

Agricultural Water Use and Productivity in Turkey

06/06/2013

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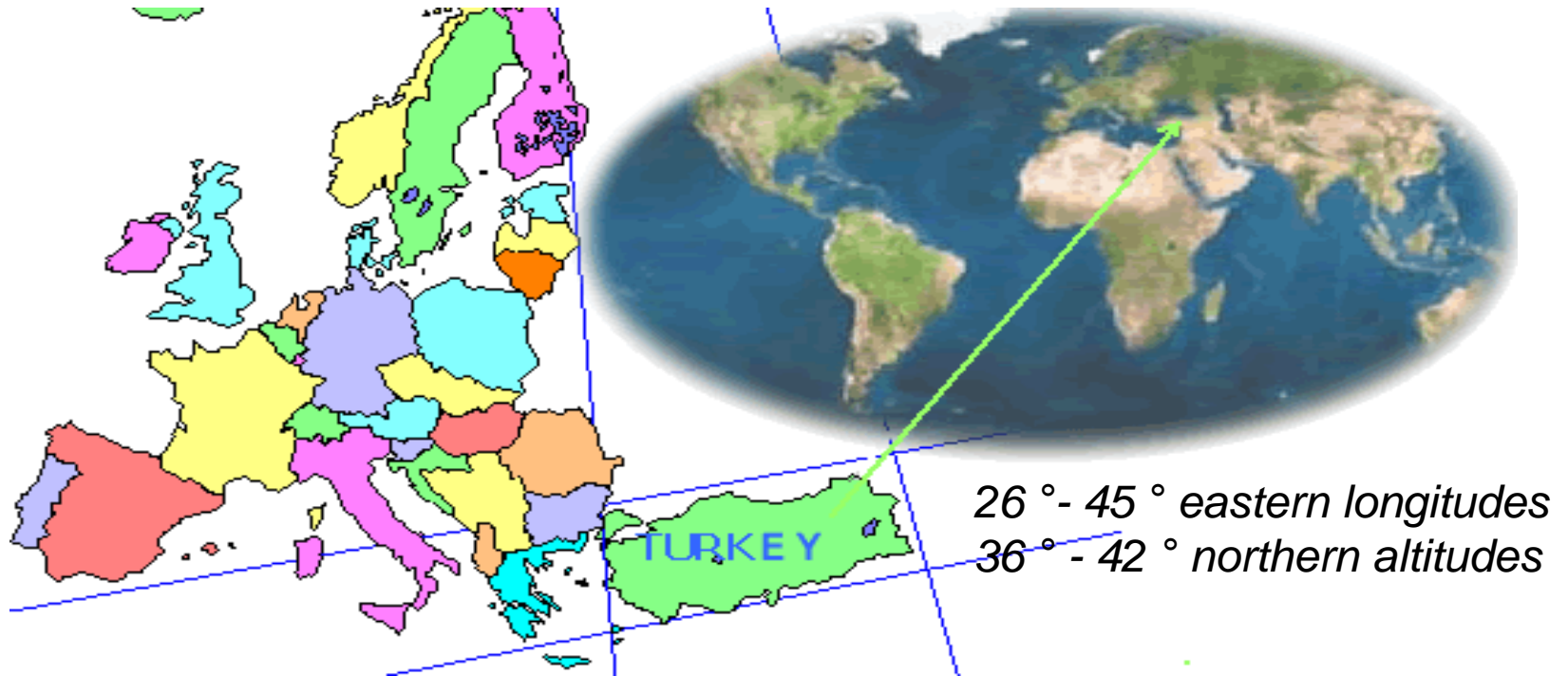
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Turkey is located on the crossroads of Europe and Asia



Geographic Location of Turkey



Land Usage	Area Mha	%
Agricultural Land	38,2	49,1
Farm (Cultivated) land	24,5	31,5
Natural grass land	14,6	18,8
Forest Land	21,5	27,6
Settlement and others	3,5	5,0
Toplam	77,8	100,0

- ❖ Total Population 75 Million
- ❖ Rural Population 17 Million (23%)
- ❖ Urban Population 58 Million (75%)

2. Agricultural Sector In Turkey

Living region

23 % of population lives in rural

Employment

6,1 million employee (25 %),

Export

11% of all export share (16 Billion \$)

Row material

For Industry such as tekstile, sugar industry,

Food Production

74 million domestic, 30 million tourist

Income

3622 \$

Agriculture is an economic sector

3. Land And Water Resources

Land



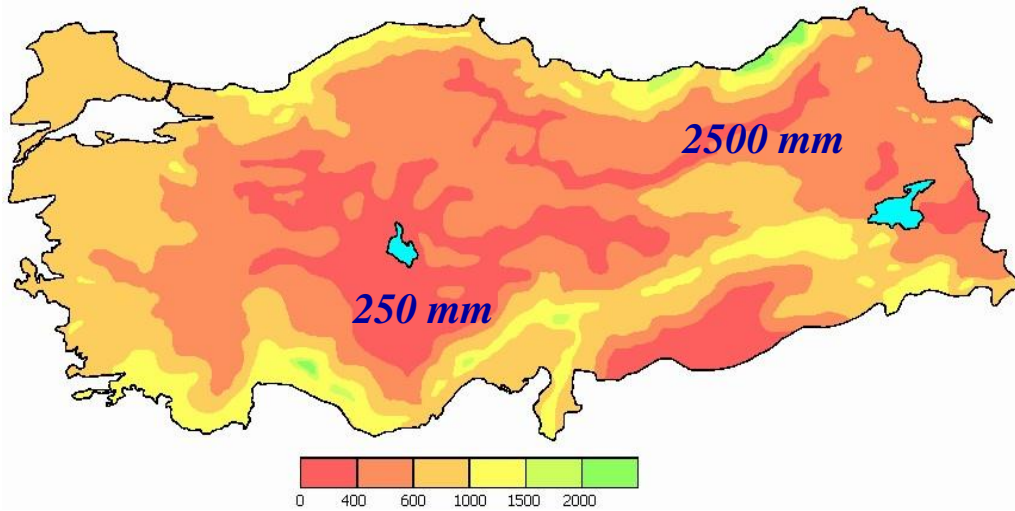
- ❖ Total area : 78 million ha
- ❖ Agricultural area : 24.5 million ha
- ❖ Erable land : 18,4 million ha
- ❖ Economicly Irrigable area : 8.5 million ha
- ❖ Irrigated area (2012) : 5.5 million ha
- ❖ Rate : 65 %

Water



- ❖ Surface water : 98 Billion m³
- ❖ Groundwater : 14 Billion m³
- ❖ Total available Water (net): 112 Billion m³

Water Resources



The annual average precipitation is 643 mm, but it varies from 250 mm at the central Anatolia to over 2 500 mm at the eastern Black Sea region

