Information management system for Jiamakou Irrigation Scheme - A Case Study in China

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Outline
1. Introduction of Jiamakou Irrigation Scheme
2. Needs for information management system
3. Functions of information management system
4. Methods for establishing information management system
5. Results
6. Experiences

Project Location

Jiamakou Irrigation Scheme

Location of Jiamakou Irrigation Scheme

The system is located in Jiamakou Village on the east bank of the northern course of Yellow River in Yuncheng City, Shanxi Province, 280km east from the famous ancient city Xi’an.
Physical Context

• The Jiamakou Irrigation Scheme - 1,610 sq.km. designed to irrigate 35,000 ha, and will be extended to 60,000 ha.
• Elevation ranges from 360 to 450 m. Semi-arid area, with an annual average rainfall between 490 and 620 mm.
• Within the irrigated area, surface water resources are very limited, the depth of groundwater is 160~200 m.

Scheme Layout

• Six main (with submain) canals with a total length of 86.3 km, 42 branch canals with a total length of 234.7 km, 2,511 tertiary canals, with a total length of 1,370 km and 4,940 hydraulic structures.
• The scheme is solely for agricultural purposes and benefits 250,000 farmers.
• Cropping pattern shifting from wheat, cotton and cereal crops to fruit trees (apple, pear, and grape......)
Modern irrigation management in the Chinese context

➢ FAO     ICID
➢ With the requirements of the Chinese socialist market economy system, which has sought to pursue people-oriented, comprehensive and harmonious sustainable development, the JIS sought to gradually adjust and improve the irrigation modernization.

Management Objectives

by reaching a good balance among the economic, social and environment benefits and thus better respond to the multiple requirements of farmers, systems and government.

The “three win” goal

Needs for information management system

➢ The JIS serves 250,000 farmers, covering nine towns in two counties (cities) and an irrigated area of 35,530 ha with a mission to do so with punctual and optimal efficiency.
➢ The traditional management practices could not be adapted to satisfy the rigours of the modern demand and the scheme’s goals.

Water: a resource and a commodity

Water resource is limited     Irrigating water is a particular goods
Management approach: Water-entity management

Irrigation business chain

Water-production management

The “three flows” in supplying water
- The commodity (water) flow
- The capital (water fee) flow
- The information (water information) flow

Service Oriented Management [SOM] = 3 basic flows
- WATER - INFORMATION – MONEY

Functions of information management system
- To process massive data
- To increase transparency, ensure equity, prevent corruption and improve irrigation services to farmers
- To provide the basis for scientific decision making
### Massive data processing

#### Daily data collection

<table>
<thead>
<tr>
<th>Item</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pumping Stations</td>
<td>3,860</td>
</tr>
<tr>
<td>Water measuring stations</td>
<td>165</td>
</tr>
<tr>
<td>Main canals</td>
<td>842</td>
</tr>
<tr>
<td>Branch and tertiary canals</td>
<td>1,421</td>
</tr>
<tr>
<td>Farmers</td>
<td>25,313</td>
</tr>
<tr>
<td>Total</td>
<td>31,661</td>
</tr>
<tr>
<td>Yearly data collection (130 operation days)</td>
<td>4,115,930</td>
</tr>
</tbody>
</table>

### Macro management

65km from east to west and 35km from south to north
Covering 2 counties with 207 villages

### Water measurement and its information publicity

- Current meter
- Parshall flume
- Ultrasonic flow meter
- Cutthroat flume

### Sunshine Project

Publicizing crucial water information
- water volume
- water pricing
- water fee

Information inquiry through telephone or touchscreen
System monitoring and decision-making

Through weather forecasting and soil moisture content measurement, the irrigation scheduling for different crops are explored to guide farmers to irrigate appropriately in order to maximize the irrigation benefits.

Components of Information Management System

Main communication network unit

To connect all the points within the irrigated area through wireless microwave and optical fibre for data and audio transmission and video monitoring.

Irrigation management unit

It involves all the links in the whole water-flow process and water-distribution service.
Water levels monitoring at main and branch canals

Pumping station monitoring unit

➢ Remote adjustment
➢ Remote measurement
➢ Remote control

Water-fee collection unit

➢ Printing a water-fee receipt and providing relevant reports
➢ To know the status of the water-fee collection at any time

Farm household management unit

➢ Basic information for each water consumer, such as their planting area, cropping pattern and the amount of water used historically;
➢ Water-fee inquiries via telephone or internet communication
Results

In May 2006, FAO conducted a five-day assessment of the irrigated area and made the following appraisal: “The overall irrigation benefits, water use efficiency and irrigation water productivity are all higher compared with other irrigated areas with the same conditions and lead the way in China and the Asia–Pacific region.”
Conclusions and Discussions

✓ Informatization must be centered around the irrigation management goal

✓ Informatization construction should be adapted to local conditions. It is a gradual process and should pay attention to investment and benefit

✓ Information system must be combined with the results of irrigation experiments, and then compared with the actual water use to have a reasonable evaluation of irrigation performance

Conclusions and Discussions

✓ Capacity building: to accelerate the training of information personnel and to create an environment that attracts talents

✓ Informatization should be combined with automation to further improve the irrigation management performance.

Thanks for your attention!