The Republic of Turkey
Ministry of Forestry and Water Affairs

General Directorate of Combating Desertification and Erosion

Land Degradation Neutrality (LDN)
Turkey's National Report
(2016-2030)

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Forest and Water is Life.

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Background Information on Turkey

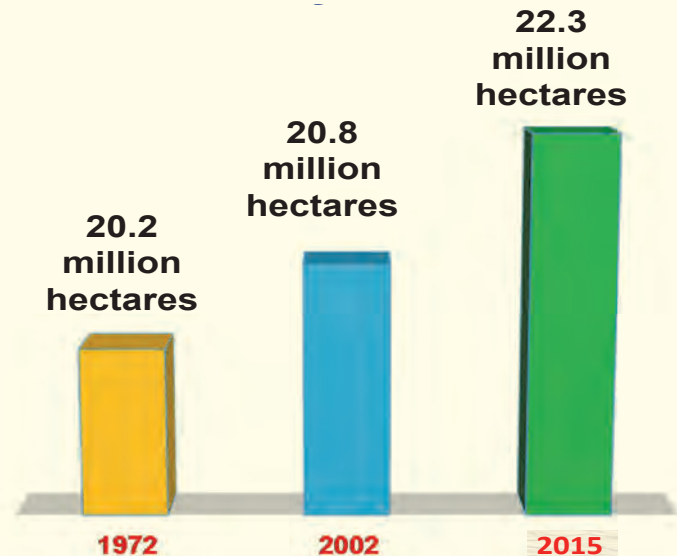|	
Total surface area	780,043 km^2
Population	80 million
Climate	Semi-arid and sub-humid Mediterranean climate
Average precipitation amount	588 mm/year
Average elevation	1132 m
Forestlands	28.5 %
Agricultural lands	31 %
Rangelands	19 %
Protected sites	7.6 %

OUR FOREST ASSET INCREASES...

So far in Turkey, a total of;
- 2,338,073 hectares of afforestation works
- 1,357,929 hectares of erosion control
- 2,899,977 hectares of rehabilitation activities
were completed.

OUR FOREST ASSET INCREASES...

➤ **We increased our forest assets by 9 million decares in the last 12 years.**

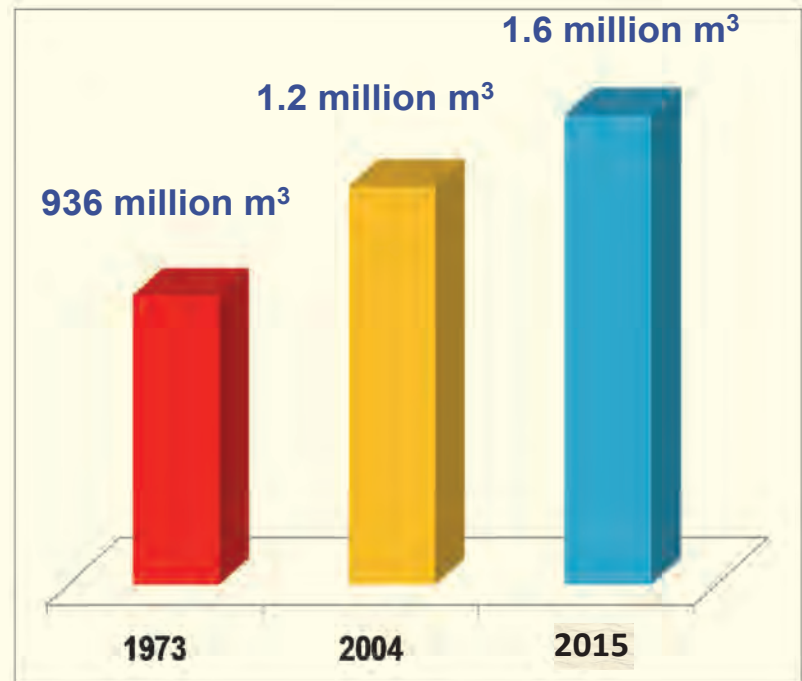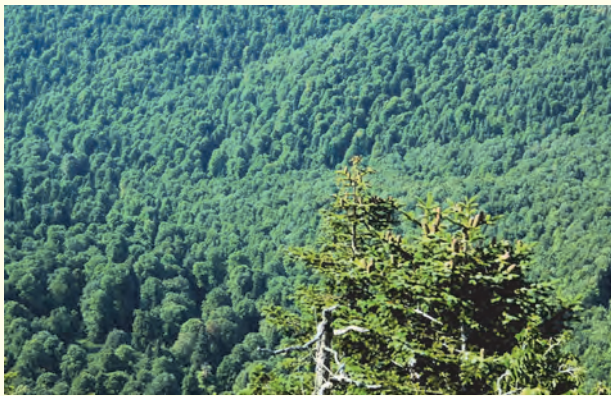➤ **The target is to convert 30% of the country area into forests by the year 2023.**

