



# Ministry of Agriculture and Rural Affairs

General Directorate of Agrarian Reform

Land Consolidation Projects in Turkey

Gürsel KÜSEK (PhD)

2010



## General view of Turkey



Population: 72 million

### Area;

Total : 780,580 sq km  
Water : 9,820 sq km (%1.2)  
Agricult. : 265,000 sq km (%34)  
Pasture : 125,000 sq km (%16)  
Woodland: 200,000 sq km (%26)

### Elevation extremes:

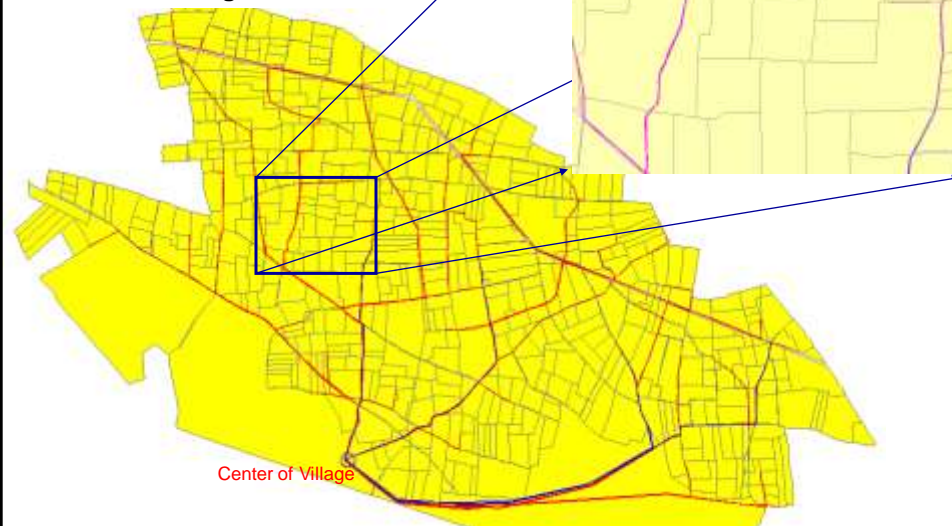
Mediterranean Sea 0 m  
Mount Ararat 5,166 m

### Climate:

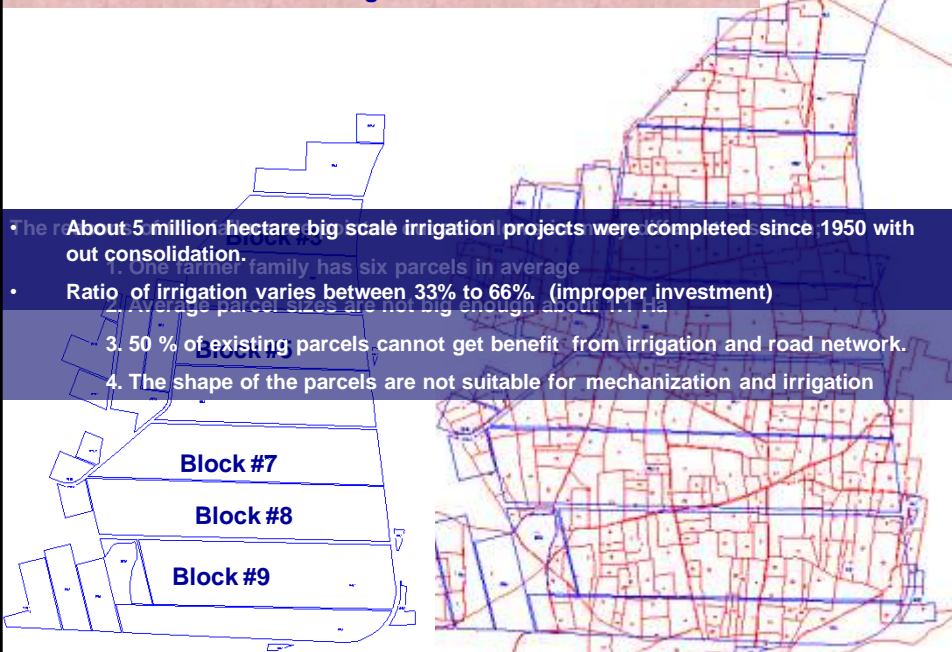
hot, dry summers with mild,  
wet winters in coastal areas,  
continental in interior parts

Red lines are present road network and black lines are boundary of the parcels.