Turkey hydrologically is divided into 25 drainage basins



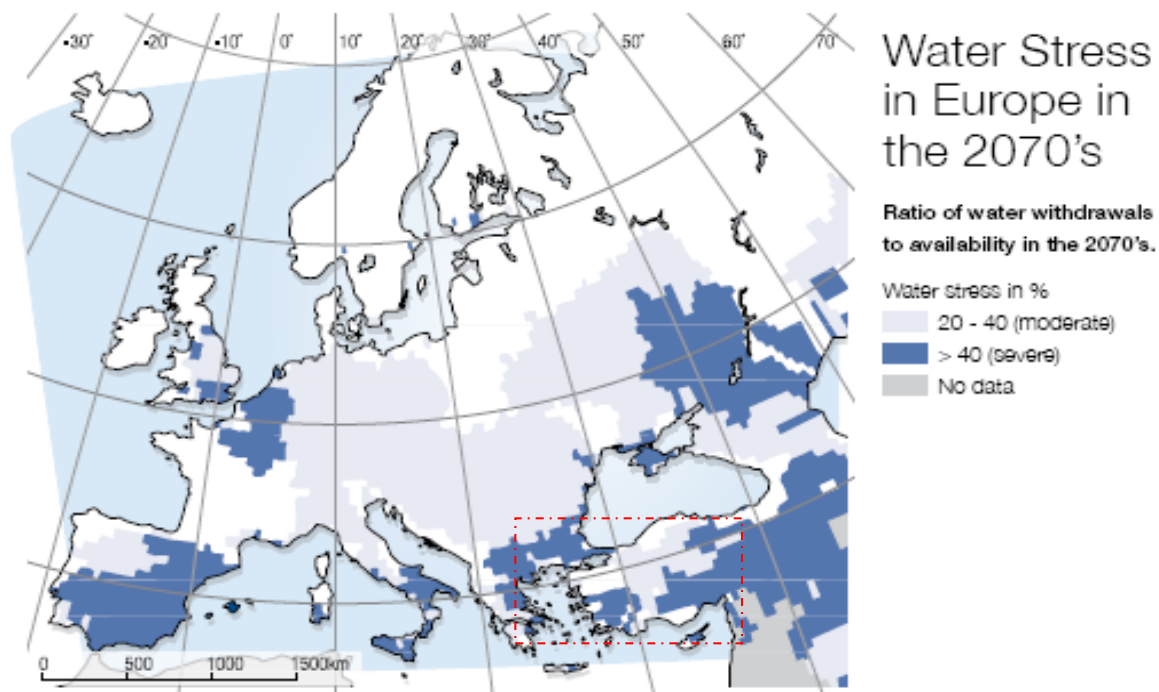
- The rivers often have irregular regimes.
- 120 natural lakes and 579 artificial lake

According to Available Water

Annual available water	Water rich	Poor Water	Water scarcity
m ³ per capita	8.000-10.000	2.000 and less	1.000 and less