20.2 million hectares — 1972

20.8 million hectares — 2002

22.3 million hectares — 2015

DESERTIFICATION MAP OF TURKEY

TÜRKİYE ÇÖLLEŞME RİSK HARİTASI (AHP)

Sınıf	Sınıf Aralığı	Açıklama		Sınıf	Sınıf Aralığı	Açıklama		Sınıf	Sınıf Aralığı	Açıklama	
1	1,00 - 1,27	Çok Düşük - Çok Düşük		4	1,41 - 1,45	Düşük - Orta		7	1,55 - 1,60	Yüksek - Yüksek	
2	1,28 - 1,34	Çok Düşük - Düşük		5	1,46 - 1,48	Orta - Orta		8	1,61 - 1,67	Yüksek - Çok Yüksek	
3	1,35 - 1,40	Düşük - Düşük		6	1,49 - 1,54	Orta - Yüksek		9	1,68 - 2,00	Çok Yüksek - Çok Yüksek	

LEJANT
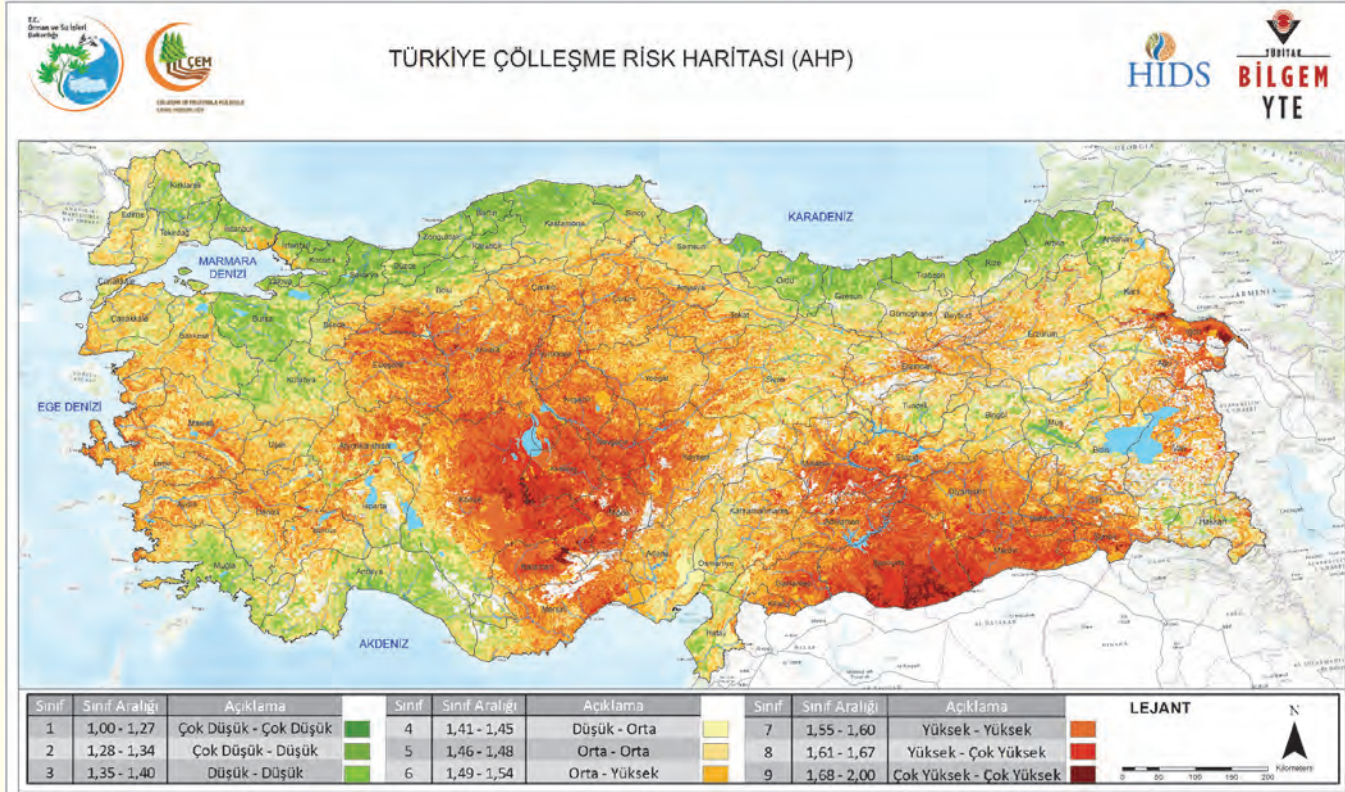
Government leadership and stakeholder participance