This is a sample of the parcel pattern. In present situation, generally most of parcels haven't direct road access and their shape is not suitable for irrigation and mechanization.



Without consolidation, on present parcel pattern, the new road and channel network were designed as shown below.



- The re About 5 million hectare big scale irrigation projects were completed since 1950 with out consolidation.
- 1. One farmer family has six parcels in average
- Ratio of irrigation varies between 33% to 66%. (improper investment)
- 2. Average parcel sizes are not big enough about 1.71 Ha
- 3. 50 % of existing parcels cannot get benefit from irrigation and road network.
- 4. The shape of the parcels are not suitable for mechanization and irrigation



**PII Pompa İstasyonu**



**PII Ana Kanalı**



**PII Pompa İstasyonu**



**PII Pompa İstasyonu**

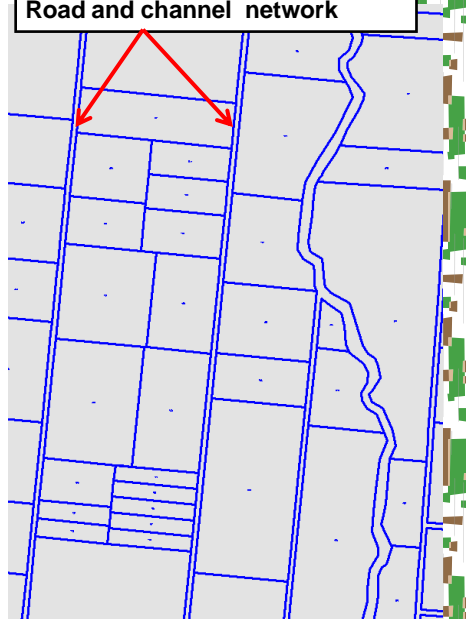
## Land Consolidation

**Channel network**



**Without land consolidation**

**Road and channel network**



**With land consolidation**

During parcel planning step we have interview with every single villagers.



According to the villagers demand and the technical expects, the new parcel design were completed.

Then, we have many meetings with villagers;

- To describe problems,
- To discuss solutions,
- To discuss preparation and application steps.
- To describe the responsibilities.

\* Government responsibilities;

- Getting farmers approval for parcel planning.
- Each parcel will utilize the channel and road network directly.
- No investment charge to farmers.

\* Villagers responsibilities;

- Farmers will not ask for things to disturb parcel planning.
- The area needed for channel and road network will be taken from farmers in proportion to their land and they will ask for no money for the land.





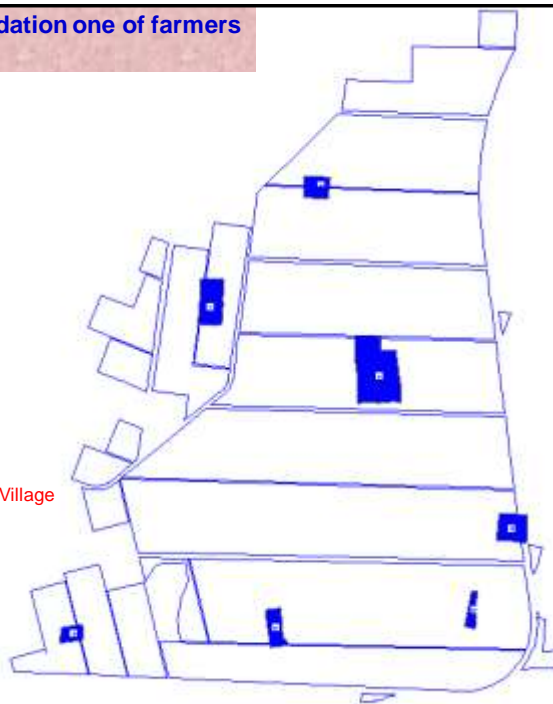
- End of the meetings we get a vote.

if more then 66% of land owners say “YES” AND  
If the willing land owners have 51% of total land of  
project area.  
Then the project is undertaken.  
According to the law;  
The voting and other steps must be open.