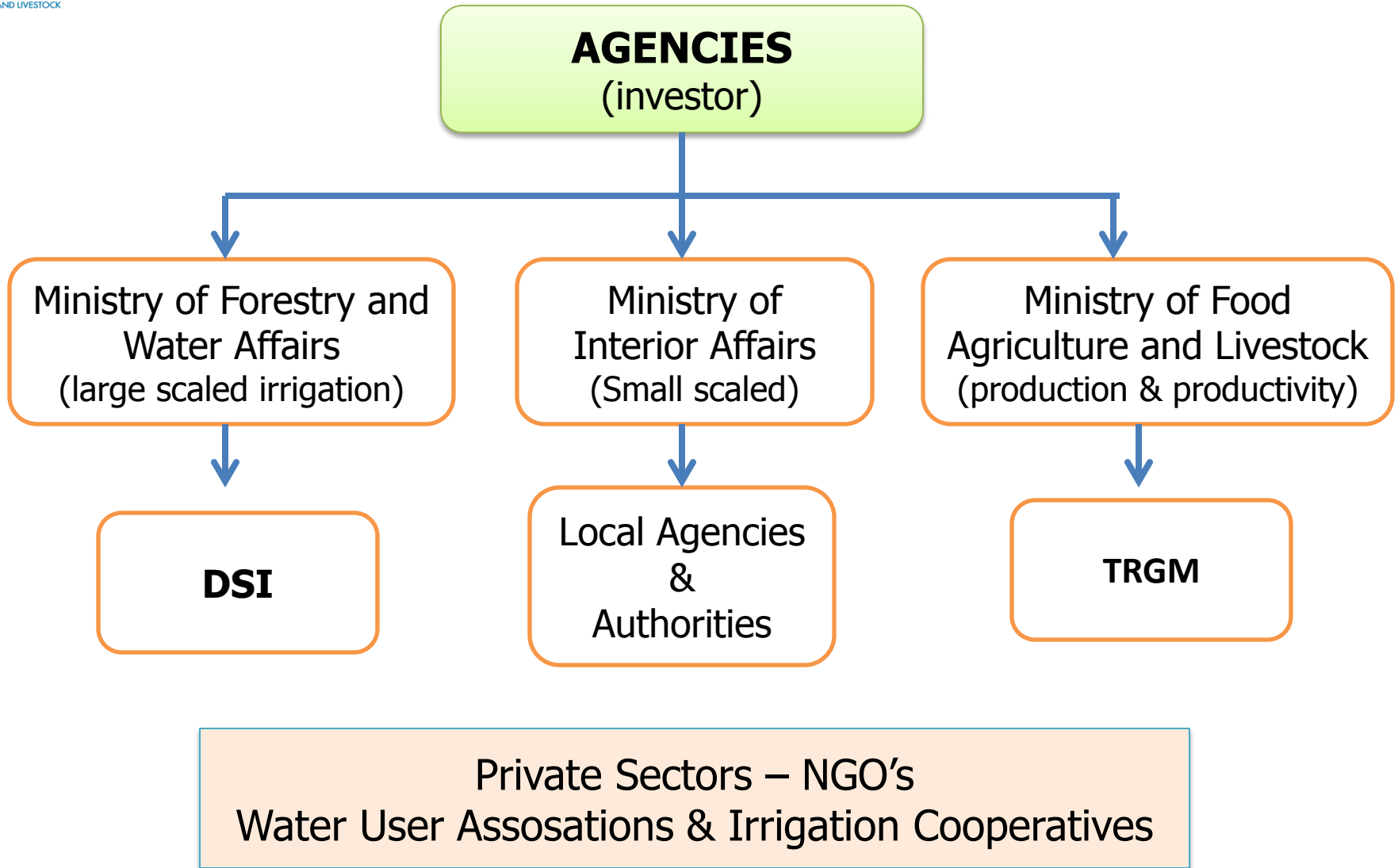
droughts, floods and contamination

Turkey
1.500 m³
per capita



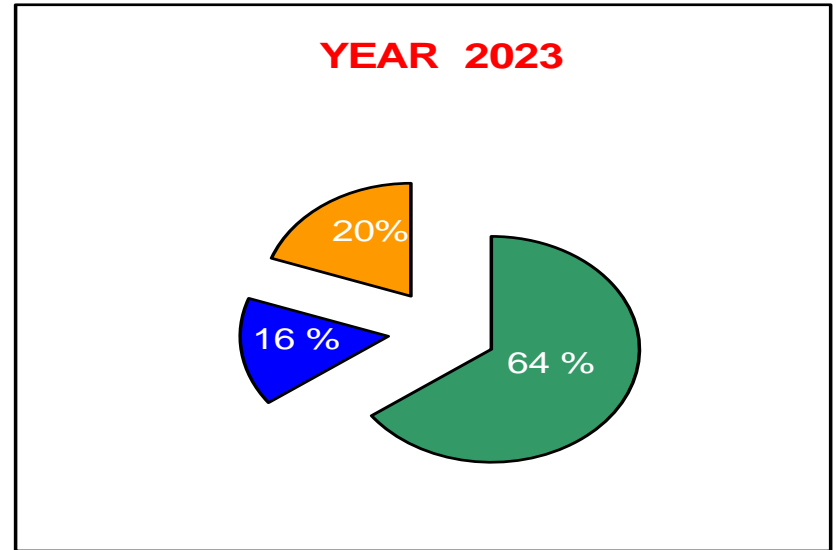
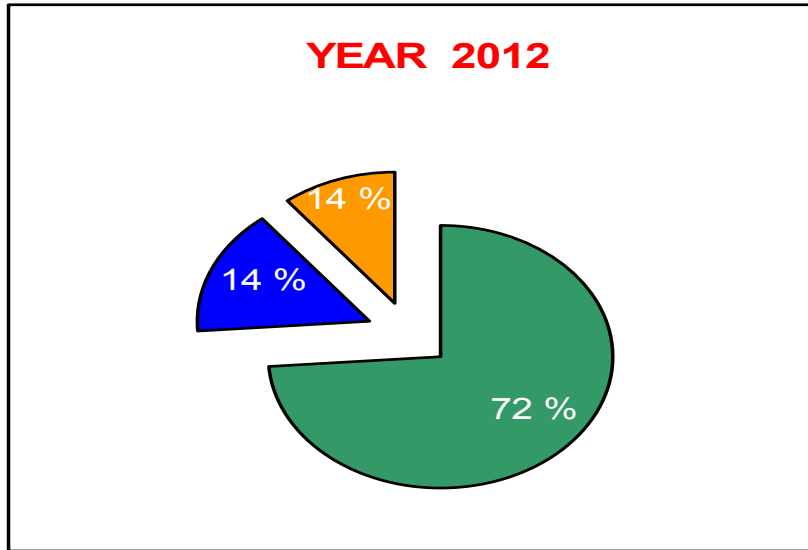
Turkey is not a water-rich country.

Irrigation Works in Turkey



- ***Agencies Responsible for Irrigation, Development and Management***

4. Water Consumptions by Sectors (2012)



IRRIGATION	36 billion m³
DOMESTIC	7 billion m³
INDUSTRIAL	7 billion m³
TOTAL	50 billion m³

IRRIGATION	72 billion m³
DOMESTIC	18 billion m³
INDUSTRIAL	22 billion m³
TOTAL	112 billion m³

72 % of the water resources is used for irrigation

- Water is under the pressure of agriculture, industry and service sectors..
- The pressure is increasing against agriculture.

5. Irrigation Management (2012)

Irrigable area economicly is 8,5 milyon ha.

Irrigated area is 5.5 million ha (65 %)

	Milyon ha	Oran %
DSİ	3,3	61
Abolished GDRS	1,2	20
Private Irrigations	1,0	19
Total	5,5	100

DSİ, 2012



- **1950 -2012** , more than **9 000** irrigation projects have been consructed.
- Management of irrigation system is tranfered to producer organizations such as **Water User Assosation** and **Irrigation cooperative**
- Participatory irrigation management

Participatory Irrigation Management

Irrigation networks built by the State are transferred to NGO's

- ✓ To realize participatory irrigation management,
- ✓ To ensure auto control,
- ✓ To reduce the operation and maintenance expenses,
- ✓ To ensure equality in water distribution,
- ✓ To ensure sustainable irrigation and agriculture.

For these aims;

- 96% of all irrigation networks have been transferred

- | | | |
|----------------------------------|------|-----------|
| • <i>Water User Assosation</i> | 400 | 1.982.000 |
| • <i>(large scaled networks)</i> | | |
| • <i>Irrigation Cooperative</i> | 1530 | 560.000 |
| • <i>(Small scaled networks)</i> | | |

Monitoring And Assessment

According to evaluation of irrigation results

- *Irrigation rate* 55 %
- *Irrigation efficiency* 45 %

How to increase the irrigation rates?

How to ensure the effectiveness of irrigation?



net income (DSİ 2012)

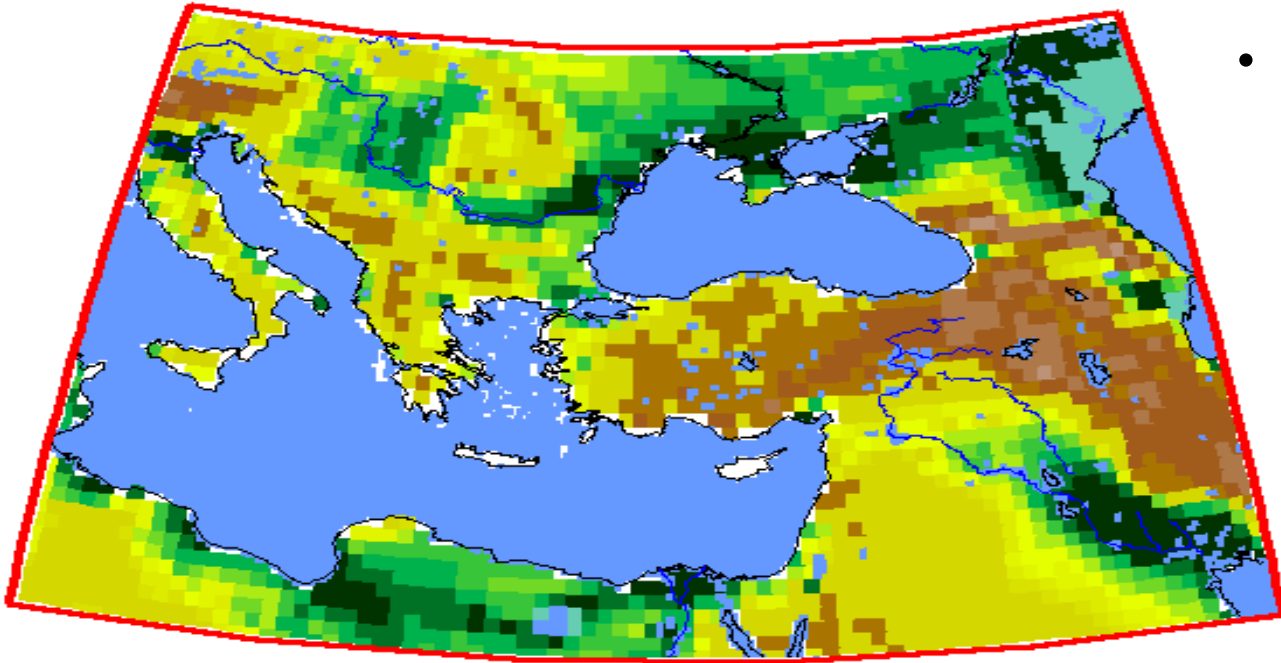
Dry area : \$ 60 /da

Irrigated area : \$ 363 /da

Revenue increase : \$ 303 /da

Irrigation

Possible Threats And Lessons Learned



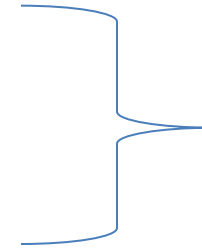
- Turkey is in the highest risk group with respect to the negative impacts of climate change (Report of IPCC)

- Effects of **Global Climate Change** on agriculture
- **Drought** affects water use and increases the food crisis.
- Turkey is located in the **arid and semi-arid region**.
- **Irrigation** is compulsory for increasing yields of products
- **Food production** 2/3 is realised irrigated areas.

