Management and Issues of Irrigation Networks in Iran

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Present situation:

Population:	$68*10^6$
Renewable water resources:	$130*10^9$ m^3
	1900 m^3 per capita
Water currently in use:	$89.5*10^9$ m^3
Based on current criteria:	Iran is in “severe crisis”

Distribution of water between different sectors

Agriculture:	88%
Household:	9%
Environment:	2.6%
Industry:	0.4%

Agricultural lands downstream of main irrigation canals:

Active:	$1601*10^3$ ha
Under study and construction:	$2342*10^3$ ha

There are 3 ways to increase food production:

1. Improve water use efficiency
    - yield per water consumed
2. Reduce water quality degradation
3. Reduce return flows into saline sinks

Let us focus on the first topic.

Major Management and Institutional Problems in Iran's Irrigation Networks:

1. Economic, social, and cultural issues
2. Standards and guidelines shortcomings
3. Problems and difficulties with modern techniques
4. Problems with efficient performance assessment of networks
5. Problems with network management on a national scale
6. Problems with operation and maintenance of the network

Economic, social, and cultural issues:

1. Poor cooperation with users
2. Incorrect pricing
    - agricultural inputs and products, water fees
3. Poor organization for rehabilitation projects
4. Disregard for proper crop yields
5. Poor extension training
6. Cultural and traditional issues
7. Inflexible water allocation system

Standards and guidelines shortcomings:

1. Lack of cohesion and cooperation between different institutions
2. Poor guidelines for consultant and contractor selection
3. Inefficient guidelines for network rehabilitation
4. Poor repair and maintenance guidelines
5. Poor operational guidelines

Problems and difficulties with using modern techniques:

1. Problems with data handling
2. Poor use of advance data processing
3. Problems with using advanced methods in irrigation
4. Problems with network automation
5. Unsuitable cropping pattern
6. Environmental issues

Problems with efficient network performance assessment::

1. Poor definitions of criteria and standards
2. Poor network performance at the operational phase
3. Problems with suitable instrumentations

Problems on network management at the national scale:

1. No coordination in the design of the dam and the network
2. Disregard of gradual operation procedures and fund recovery
3. Disregard of integrated water supply and resources in the watershed
4. Poor and inefficient user association

Problems with the operation and maintenance of the network::

1. Operational problems
2. Problems with repair and maintenance
3. Problems with integrated surface-groundwater resources

What do we must do?

1. Improve economic, social, and cultural situations
2. Establish suitable standards and guidelines
3. Utilize modern techniques (on-demand operation, …)
4. Establish efficient performance criteria
5. Implement widespread programming for network management at the national level
6. Facilitate optimal operation and maintenance of the network

Appendixes

Economical, social, and cultural issues:

Poor user cooperation

- Problems with legal issues
- Problems with ownership issues
- Unclear concept of profitability
- Shortcomings on the framework of cooperation
- Poor monetary strength and difficulties with lending
- Poor timely governmental support and changes in monetary disciplines

Economical, social, and cultural issues:

Incorrect pricing (agricultural inputs and products, water fee)

- Legal shortcomings on water fee computation
- Disparity between water fees and water productivity
- Inefficiency of price guarantees
- Market price instability
- Dependency on climate (temporal and spatial domain)

Economical, social, and cultural issues:

Poor organization of rehabilitation

- Lack of acceptance by farmers
  - low monetary strength
  - shortcoming in cooperative extension and training efforts
- Land ownership issues
- Sparse land configuration and sparse farming

Economical, social, and cultural issues:

Disregard for proper crop yield

- Poor crop pattern studies
- Lack of willingness to follow recommended cropping patterns

Economical, social, and cultural issues:

Poor extension and training

- Lack of diversity in research, extension, and operation phases
- Poor use of scientific methods for extension efforts
- Lack of acceptance and use of extension and training programs
- Poor extension programs
- Lack of willingness to use field pilots

Economical, social, and cultural issues:

Cultural and traditional issues

- Disregard for traditional farming techniques
- Disregard of traditional heritage for site selection
- Disregard of local cultural habits
    - on user association
    - on performance evaluation
    - on operation and maintenance
    - on design and operation
    - on ownership
- Poor definitions of the cooperative extension concept
- Diversity of nationalities and religions

Economical, social, and cultural issues:

Inflexible water allocation system

- Disregard for traditional water rights
- Disregard of environmental water needs
- Rigidity in water allocation between wet and dry years
- Poor structures
  - on skilled personnel
  - on suitable structures

Shortcomings in standards and guidelines:

Lack of harmony between different institutions

- Problems with fixing boundaries
- Technical specifications
- Interpretations of guidelines