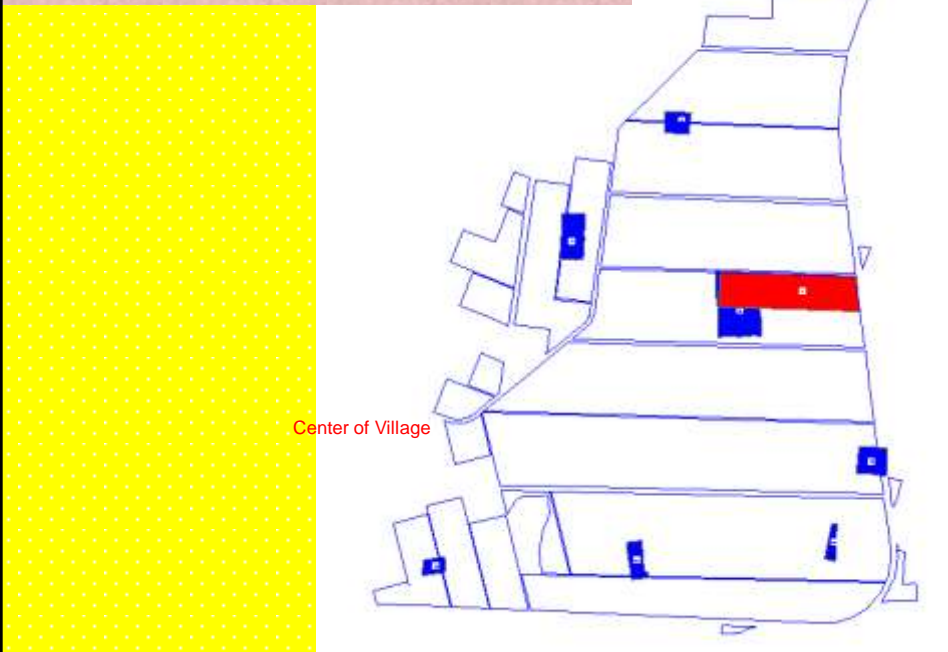
For example, before the consolidation one of farmers  
had seven parcels.



Center of Village



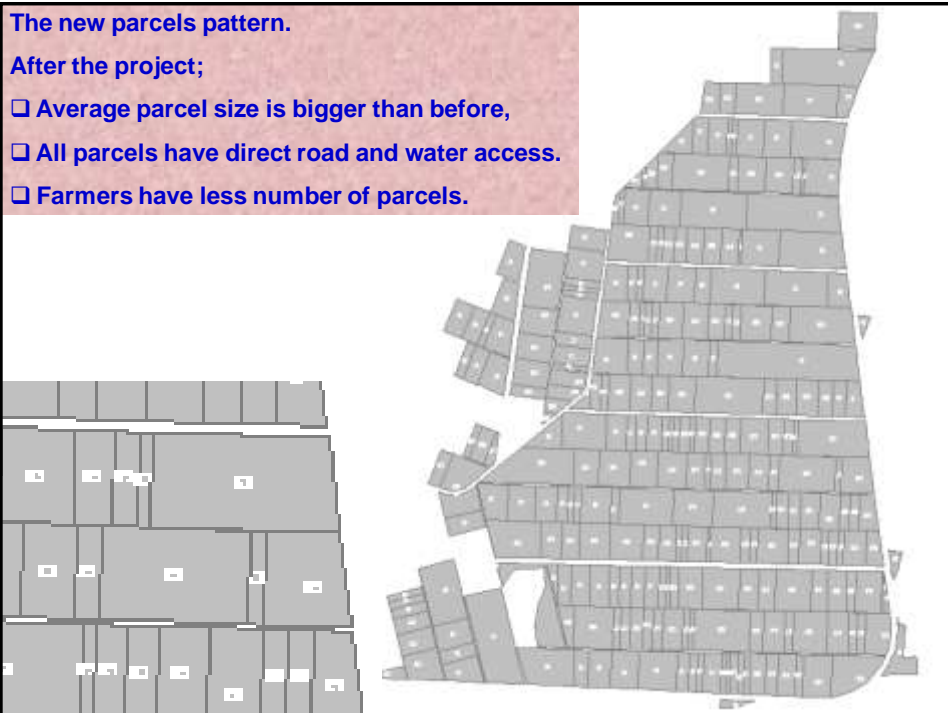
After the project the farmer is agree to have just one parcel. (Red colored one.)