Problems – Callanges on productivity

1 Irrigation Networks

- 88 % Gravity Irrigation
 - 12 % Piped Irrigation
- Half of them is over the age of 30



**Modern
Irrigation
systems**

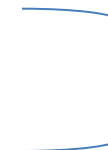
2 Problems with agricultural Structure

- ✓ Fragmented and scattered parcels (*Appr. 10*).
- ✓ Parcel size (*not enough*)
- ✓ to reach to canal directly (*less than 50%*)
- ✓ Parcel is not suitable for mechanization



**Land
Consolidation**

3 Problem of salinity and rising of groundwater level in irrigated land



**Land
reclamation
and drainage**

4 Operation and production issues

- deficit-limited irrigation in drought season

Solutions And Experiences

1 Irrigation Networks

DSI *Policy change (2004)*

- from an open channel to piped irrigation system
- To support rehabilitation projects
- 3 milyon ha will be projected with piped system by DSI

TRGM -

- Modern irrigation systems are supported by the RDSP



Irrigation Supports by the MoFAL (2006-2012)

Subject	Total	Area (da)	Farmers
Collective Pressure Irrigation Systems (75 % Grant)	539	279.236	55.603
Support for Irrigation Machine & Equipment (50 % grant)	6.424	398.022	6.316
Individual support from banks		3.350.000	144.000
GENERAL TOTAL	6.963	4.027.258	205.919

% 30-80 water saving

% 20-50 yield increase

% 40 energy saving

% 50 fertilizer % 30 saving chemicals.

2006-2012 – 200 farmers have been supported by RDS Programm
400 000 ha has been irrigated by modern irrigation system.

Thus, primarily of water and other inputs has been saved largely

2 Problems with agricultural Structure

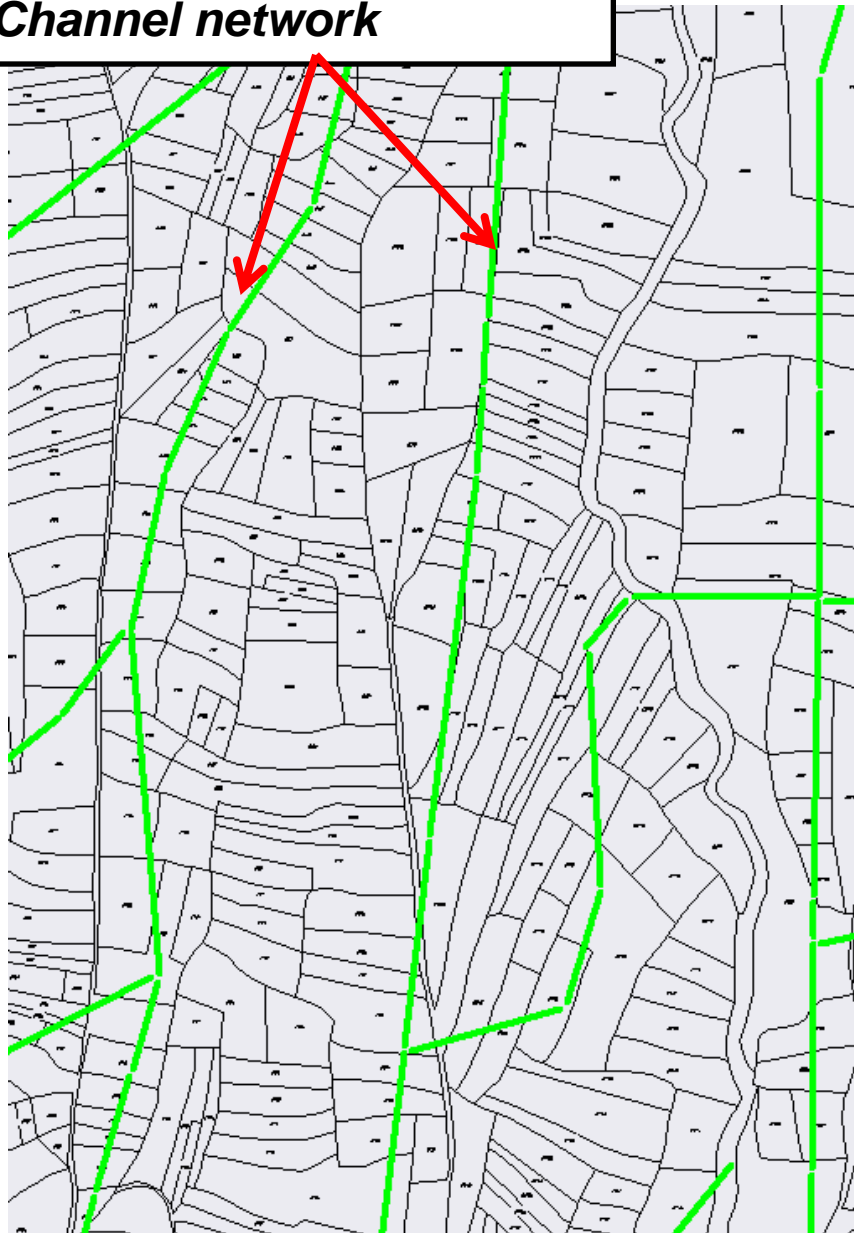
Why Land Consolidation?

Land Consolidation is an important key;

- To solve social and physical infrastructure problems about farmers
- To decrease public investments costs and to accelerate irrigation investments

