Turkey Irrigation Sector Reform
What Did Work And What Did Not Work

By
Usaid El-Hanbali and Ebru Karamete

ISLAMABAD, PAKISTAN
MARCH 9, 2011
OUTLINE OF THE PRESENTATION

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1. BACKGROUND

1.1 WATER RESOURCES

• **Turkey’s total surface area is about 780,000 km², comprises 26 river basins.**

• **There are six river basins in the large category (>30,000 km²), 16 in the medium (10-30,000 km²), and four in the small category (<10,000 km²).**

• **Annual surface run-off is estimated at 193 km³, with nearly a quarter of the run-off from the Euphrates and the Tigris Rivers, followed by Sakarya and Yeşilirmak Rivers.**

• **About 112 km³ of water is available annually for consumption, which means about 1,700 m³ per capita.**

• **Water availability is estimated to fall below 1,000 m³ per capita by 2025.**

• **There are more than 500 dams.**
TURKEY’S WATER POTENTIAL
BY BASIN

Average annual flow, billion m³

<table>
<thead>
<tr>
<th>Basin</th>
<th>Flow (billion m³)</th>
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<tbody>
<tr>
<td>Other</td>
<td>86.2</td>
</tr>
<tr>
<td>Euphrates</td>
<td>31.6</td>
</tr>
<tr>
<td>Tigris</td>
<td>21.3</td>
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<tr>
<td>Eastern Black Sea</td>
<td>14.9</td>
</tr>
<tr>
<td>Antalya</td>
<td>11.1</td>
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<tr>
<td>East Mediterranean</td>
<td>11.1</td>
</tr>
<tr>
<td>Western Black Sea</td>
<td>9.9</td>
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Other 46%
Euphrates 17%
Tigris 11%
Eastern Black Sea 8%
Western Black Sea 5%
Antalya 6%
Eastern Mediterranean 6%
ISSUES IN WATER SECTOR

- LACK OF RELIABLE DATA
- INCREASING WATER RESOURCES SCARCITY
- COMPETING USE BY SECTORS
- INEFFECTIVE NATIONAL LAWS
- INADEQUATE INVESTMENT
- RISING WATER TABLES
- HIGH SALINITY LEVELS
- IMPACT ON AGRICULTURE
ATTATURK DAM
1.2 AGRICULTURE AND IRRIGATION

- Agriculture contributes about 8 percent to GDP in Turkey (2009);
- 25 percent of the country’s labor force works in agriculture (2009);
- About 8.5 million hectares (ha) of the 28 million ha that has been classified as arable land is considered economically irrigable;
- Current level of development is over 4.4 million ha (2.0 million ha DSI, 1.4 million ha GDRS, and 1.0 million ha private farmers and enterprises);
- General Directorate of State Hydraulics Works (DSI) is the primary state executive agency responsible for planning, implementation and management of hydraulic works;
- GDRS is the General Directorate of Rural Services, abolished in 2005, however, its staff was not transferred to DSI, but to the 81 provincial governments in which the field staff were based.
EXPANSION OF IRRIGATION

- Over the past 50 years Turkey has invested heavily in water storage facilities and irrigation systems.
- By the end of 2005, a total of 556 large- and medium-sized dams have been constructed, mostly by DSI, with 421 dams providing water for irrigation.
- DSI’s schemes relies mostly on surface water sources, with 1.7 million ha supplied by gravity.
- DSI developed approximately 0.4 million ha for irrigation using groundwater through tube wells, most of which are operated by groundwater irrigation cooperatives (GWIC).
- About 94 percent of irrigation is through surface methods (furrow, basin, border), with the balance relying on pressurized irrigation (sprinkler and drip).
DSI Regional Directorates