The new parcels pattern.

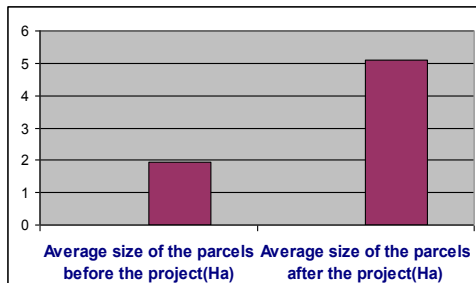
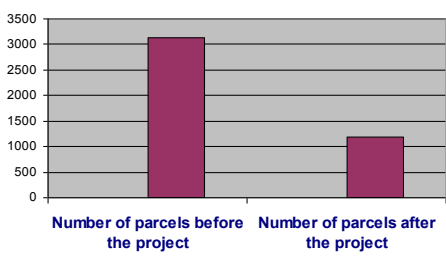
After the project;

- ☐ Average parcel size is bigger than before,
- ☐ All parcels have direct road and water access.
- ☐ Farmers have less number of parcels.



### The summary of the project area

Number of village	Project area (ha)	Number of farmers	Population	Number of parcels before the project	Average size of the parcels before the project (Ha)	Number of parcels after the project	Average size of the parcels after the project (Ha)	Consolidation Rate
3	6,051	543	3309	3125	1.94	1188	5.10	62



### The infrastructures.

All development activities were completed with consolidation.



The new parcels pattern.



This part of the project area was covered by apricot trees. So road and channel network were designed by taking the orchards into consideration.

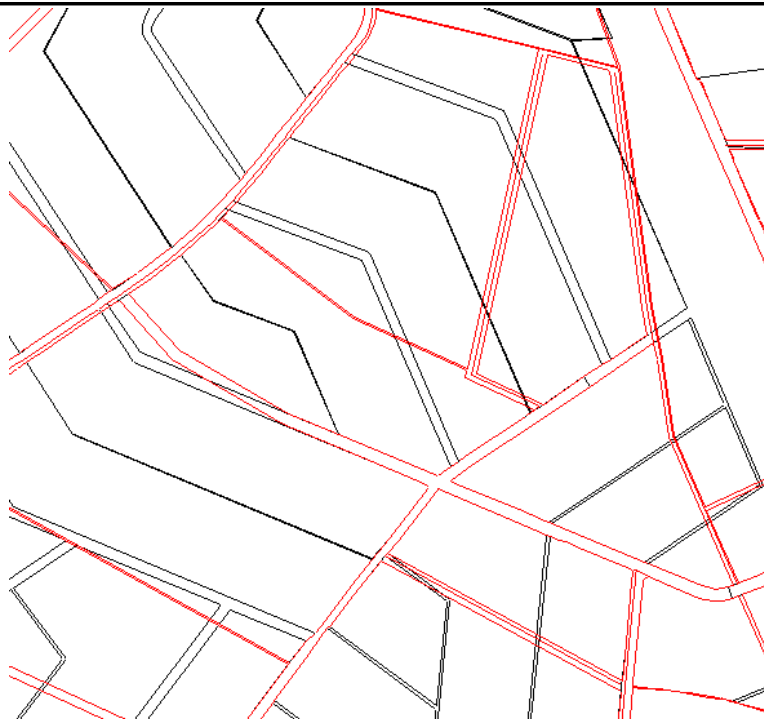




## How can we calculate the benefit of the land consolidation?

- The cost of Government investment is being reduced.
- For Farmers;
  - Length of the road between parcels and farm is shortened and quality of the roads are increased thus transportation cost is reduced.
  - The new parcel's shapes are designed rectangular shape which is suitable for agricultural mechanization. This increases the efficiency and the farmers income.