- Government showed commitment to the matter with the hosting of COP 12 and the Ankara Initiative.

Government leadership and stakeholder participance

- **National working groups** comprising of public institutions, scientific institutions, public sector, CSOs, local communities and land users.
- The working group identified **National Targets**.

Government leadership and stakeholder participance

LDN target activities were in fact included in;

- National Development Plans
- Government Programmes
- Strategy Documents
- Action Plans as 2023 targets. Within the scope of LDN target setting, existing targets were revised to **include the year 2030.**

Identification of LDN baseline values

3 Significant Indicators

- Land Productivity
- Over / Under Ground Carbon Stocks
- Land Cover and Changes in Land Cover

Land Productivity Current Status and Trends

- **Collect Earth** programme, and **NDVI** and **NDWI** data were employed.

- Examinations were carried out in **3950 points**, randomly dispersed in arid and semi-arid regions in Turkey (78.13%). This study was expended by including **61,000 points** from all over Turkey, and thus, hot points for degradation could be identified more accurately

- Forestland data was obtained from the **Forest Management Plan.**

- CORINE programme was excluded from evaluation due to its land cover classifications, as well as its **scale size.**

- MODIS (2000-2010) global land cover data was not used as it conflicted national data. Planned forestry works, particularly, were categorised as forest degradation, and **afforestation works** can only be observed **15-20 years later** due to the scale size.

Soil Organic Carbon Current Status and Trends

Türkiye Toprak Organik Karbon Stoku Haritası (TAGEM-FAO)
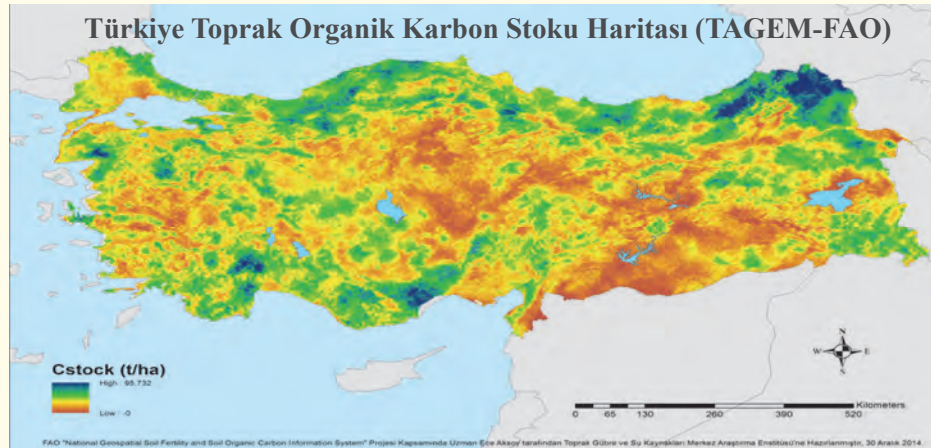
Soil Organic Carbon Stock Values of Turkey

