IRRIGATION DEVELOPMENT & MANAGEMENT ACTIVITIES IN TÜRKİYE

Ahmet ŞEREN
Director of Irrigation & Drainage Structures Section, Operation & Maintenance Department, General Directorate of State Hydraulic Works (DSI), Turkey, aseren@dsi.gov.tr

WORKİNG GROUP ON IRRİGATİON DEVELOPMENT AND MANAGEMENT (WG-IDM)
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GENERAL STATISTICAL VALUES
Türkiye is located on the crossroads of Europe and Asia
Our country is under water stress in terms of the amount of water per capita.

Turkey is located in a semi-arid region; precipitation has uneven distribution varying between 250-2500 mm.

Irrigation required area to achieve optimum yield level is 93%.
Actual Water Consumption

- **Irrigation**: 72 billion m³ (77%)
- **Domestic**: 18 billion m³ (16%)
- **Industry**: 22 billion m³ (20%)

Total Consumed Water: 112 billion m³

Water Consumption Projection

- **Irrigation**: 72 billion m³ (64%)
- **Domestic**: 18 billion m³ (16%)
- **Industry**: 22 billion m³ (20%)

Total Consumed Water: 112 billion m³
Economically irrigable land by 2020

- **4,36 million hectare DSİ**
- **2,29 million hectare Public and Former GD of Agricultural Reform**
- **6,65 million hectare**
OPERATION MODELS OF IRRIGATION SCHEMES

- DSİ Managed
- Transferred (Water User Associations, Municipalities, Village Authorities, Groundwater Cooperatives, Universities, Research Institutions etc.)
- Service Procurement
## Irrigation Schemes by the End of 2020

<table>
<thead>
<tr>
<th>Irrigation Schemes</th>
<th>Numbers</th>
<th>Area (ha)</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DSİ Managed</td>
<td>304</td>
<td>232,546</td>
<td>7</td>
</tr>
<tr>
<td>Transferred</td>
<td>1,204</td>
<td>2,714,027</td>
<td>78</td>
</tr>
<tr>
<td>Built for the cost</td>
<td>29</td>
<td>17,013</td>
<td>0.5</td>
</tr>
<tr>
<td>Groundwater Cooperatives</td>
<td>1,446</td>
<td>499,239</td>
<td>14.5</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>2,983</td>
<td>3,462,825</td>
<td>100</td>
</tr>
</tbody>
</table>

- **DSİ Managed**: 7.00%
- **Transferred**: 78.00%
- **Built for the cost**: 0.50%
- **Groundwater Cooperatives**: 14.50%

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*24th International Congress on Irrigation and Drainage & 73rd IEC Meeting*

*3-10 October 2022, Adelaide, Australia*
DEVELOPMENT OF IRRIGATION SYSTEMS IN TÜRKİYE
DEVELOPMENT OF IRRIGATION SYSTEMS

- ANCIENT PERIOD
- OTTOMAN EMP. PERIOD
  - Konya Irrigation Project (1903 – 1913) - First irrigation project by the government

- BEGINNING PERIOD OF THE REPUBLIC
  - Tokat Kazova Irrigation Scheme (1945)
  - İzmir Menemen Irrigation Scheme (1949)
DEVELOPMENT OF IRRIGATION SYSTEMS

- 1950 - 1965 open canal irrigation systems
  - Huge infrastructural investments on irrigation and drainage started after the establishment of the General Directorate of State Hydraulic Works (1954).

- 1970 - 1980 canalette systems
DEVELOPMENT OF IRRIGATION SYSTEMS

- 1980 - 1990 low&med pressurized piped irrigation systems applied commonly
- After 1990s high pressurized pipe irrigation systems applied commonly
- From the beginning of 2000, high pressurized pipe irrigation systems furnished with high technology
SERVICE PERIOD OF THE IRRIGATION SCHEMES UNDER THE OPERATION

- 1-5 ha: 13%  - 6-10 ha: 5%
- 11-20 ha: 10%  - 21-39 ha: 33%
- 40-49 ha: 11%  - > 50 ha: 28%
- 952.027 ha
- 311.830 ha
- 817.136 ha
- 286.902 ha
- 157.057 ha
- 376.910 ha
84% of the irrigation areas are irrigated by surface water resources and 16% by underground water resources.

72% of the irrigation areas are irrigated by gravity and 28% by pumping.
IRRIGATION PERFORMANCE INDICATORS
CHANGE IN IRRIGATION EFFICIENCY

%


47 48 47 46 46 45 45 45 47 47 47 47 47 47 47 50
CHANGE IN WATER USAGE

m3/ha


9906 10413 10559 11064 10514 10988 10021 9803 11081 10414 10614 11533 10948 9562 11245 11331 10964 11431 11466 10262 9515

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Water savings compared to the average:

- **24%** in piped irrigation facilities with meters
- **46%** in irrigation facilities charged on the basis of volume

**IRRIGATION EFFICIENCY - 2021**
WATERTABLE MONITORING IN IRRIGATION SCHEMES

![Chart showing areas with different watertable conditions and salinity problems.]