When the land consolidation was considered the network in red was designed. Since the average parcel size increased after the consolidation the parcels were reached with shorter road and channel systems.

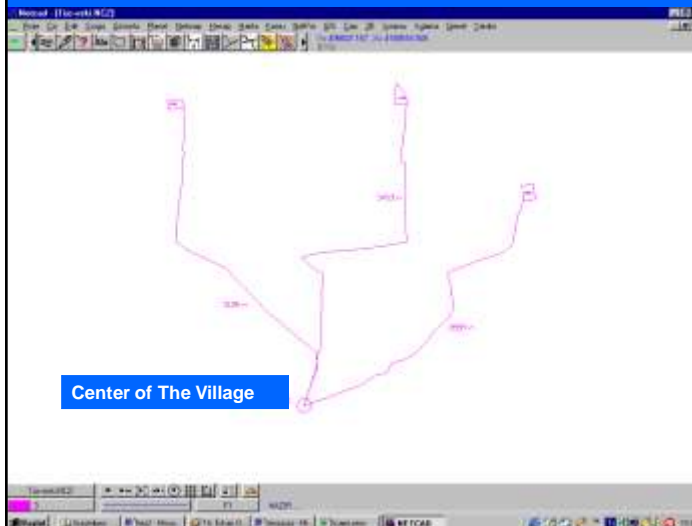


## Benefits of farmers

For example, one of farmers has three parcels.

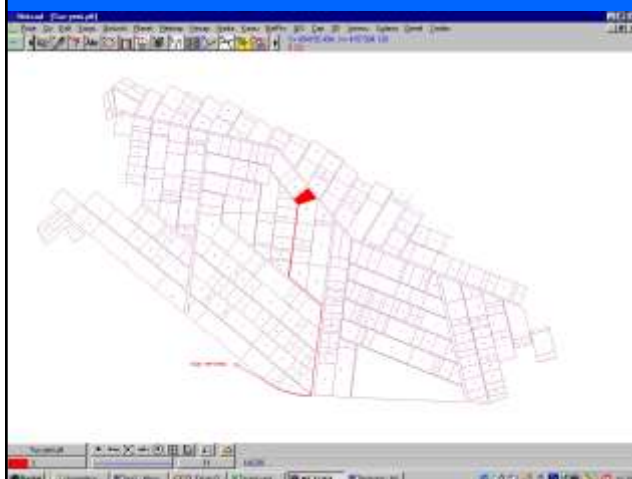
$3125 + 3453 + 2859 = 9437$  meters road length.

Each time for agricultural activities, farmer's should go 9437 meters.

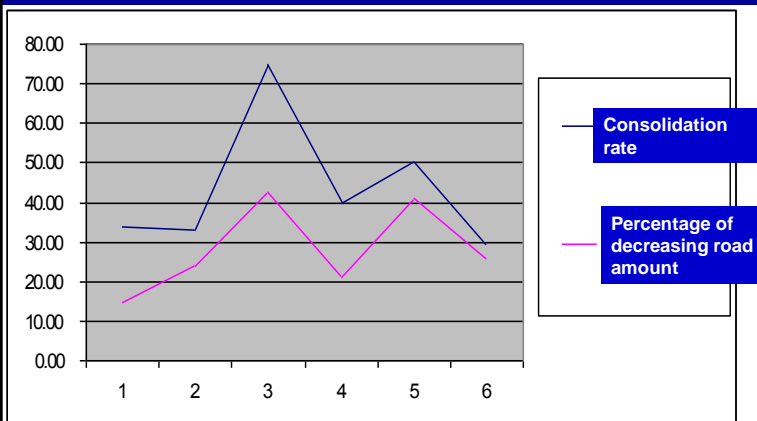


After consolidation project, same farmer's should go 3964 meters to get to the parcel. This saves 5473 m driving (58%)

Percentage of the decreasing rate of road length is changing village to village according consolidation rate and number of parcels of farmers.