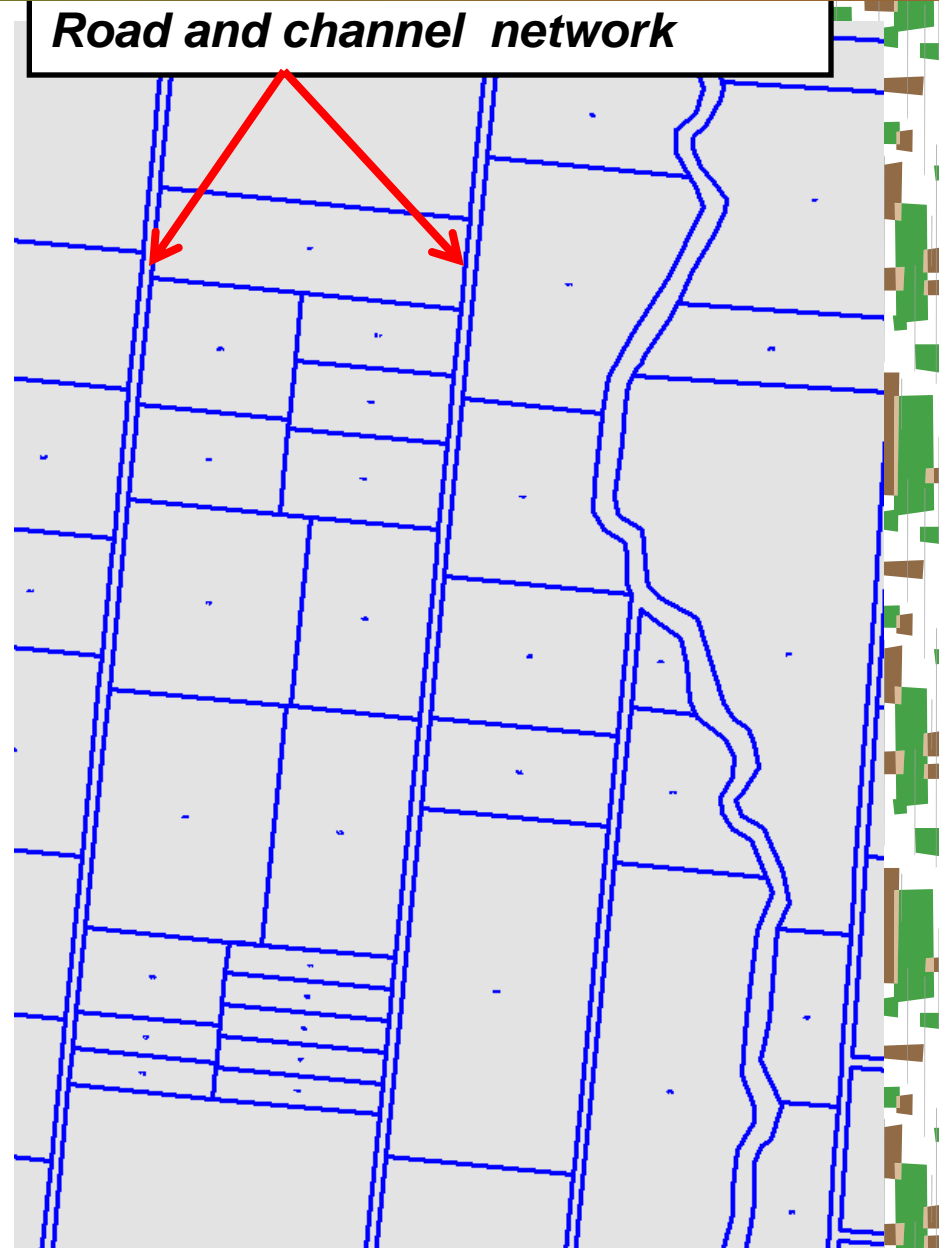
Land Consolidation

Channel network



Without land consolidation

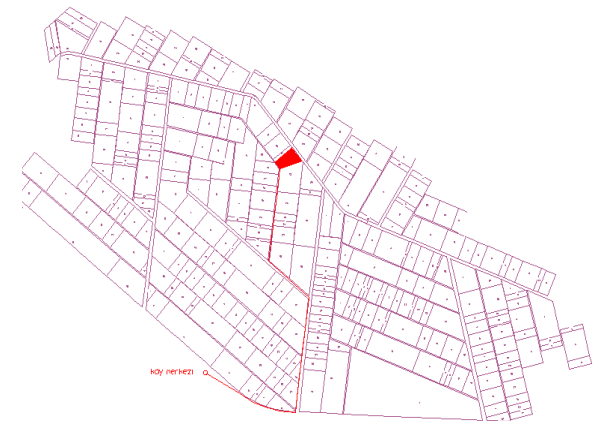
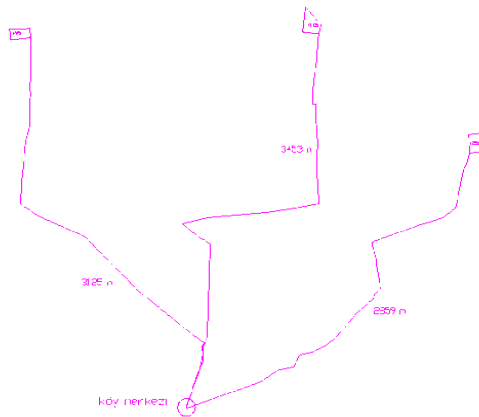
Road and channel network



With land consolidation

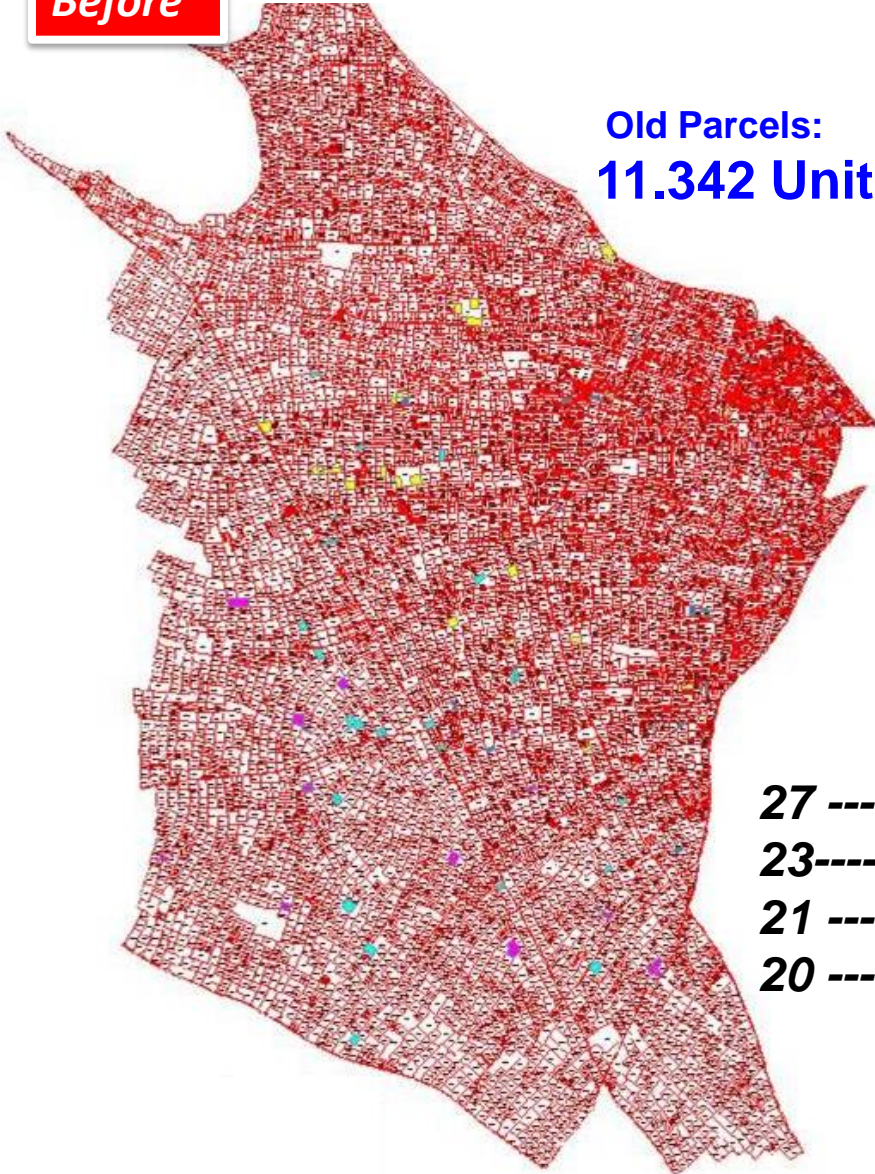
The Benefits Of Land Consolidation

1. The parcels grow. Implementation of agricultural techniques and irrigation methods are facilitated.
2. Parcel number reduces (40%) Parcel size increases (80%)
3. The distance between operation center and parcels reduces provide significant fuel savings.
4. Irrigation efficiency increases (*from 60% to 90%*)
7. Machinery and labor savings(2.5 hour/da) can be achieved.
9. Social peace can be created in the project area.
10. Transportation and irrigation problems of all parcels are solved,