- DSI The 1. Regional Directorate BURSA
- DSI The 2. Regional Directorate IZMIR
- DSI The 3. Regional Directorate ESKISEHIR
- DSI The 4. Regional Directorate KONYA
- DSI The 5. Regional Directorate ANKARA
- DSI The 6. Regional Directorate ADANA
- DSI The 7. Regional Directorate SAMSUN
- DSI The 8. Regional Directorate ERZURUM
- DSI The 9. Regional Directorate ELAZIG
- DSI The 10. Regional Directorate DIYARBAKIR
- DSI The 11. Regional Directorate EDİRNE
- DSI The 12. Regional Directorate KAYSERI
- DSI The 13. Regional Directorate ANTALYA
- DSI The 14. Regional Directorate ISTANBUL
- DSI The 15. Regional Directorate SANLIURFA
- DSI The 16. Regional Directorate VAN
- DSI The 17. Regional Directorate SIVAS
- DSI The 18. Regional Directorate ISPARTA
- DSI The 19. Regional Directorate KAHRAMANMARAS
- DSI The 20. Regional Directorate AYDIN
- DSI The 21. Regional Directorate TRABZON
- DSI The 22. Regional Directorate KASTAMONU
- DSI The 23. Regional Directorate KARS
- DSI The 24. Regional Directorate BALIKESIR
- DSI The 25. Regional Directorate ARTVIN
IRRIGATION SECTOR

2.1 REFORMS IN IRRIGATION SECTOR

- IRRIGATION MASTER PLAN – WORLD BANK (1991) RECOMMENDED THAT DSI TRASFERR MANAGEMENT OF IRRIGATION SYSTEMS TO FARMERS.

- FROM 1995- 2005, IRRIGATION MANAGEMENT TRANSFER (IMT) PROGRAM FROM DSI TO FARMERS STARTED: 1.2 MILLION HA → 2.0 MILLION HA

- 1996 INPIM INTERNATIONAL CONFERENCE IN ANTALYA (MILESTONE).

- THE PARTICIPATORY PRIVATIZATION OF IRRIGATION MANAGEMENT AND INVESTMENT PROJECT (PPIMIP) - 1998 WAS SET WITHIN THE CONTEXT OF AN EXTENSIVE PROGRAM OF REFORM IN AGRICULTURE/IRRIGATION AIMED AT ACHIEVING HIGHER PRODUCTIVITY AND EFFICIENCY AND DECREASING GOVERNMENT INTERVENTION.

- 2007 TOWARDS LONG-TERM SUSTAINABILITY STUDY IN WATER AND IRRIGATION AND DRAINAGE SECTORS (DRAFT – WORLD BANK).
REFORMS IN THE IRRIGATION SECTOR

- THERE ARE DIFFERENT LAWS AND THAT REGULATE IRRIGATION SECTION INCLUDING:
  - LAW NO. 442 REGULATING VILLAGE AUTHORITIES (THAT MANAGE LESS THAN 1% OF IRRIGATED LAND);
  - LAW NO. 1580 REGULATING MUNICIPALITIES AND WUAS THAT MANAGE 54% OF IRRIGATED LAND WHICH WAS REPLACED BY LAW NO. 5355 OF 2005 LAW REGULATING WUAs AS LOCAL GOVERNMENT ASSOCIATIONS, AND
  - LAW NO. 1163 REGULATING IRRIGATION COOPERATIVES (ICS) THAT MANAGE 24% OF IRRIGATED LAND.

- THE REMAINING 22% OF IRRIGATED LAND (APPROXIMATELY 1 MILLION HA) IS REPRESENTED BY SCHEMES (USUALLY VERY SMALL, ABOUT 5 HA) CONSTRUCTED AND MANAGED BY THE FARMERS THEMSELVES WITHOUT THE SUPPORT OF ANY WUO.
IRRIGATION MANAGEMENT TRANSFER PROGRAM TOOK PLACE FROM 1995 TO 1999. BY 2005, 94 PERCENT OF THE APPROXIMATELY 2 MILLION HA EQUIPPED BY DSI HAD BEEN TRANSFERRED TO WUAS WITH ONLY 74 SCHEMES ON 100,500 HA, STILL BEING RETAINED BY DSI.

DSI CONTINUES TO HAVE AN INTEREST IN THE SYSTEMS TRANSFERRED TO WUAS TO ENSURE THAT THEY ARE MAINTAINED TO A MINIMUM STANDARD AND THAT POTENTIAL FUTURE PROBLEMS ARE REDUCED.