There are very close relation between consolidation rate and percentage of decreasing road amount.



The regression equation was found as below;

$$(PDRA) = \beta_0 + \beta_1(CR) + u^{\wedge}$$

$$^{\wedge}PDRA = 11,001 + 1,080 (CR)$$

PDRA= Percentage of decreasing road amount

CR= consolidation rate

CR = 0 → 11 %

CR = 60 → 76 %

Also quality of the roads are important for gasoline consumption. The Coefficients of road quality are given in most of publications like below.

Variety of road	Coefficient
Asphalt covered road	1
Good quality gravel covered road	2
Undeveloped road	3 - 4



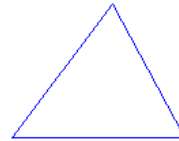
Time loss coefficient of parcel shape was given as below;

**Rectangular shape**



**1.0**

**Triangle shape**



**1.2**

**Oblique shape**



**1.1**

**Shapeless**



**1.3**

Items	Benefit ( US\$ / Per hectare )
Irrigation investment cost (%40)	<b>2500</b>
Legal expropriation (%5)	<b>500</b>
<b>Total</b>	<b>3000</b>
Transport cost (Farm – Parcel) (25 Lt/Ha/Year)	<b>33</b>
Transport cost (quality of road) (15 Lt/Ha/Year)	<b>20</b>
Efficiency of mechanizations in parcels. (shape of parcels) (10 Lt/Ha/Year)	<b>13</b>
<b>Total (50 Lt/Ha/Year)</b>	<b>66</b>



Completed area;  
Years

**1961-2002**  
**2003-2008**

**450.000** hectare  
**562.000** hectare

**TOTAL**

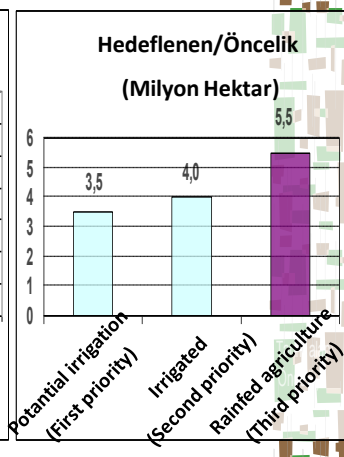
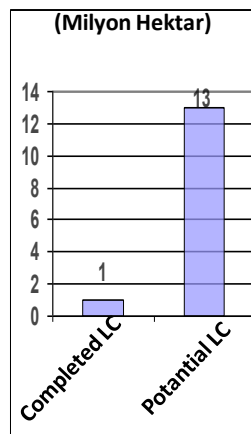
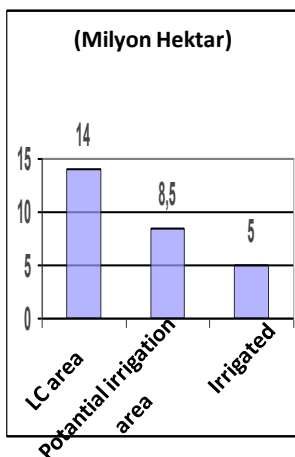
**1.012.000** hectare