- **Area with watertable at 0-1m:** 79,961 Ha
- **Area with watertable at 1-1.5m:** 209,698 Ha
- **Area with salinity problem (>5000 micromhos/cm):** 60,866 Ha
CROP PATTERN IN IRRIGATION SCHEMES

- Maize: 24.2%
- Sugar cane: 14.2%
- Cereals: 13.4%
- Sunflower: 11.4%
- Olive: 1.9%
- Potato: 1.0%
- Citrus: 1.6%
- Sapling: 2.2%
- Truck farm: 1.4%
- Forage crops: 3.2%
- Vegitables: 3.0%
- Meadow-Grassland: 0.4%
- Vineyard: 1.9%
- Olea: 0.9%
- Paddy: 3.7%
- Others: 2.8%
- Legumes: 1.9%
- Fruits: 7.2%
- Forage crops: 6.0%
- Sugar cane: 4.8%
- Others: 2.8%
SUSTAINABILITY OF IRRIGATION SCHEMES
MAINTENANCE ACTIVITIES

✓ Water user organizations are responsible to meet the maintenance needs of irrigation schemes according to the Transfer Agreement acted with DSİ and the Law.
## MAINTENANCE ACTIVITIES

<table>
<thead>
<tr>
<th>Type of Maintenance</th>
<th>Long Terms Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Irrigation canal cleaning (m³)</td>
<td>4 400 000</td>
</tr>
<tr>
<td>Drainage canal cleaning (m³)</td>
<td>3 350 000</td>
</tr>
<tr>
<td>Maintenance of concrete (m³)</td>
<td>80 000</td>
</tr>
<tr>
<td>Maintenance of O&amp;M service roads (km)</td>
<td>15 000</td>
</tr>
<tr>
<td>Paint of metal equipment (m²)</td>
<td>40 000</td>
</tr>
</tbody>
</table>
In order to meet growing needs of structures and to increase the duration of use Maintenance Projects are implemented.

Based on the principle of the execution of together with the WUOs.
There are two types of implementation.

I. In the first one, the work carried out by DSI in all aspects and the cost is recovered in 3-7 equal instalments.

II. In the second one, required material for the implementation of the work provided by DSI, labour done by WUOs. The cost of supplied material is recovered in 3-7 equal instalments.

Their upper limit is 800,000 USD.
MAINTENANCE PROJECTS

Renovation of concrete canal of Altınyazı Karasaz Irrigation Scheme in cooperation with Karasaz Irrigation Cooperative

Renovation of pumping station of İznilk Boyalıca Irrigation Scheme in cooperation with Boyalıca Water User Association
Some irrigation schemes have been damaged over time due to natural conditions, human interventions and misuse and cannot be sustained by maintenance budget.
## CURRENT STATUS OF THE MODERNIZATION PROJECT

<table>
<thead>
<tr>
<th>Status</th>
<th>Number of Project</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modernization work completed</td>
<td>41</td>
<td>37 061</td>
</tr>
<tr>
<td>Construction work ongoing</td>
<td>21</td>
<td>130 978</td>
</tr>
<tr>
<td>Project preparation completed</td>
<td>55</td>
<td>165 988</td>
</tr>
<tr>
<td>Project preparation work ongoing</td>
<td>64</td>
<td>501 199</td>
</tr>
<tr>
<td>Planning work ongoing</td>
<td>81</td>
<td>410 861</td>
</tr>
<tr>
<td>TOTAL</td>
<td>262</td>
<td>1 246 087</td>
</tr>
</tbody>
</table>

- Modernization work completed: 3%
- Construction work ongoing: 11%
- Project preparation completed: 13%
- Planning work ongoing: 33%
- Project preparation work ongoing: 40%
Developments in automation and decision support systems are taken into account in new irrigation projects.

These applications, especially in piped irrigation systems, can prevent intervention and water can be supplied to the network to the extent of real needs.
MODERNIZATION PROJECT

SEYİTLER IRRIGATION AUTOMATION SYSTEM
CENTRAL MANAGEMENT SCREENS

✓ It is an agricultural management system in which meters and valves for irrigation purposes specific to each parcel are centrally controlled with the SCADA system.
With the mobile application, regional directorate and water user organization managers can also manage the system remotely.

Such as starting-ending irrigation, declaration proceedings, accessing water observation station data and setting alarms, plot/farmer irrigation date, amount, authorization changes, plant pattern operations can be done without limitation of place or device 24 hours a day, 7 days a week, by providing many different data access or intervention possibilities.
ECONOMIC PORTRAIT OF THE MODERNIZATION PROJECTS

- Although some experts do not adopt the modernization of irrigation networks before new areas being taken to operation, an increase of 1% in the irrigation ratio means that 65 million USD increase in value of production.
- In addition, an increase of 1% in irrigation efficiency, 500 million m³ of water is saved.

Average cost of piped irr. network is 7 000 $/ha
MONITORING & EVALUATION OF IRRIGATION SCHEMES
A digital platform to monitor, evaluate and report the O&M activities of irrigation facilities serves gross 4,6 Mha operated by DSİ and transferred to WUOs.

SUTEM is a kind of management information system that provides the basis for the decision support system.
Meeting the requirements through a single application

- Reporting
- Budget & Accounting
- Irrigation Management
- Measurement of Irrigated area
- Maintenance

Ease of control and inspection

SUTEM

TARGETS

- Centralized data security
- Standardization in reports
- Saving time and labor
- Effective use of external services

Central Population Management System
Land Registry and Cadastral Information System
Spatial Real Estate System
Central Population Management System
Farmer Registration System
MEGSİS
SUTEM
MERNİS
TAKİS
ÇKS
MEGSİS
DESIGN AND INTEGRATION

- Log and Identification Module
- Inventory Module
- Budget and Accounting Module
- Accrual-Collection Module
- Irrigation Management Module
- Field Operations Module
- Maintenance Module
- Water User Module
- Document Management Module
- Communication Module
- Audit Module
- Purchasing Module
- Investment and Expropriation Module
- Crop Census Module
- Monitoring and Evaluation Module
- Report Module

SUTEM
CONCLUSION

- It is important to build structures, but the sustainability of them can be provided by good O&M activities. Therefore, more attention should be given to the operation and maintenance.
«The destiny of the next generation is determined by previous one.»

K'ung Fu-tzu
Thank you for your attention...

aseren@dsi.gov.tr