

Water is delivered to the correct field ID. There is no question as to where the water went.
This diagram shows several highly watered areas on this map. With the current database structure, there is no way to determine why these blocks are using so much water without physically going to the location.

Using field ID’s, we can quickly identify the highly watered areas by field, and can then check that field to see if there is an over-watering issue.

Ordering water with the Field ID simplifies the identification of problem areas; thus, problems can be pinpointed rather than generalized. Water can be ordered directly by field ID or ordered by field map, once an accurate map has been created using GIS.
Recommendations

Accounting methods should be changed to identify individual fields receiving water. Water orders should be placed by field ID making it easier to monitor water usage.

What is required to move to a field ID system? Complete a map of water account boundaries [i.e., fields]. Develop a field ID system to link individual fields to water accounts. Note: the district has already begun work on both.

A disadvantage of implementing the field ID ordering system is that it does not allow for backwards compatibility. The district’s historic records will not be useable by the new system. It is recommended that the district implement the new system on the turn of the fiscal year, due to the compatibility issues.

Future Considerations

Implementing the field ID ordering and accounting system and completion of the GIS of the district (see Chart 8 above) will give the district additional capabilities. For example, rowers could order water by simply clicking on the correct field either on a computer at the district office or on the internet.

We are currently developing a prototype GIS/accounting system for use in irrigation districts. Once completed, we will demonstrate its capabilities and provide training to district personnel on its use.