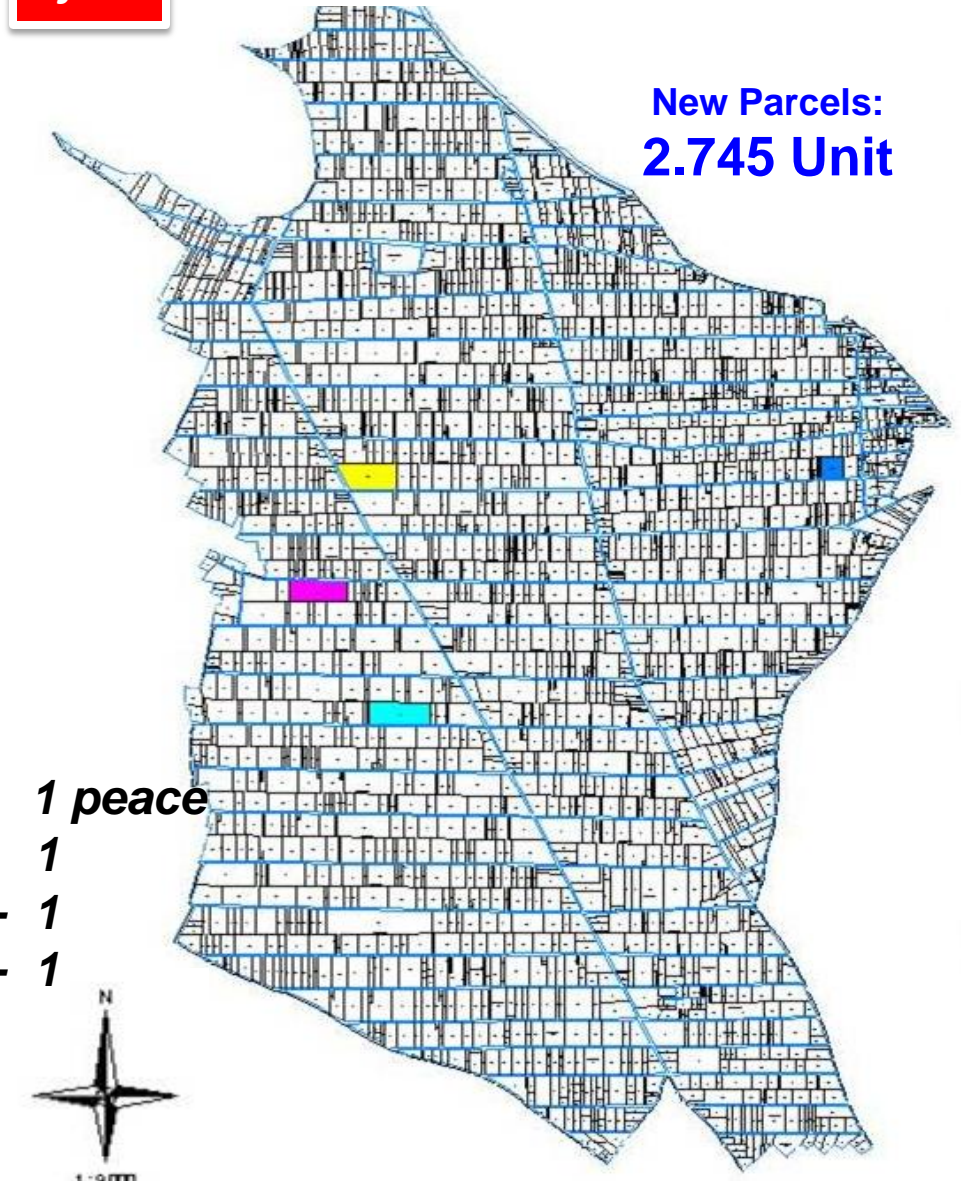


Denizli Tavas Büyükkonak Land Consolidation Project (10500 da)

Indication Map of the Old Cadastral Status
Before



Parceling Map after the Consolidation
After



Land Consolidation And Water Saving

Year	Kisecik Irrigation 24.750 decar	Well Unit	Flow Lt/s	Working hours	Out flow m3	Rate %
1999	Open Channel Irrigation System	45	2.365	74.273	14.583.022	
2009	Underground Irrigation System	46	1.725	68.416	9.681.290	34
2010	Consolidation + Underground Irrigation System	44		35.064	5.253.177	45
Rate of water saving						64

Source: Irrigation and Consolidation Project of Karaman Kisecik

If land consolidation is applied with irrigation project, composed of more than 50 % water savings

Karaman Merkez Kisecik LC + Modern Irrigation Project (2750 ha)

Toplulaştırma öncesi sulama hattı uzunluğu 20645

Average parcel size
1,61 ha 3,61 ha

Direct access to the irrigation line

61 %

100 %

Consolidation and modern irrigation system ensured
64 % of water Savings

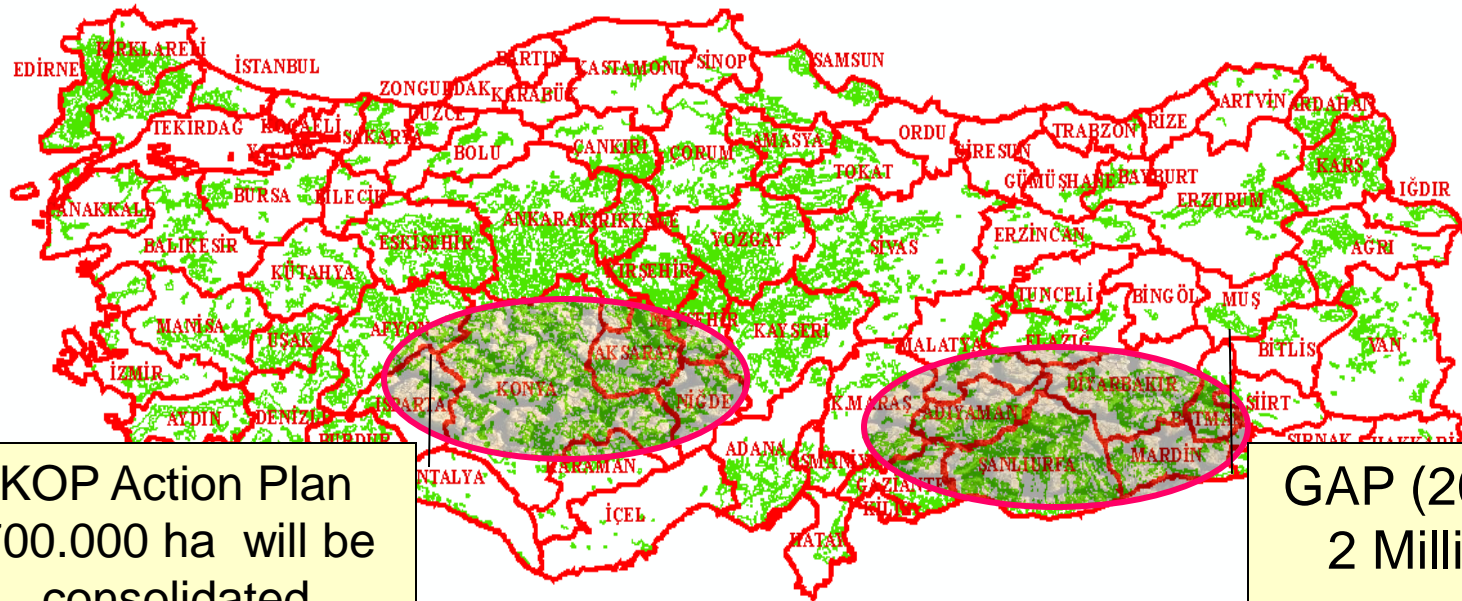
Toplulaştırma sonrası sulama hattı 17602