THE RATE AT WHICH THE TRANSFER TOOK PLACE WAS IMPRESSIVE BY ANY STANDARDS, PARTICULARLY CONSIDERING THAT THE CONCEPT WAS RELATIVELY NEW AND THE SCALE WAS LARGER THAN MOST COUNTRIES IN WHICH IT HAD BEEN CARRIED OUT. INITIAL RESULTS OF THE TRANSFER WERE ENCOURAGING, INCLUDING A DOUBLING OF IRRIGATION SERVICE FEE COLLECTION RATES, A SHIFTING OF O&M EXPENDITURES FROM PUBLIC TO PRIVATE SECTOR, AN ACCUMULATION OF RESERVES IN SOME WUOS FOR FUTURE CAPITAL PURCHASES, AND A REDUCED WAGE BILL FOR SYSTEM O&M PERSONNEL.
LESSONS LEARNT FROM WUAs ESTABLISHMENT

- Farmers’ interest evaluated while selecting schemes to be transferred.
- Collection rates based on volumetric usage at farmers’ level.
- Technical capacity of WUAs be increased to maintain their networks.
- Farmers and WUAs trained on on-farm water management and irrigation agronomy.
- Asset management tool, particularly by involving close discussion and involvement with the WUOs, the beneficiaries and users, while carrying out government’s planned program of modernization and improvement of irrigation schemes and this will include rehabilitation and upgrading of existing I&D infrastructure. New WUAs law has good elements but still does not ensure independent entity which can operate freely without the local governments interference.
ISSUES IN IRRIGATION SECTOR

- INEFFICIENT IRRIGATION DEVELOPMENT PLANNING;
- LOSS OF EFFECTIVE IRRIGATED AREA DUE TO DECLINE OF O&M EFFORTS;
- PROBLEMS RELATED TO WATER OVER-USE IN RIVER BASINS;
- OVER-ABSTRACTION OF GROUNDWATER;
- LACK OF PRIORITIZATION OF IRRIGATION INVESTMENTS;
- LACK OF LEGISLATION RELATED TO WUAs;
- NOT FULLY INTEGRATING WATER RESOURCES MANAGEMENT AGENCY.
2.2 WORLD BANK IRRIGATION PROJECTS IN TURKEY


- **OBJECTIVES**
  - STRENGTHEN IRRIGATION-RELATED INSTITUTIONS BY SUPPORTING DSI AND GDRS.
  - RELIEVE THE PUBLIC SECTOR OF ITS TRADITIONAL RESPONSIBILITY FOR FUNDING AND SUBSIDIZING THE COSTS OF IRRIGATION O&M;
  - INITIATE A PROCESS OF REDUCING PUBLIC SECTOR RESPONSIBILITY FOR FUNDING AND MANAGING IRRIGATION INVESTMENT; AND
  - PROMOTE EFFICIENT AND SUSTAINABLE UTILIZATION OF IRRIGATION SYSTEMS WHICH WOULD CONTRIBUTE TO IMPROVED AGRICULTURAL PRODUCTIVITY.
COMPONENTS

- OPERATION AND MAINTENANCE EQUIPMENT (GRANT 38%) + A PILOT FOR REHABILITATION AND MINOR IMPROVEMENTS TO IRRIGATION SCHEMES (50%);
  - INSTITUTIONAL STRENGTHENING;
  - PILOT DRIP IRRIGATION SCHEMES

ACHIEVEMENTS

- THE PARADIGM SHIFT AWAY FROM GOVERNMENT SUPPORT OF IRRIGATION SCHEMES TOWARD A SYSTEM OF MUCH GREATER BENEFICIARY PARTICIPATION AND FINANCIAL SUPPORT;
- THE INCREASED CONFIDENCE OF FARMERS IN WUOS;
- THEIR INCREASED PROPENSITY TO PAY FOR WATER THEY USE;
THE PARTICIPATORY PRIVATIZATION OF IRRIGATION MANAGEMENT AND INVESTMENT PROJECT