Shortcomings in standards and guidelines:

Poor guidelines for consultant and contractor selection

- Inefficiencies in guidelines
- Problem of bureaucracy in interpretation of guidelines
- Disregard for international experiences

Shortcomings in standards and guidelines:

Inefficient guidelines for networks rehabilitation

- Poor recognition of shortcomings
  - lack of guidelines
  - disregard of climate situations
  - geotechnique and soil mechanics difficulties
- Poor definition of rehabilitation methods
- Poor design and construction

Shortcomings in standards and guidelines:

Poor repair and maintenance guidelines

- Periodic services
- Canal lining
- Access roads
- Regulatory structures
- Distribution structures
- Conveyance structures
- Dredging
- Repair of construction and materials

Shortcomings in standards and guidelines:

Poor operational guidelines

- Water distribution
- Water regulation and delivery
- Integrated operation

Problems and difficulties with using modern techniques:

Problems with data handling

- Inefficient cooperation between institutions
- Outdated maps
- Inefficiencies in data processing
- Insufficient data
  - water resources
  - soil

Problems and difficulties with using modern techniques:

Poor use of advanced data processing

- GIS
- RS
- IT
- Project control methods

Problems and difficulties with using modern techniques:

Problems with using advanced irrigation methods

- Design problems
- Disregard of local conditions
- Problems with construction and operation
- Problems with equipment

Problems and difficulties with using modern techniques:

Problems with network automation

- Automated structures
- Unsuitable structures
- Problems with electrical supply
- Problems with technical support
- Problems with technical training

Problems and difficulties with using modern techniques:

Unsuitable cropping patterns

- Economic problem
- Cultural and social problems
- Poor farmer's knowledge
- Poor timing and frequency of available water
- Poor land partitioning
- Problems with crop rotation

Problems and difficulties with using modern techniques:

Environmental issues

- Soil pollution problems
- Disturbances to downstream water rights

Problems with efficient network performance assessment:

Poor definition of criteria and standards

- Lack of review of the criteria and standards by responsible institutions
- Incompatibility of criteria and standards by local institutions
- Poor definitions of suitable criteria
- Poor quantitative criteria
- Cultural and social problems

Problems with efficient network performance assessment:

Network performance at operational phase

- Environmental performance of network
- Problems with cooperation between different institutions
- Cultural and social problems
- Poor establishment of criteria
- Poor monitoring and instrumentation
- Insufficient skilled personnel

Problems with efficient network performance assessment:

Problem with suitable instrumentation

- Insufficient piezometers and observational wells
- Poor monitoring guidelines
- Insufficient quantitative and qualitative measuring instruments

Problems of network management at the national level:

Lack of coordination in the design of the dam and the network

- No harmony between relevant institutions
- Disregard for the secondary network at the beginning
- Monetary restrictions

Problems of network management at the national level:

Disregard for gradual operation and fund recovery

- Operational phase postponed until construction is completed
- Disregard of the project time schedule
- Disregard of prior construction experiences

Problems of network management at the national level:

Disregard for integrated water supply and resources in the watershed

- Water resource management issues
  - integrated surface-underground resources
  - sustainable water balance
  - intra-basin water transport
  - environmental and effluent issues
- Water consumption management issues
  - water rights
  - volumetric delivery of water
  - national water council issues

Problems of network management at the national level:

Poor and inefficient user association

- Problems with soil and water resources
- Legal problems
- Institutional and legal problems of operational agencies
- Inefficient laws and circular letters
- Poor management of secondary institution
- Lack of guidelines for the management of pressurized irrigation systems

Problems with the operation and maintenance of the network:

Operational problems

- Problems with the regulation and distribution of water
- Problems with water delivery
- Problems with water measurement
  - insufficient, unsuitable, and old structures
- Leakage and overflow from canals, gates, and structures
- Monetary problems
- Problems with collection of water fees

Problems with the operation and maintenance of the network:

Operational problems

- Problems with sedimentation
- Poor training and education of farmers
- Ineffective operation
- Poor irrigation system management

Problems with the operation and maintenance of the network:

Problems with repair and maintenance

- Monetary problems
- Dredging and cleaning problems
  - weeds
  - sediment
  - garbage
- Institutional problems with responsibility for repair and maintenance
- Poor maintenance guidelines
- Problems due to poor design and construction
- Poor training
- Destruction and violation of network boundaries

Problems with the operation and maintenance of the network:

Problems with integrated surface-groundwater resources

- Insufficient guidelines
- Poor management
  - temporal
  - spatial domain
- Undefined groundwater ownerships
- Qualitative issues