On going project

2009 – 2012

2.5 million hectare

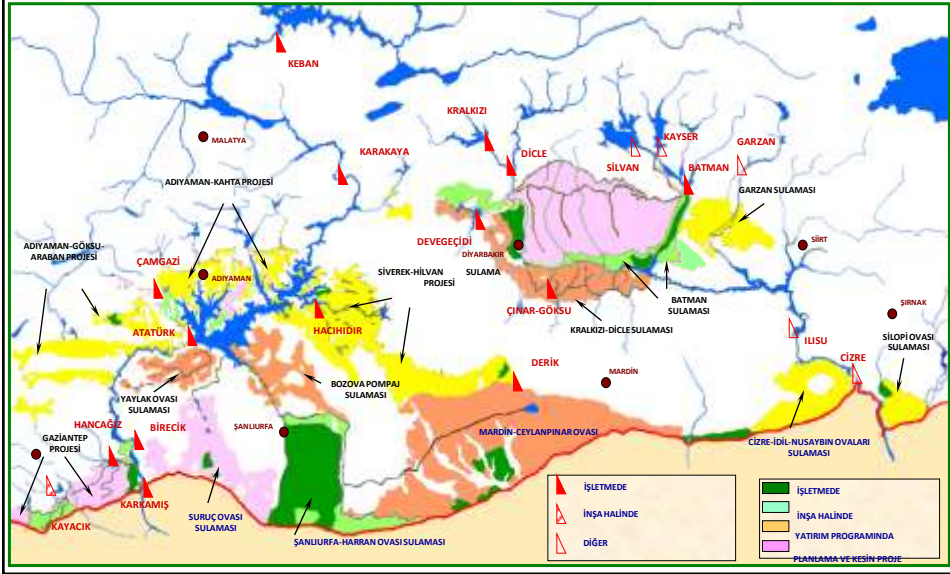
## Land Consolidation Needs and Objectives



**GAP ; - 2 Basins (Euphrates and Tigris)**

**-9 Provinces (Diyarbakır, Batman, Siirt, Şırnak, Şanlıurfa, Mardin, Gaziantep, Kilis, Adıyaman)**

**-Total area is about 2.060.000 hectare**



## International cooperation

**Government to Government projects;**

**Dutch side: Government Service for Land and Water Management of the Netherlands and Cadastre, Land Registry and Mapping Agency of the Netherlands**

**Turkish side: General Directorate Agrarian Reform, State Hydraulic Department, General Directorate of Cadastre**

1. First one was at 2008-2009
2. The second one is at 2010 – 2011

**“Strengthening of institutional capacity to implement a large multi-level land consolidation program in Turkey”**

1. TAIEX Project about ecological corridors at 2009



## Development of ecological corridors

**TAIEX Mission, Ankara 12<sup>th</sup> November 2009**

Theo van der Sluis,



EU Biodiversity Conservation expert

EU



**ALTERRA**  
GREEN WORLD RESEARCH

## Why do we need ecological network?



Maintain biodiversity (maintain larger territories)

Allow for re-establishment of species (meta-population dynamics)