2533740

Distribution of the suitable areas for Land Consolidation in Turkey

The areas can be consolidated	14,0 Million ha	1961-2002	450.000 ha
- Irrigated areas	8,5 Million ha	2003-2012	2.503.000 ha
- Dry areas	5,5 Million ha	TOPLA	2.952.000 ha

New strategy basin based and multy purposed land consolidation projects



KOP Action Plan
700.000 ha will be
consolidated

GAP (2008-2013) A.P.
2 Million ha will be
consolidated
(80 % completed)

The LC of **5,5 million ha** will provide a significant amount of **water savings**

Solutions And Experiences

3 Problem of salinity and rising of groundwater level

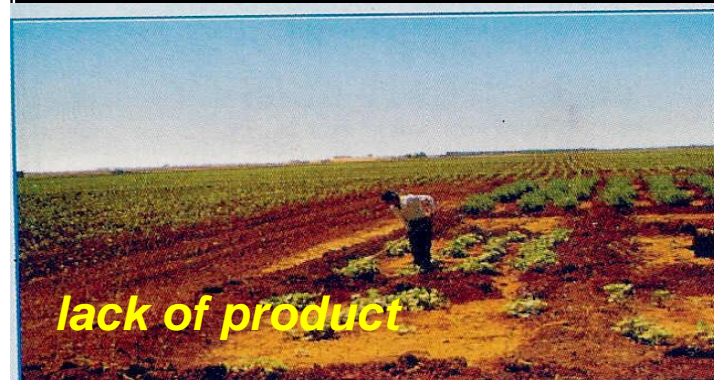
- **Less water**; causes to yield and production losses
- **More water** causes to rising groundwater table, deserting and salting, yield losses

Harran basin Irrigation Project 1995- from Atatürk Dam

- ▶ Irrigation area : 148.000 ha
- ▶ Problematic area : 55.000 ha
- ▶ Improved area (2012) : 32.000 ha

The structure of the plain is impermeable
It prevents leakage under the ground
Natural drainage is not enough

**Over-irrigation led to salinization.
production losses, (for cotton 300 kg)**



Drainage work -Trencher

Harran Basin Drainage Project 2009

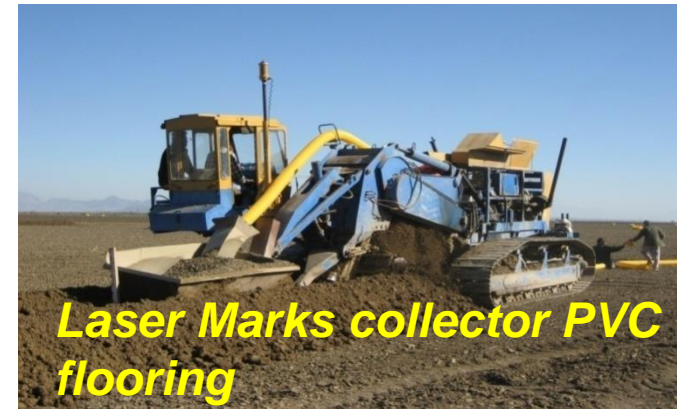
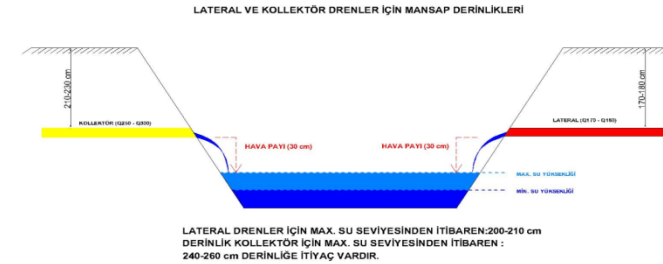
Investment subjects	Planned	Implemen ted
Drainage area (ha)	55 000	32 000
Closed Drainage Canals (km)	9 000	4.500
Engineering Structures (number)	20 000	7.000

farmers had loosed cotton 300 kg /da each year. (32000 ha)

After drainage;

Recovery is 96.000 ton/year

Farmer income increased by \$ 10.650 yearly



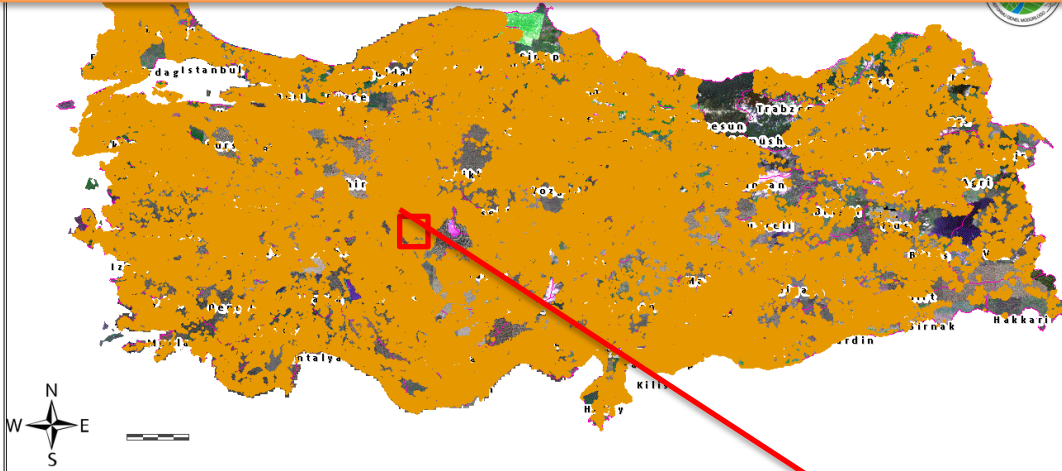
Land Parcel Information System



Agricultural parcels were digitized and Land Parcel Information System (LPIS) was established