- STRENGTHENED WUOs BY PROVIDING SUPPORT FOR O&M EQUIPMENT AND FOR REHABILITATION;
- ALLOWED COLLECTION OF REVENUES THAT ENHANCED FINANCIAL SUSTAINABILITY;
- REDUCED WATER LOSSES AND IMPROVED DEVELOPMENT OF TECHNICAL AND MANAGERIAL CAPACITIES;
- WUOs IN THE PROJECT AREAS WERE WILLING TO PAY MORE THAN HALF OF THE COST OF NEW O&M;
- THE PILOT FOR REHABILITATION AND MINOR IMPROVEMENTS TO IRRIGATION SCHEMES WAS PROVEN TO BE SUCCESSFUL;
- AND EVEN IN THIS CASE, THE HIGH AMOUNT OF FARMERS CONTRIBUTION MAKES OF THIS EXPERIENCE A QUITE UNIQUE MODEL IN THIS FIELD FOR MANY OTHER COUNTRIES, AND NOT ONLY DEVELOPING ONES;
- DOWNSIZING OF DSI AS A RESULT OF IRRIGATION MANAGEMENT TRANSFER TO FARMERS;
- REDUCED DS I O&M COST; AND
- REDUCED FUNDING TO IRRIGATION REHABILITATION SINCE WUOs PAID HALF OF THE COST.
2.3 LESSONS LEARNED FROM IMPLEMENTATION OF THE IRRIGATION PROJECT

- Rehabilitation is more important than equipment;
- Effective training for WUOs is critical;
- Facing a new paradigm, DSI needed to reorient its mission;
- Monitoring and evaluation is very important;
- Having more than one implementing agency with clearly different relative roles in project implementation can lead to a problem of dedication to the project of the agency covering the minor role.
2.4 WHAT DID WORK AND WHAT DID NOT WORK?

**WHAT DID WORK**

- There was a paradigm shift away from government support of irrigation schemes toward a system of much greater beneficiary participation;
- Promoting efficient and sustainable utilization of irrigation systems through participatory irrigation management (PIM);
- Rehabilitation of irrigation systems and providing equipment enabled WUOs to maintain properly their systems and allowed them to pay for water.
2.4 WHAT DID WORK AND WHAT DID NOT WORK?

- WHAT DID NOT WORK!!!!
  - THE EXISTING WUAS LAW DID NOT FOLLOW WORLD-WIDE BEST PRACTICES; LOCAL GOVERNMENTS/MUNICIPALITIES USUALLY INTERFER IN WUOs WORK;
  - TRANSFERRING IRRIGATION MANAGEMENT TO WUAs WITHOUT REHABILITATION OF THE IRRIGATION SYSTEM AND MAKING THEN IN A GOOD OPERATIONAL CONDITIONS, MADE IT DIFFICULT TO THE WUAs TO PROPERLY MANAGE THEIR SYSTEMS;
  - TRANSFER WAS TOO FAST AND SOME WUAs WITH POOR FARMERS FOUND IT DIFFICULT TO COLLECT MONEY FOR O&M AND OTHER WERE NOT ABLE TO MANAGE BIG INFRASTRUCTURE;
  - DSI HAVE NOT MOVED SO FAR TOWARDS INTEGRATED WATER RESOURCES MANAGEMENT;
  - IT WAS DIFFICULT FOR DSI TO PROVIDE NEEDED FUNDING FOR O&M; AND
  - INSTITUTIONS WORKING ON IRRIGATION WERE NOT FULLY INTEGRATED.
2.5 CONCLUSIONS

- Despite its impressive record of irrigation and dam development in the country, DSI would benefit from modernizing and upgrading many of its processes and procedures;
- DSI should continue its reform efforts by changing its role and be responsible for basin-wide water resources management;
- There is a need to have a dedicated WUA law that would allow government to best address issues related to performance and sustainability of WUAs;
- Rehabilitation of irrigation system and establishment of WUAs should go together (irrigation systems transferred to WUAs should be in a good operational conditions; and
- Technical support for WUAs is crucial.
- The pilot projects which was partially funded by the bank was successful and was rated satisfactory. However, it was not scaled-up or followed by another operation, but the Turkish government has now a plan to modernize I&D systems which if implemented should build on the pilot project.
THANK YOU