Prepare for climate change

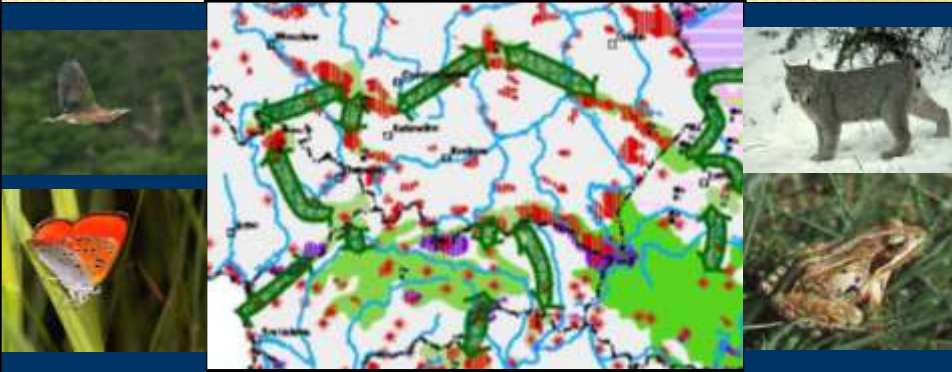


This project is funded by the  
EU

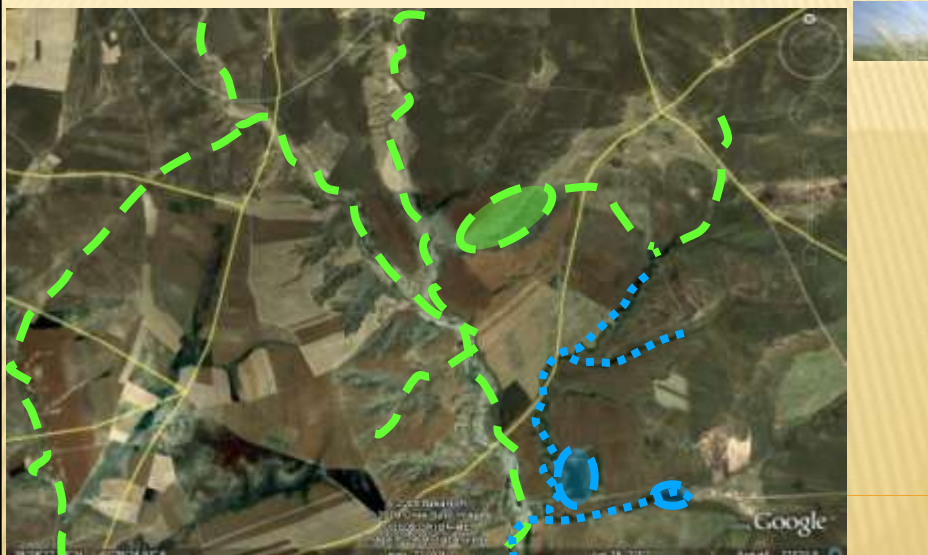


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## Why do cohesive ecological networks provide space for species?



## Development of an ecological network

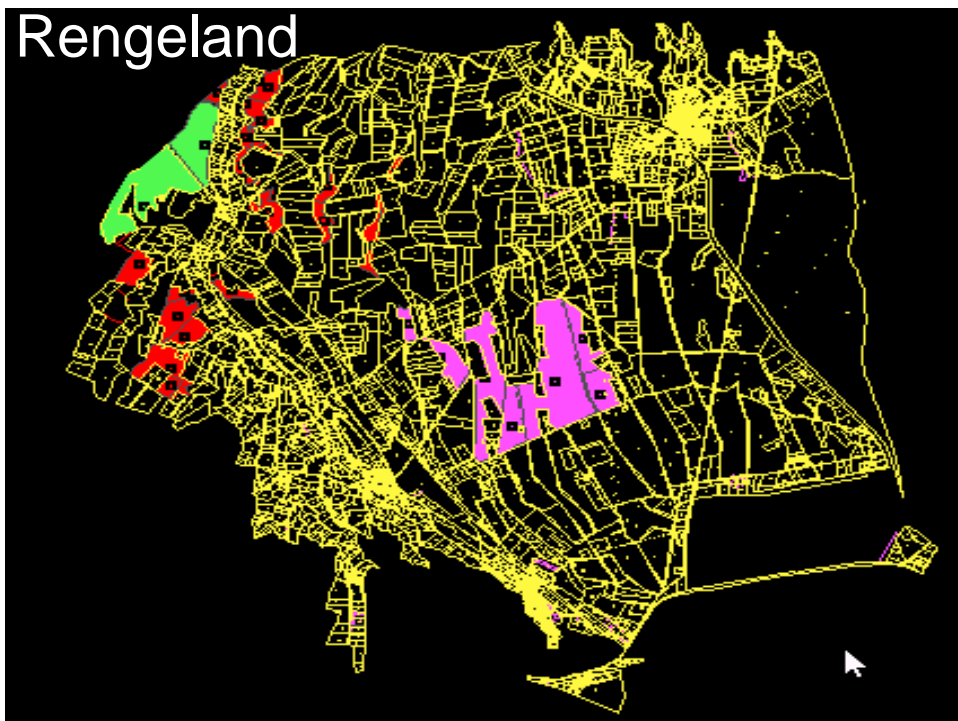




## Determination and inventory of historical and cultural places



## Rengeland



This is completed road.



This is one year old road.



This is one of the completed road and canal systems.