Farmer Register System

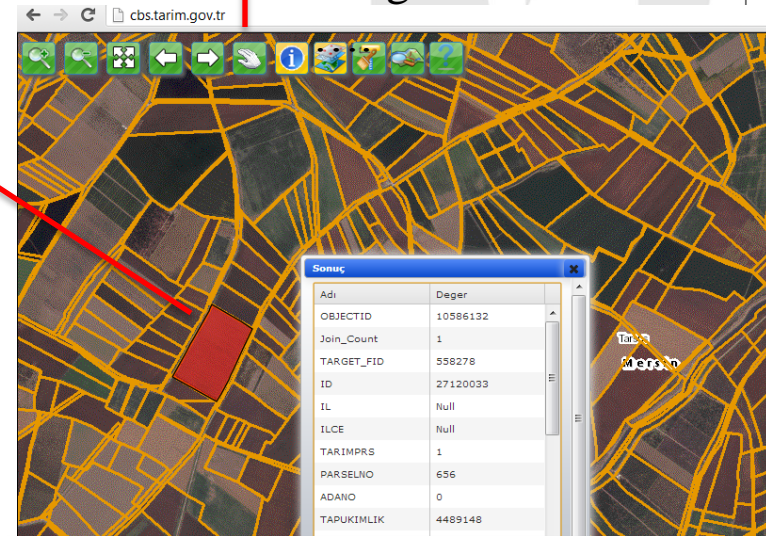
- Location data
- Parcel data (class, str, slope, dry, irrigated)
- Ownership data
- Usage data



According to data;

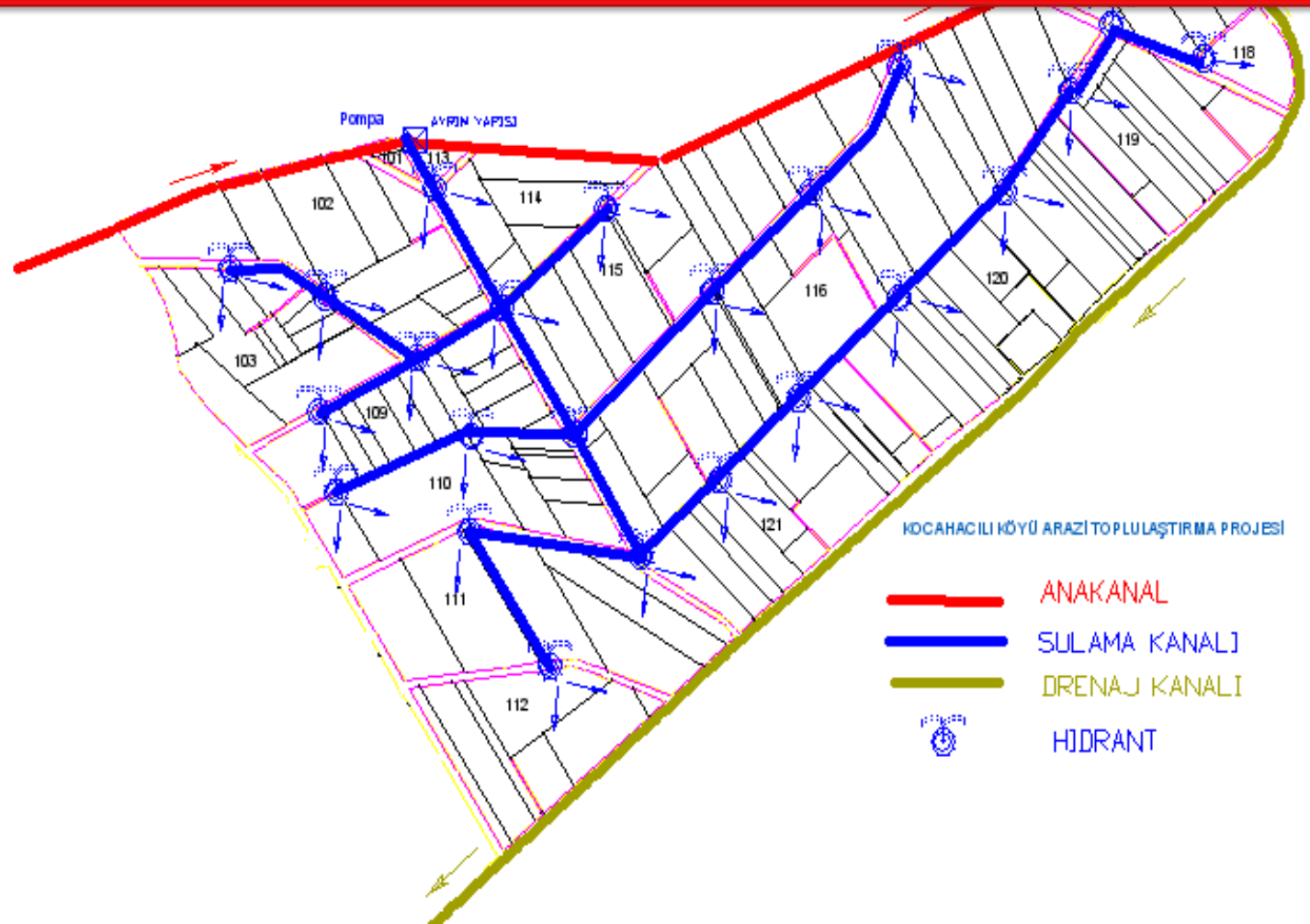
- Agricultural Parcels : 30 million
- Agricultural Holdings : 3.1 milyon
- Average land size : 6 ha
- Parcels per capita : 10 parcel

to monitor the parcel based production and supports



identification number for each parcel

- ✓ Irrigation Networks will be digitized
- ✓ It will be integrated with Land Parcel Information System and Farmer Registry system
- ✓ Irrigation will be controlled parcel based



3 Operation and production issues

- ✓ Monitoring and evaluation for irrigation networks
- ✓ Deficit-limited irrigation during drought

Production Systems Changes

- ✓ Water harvesting
- ✓ Drought-resistant varieties
- ✓ Tillage (toprak işlemesiz tarım)
- ✓ Good agricultural practices
- ✓ Organic farm

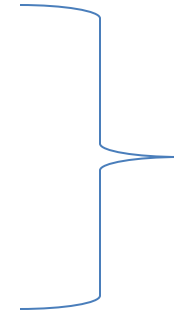


Risk Management in Agriculture

(Good Experience)

❖ Turkish Agricultural Insurance System (Tarsim)

- *Crop Insurance*
- *Greenhouse Insurance*
- *Livestock Insurance*
- *Poultry Insurance*
- *Aquaculture Insurance*



- *Hail*
- *Storm*
- *Flood*
- *Fire, EQ*
- *Landslide*
- *Quality Loss*
- *Frost (fruits)*

❖ Drought Action Plan (2013-2017)

Collaboration Opportunities

- Modern irrigation systems, (planning, projecting and training)
- Land Reclamation and drainage systems
- Land Consolidation
- Land use planning
- Monitoring of pollution from agricultural activities (Nitrate Information System - NIS)
- CIS
- Agricultural databases (AIS, FRS, LPIS)
- Turkish Agricultural Insurance System (TARSİM)
- Drought Action Plan and Implementations
- Rural Development Plan and Implementations
-

- THANKS FOR YOUR ATTENTION