	Agriculture	Forest	Pasture
SOC (t/km²)	2,979	4,512	3,708
Area (km²)	239,430	216,780	146,170
Soil Organic Carbon (tonne)	713,261,970	978,111,360	541,998,360

Carbon stocks (t/ha) = SOC (%) x Bulk Density (g/cm³) x Depth (30 cm)
Bulk Density = 1.3 gram/ cm³   *Weighted Country Average = 34.54 t/ha (SOC)= 3454 tonnes/km²*

Soil Organic Carbon Current Status and Trends

A new SOC project could not be initiated due to insufficient data and baseline values.

With a view to determine current Soil Organic Carbon stocks of Turkey, to develop a monitoring system to identify soil organic carbon amount, and to establish a monitoring system;

- Carbon units will be established of regions containing similar soil organic carbon amounts,

- Turkey's under and over ground soil organic carbon stocks will be calculated and periodically monitored when the Soil Organic Carbon Estimation Model is developed,

- Data produced and logged into the database towards the achievement of national Land Degradation Neutrality targets will be accessible online by concerned beneficiaries, and thus, repsonsible and stakeholder institutions will be provided with decision-support.

Land Cover Current Status and Changes (2000-2010)

TURKEY- JRC- MODIS DATA									
Land-Use Category	Land area (2000)	Land area (2010)	Net change in area (2000-2010)	Net land productivity change (sq km, 2000-2010)					Soil organic Carbon (2010)
	km²	km²	km²	Declining	Early stage of declining	Stable but stressed	km²	km²	km²
Forest land	164,711.40	164,323.70	-387.70	2,124.90	2,941.20	6,213.70	80,142.50	72,789.80	37.76842036
Shrubs, grasslands and sparsely vegetated areas	199,999.80	200,151.80	152.00	2,582.30	1,458.40	9,253.40	167,187.20	18,566.10	32.29037424
Cropland	376,027.30	376,262.00	234.70	5,044.50	6,272.70	24,471.30	284,450.50	55,499.70	32.78797195
Wetlands and water bodies	15,982.60	15,982.60	0.00	472.90	144.60	656.10	4,011.80	1,174.40	33.94862982
Artificial areas	16,971.00	16,971.00	0.00	1,728.00	658.00	2,010.80	10,394.30	2,119.60	35.19540836
Bare land and other areas	6,270.70	6,271.70	1.00	99.10	8.40	133.30	5,375.40	175.10	31.18244119
Total	779,962.80	779,962.80	0.00						

Land use categories based on **MODIS** data (EC-JRC)

Land Cover Current Status and Changes (2001-2015)

Land Productivity Current Status and Trends

Current Status	Change Direction	Greening Area (km²)	Desertification Area (km²)
Forest	Pasture -> Forest	770	-
Forest	Forest -> Forest	5,420	460
Forest	Settlement -> Forest	160	-
Forest	Other -> Forest	620	-
Agriculture	Agriculture -> Agriculture	2,640	1,250
Agriculture	Other -> Agriculture	300	-
Shrubland	Agriculture -> Shrubland	150	-
Shrubland	Forest-> Shrubland	-	320
Shrubland	Pasture -> Shrubland	150	300
Shrubland	Other -> Shrubland	790	160
Pasture	Forest-> Pasture	-	160
Pasture	Pasture -> Pasture	2,340	3,400
Pasture	Other -> Pasture	610	470
Settlement	Settlement -> Settlement	150	-
Settlement	Agriculture -> Settlement	0	310
Settlement	Pasture -> Settlement	150	-
Other	Agriculture -> Other	-	160
Other	Other -> Other	-	1,240
Toplam		**14,250**	**8,230**

Change Directions based on Greening and Desertification (2001-2015)

6,020 km²

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CAUSES OF LAND DEGRADATION IN TURKEY (%)

Cause	%
Climate	35,6
Water	18,4
Soil	17,2
Land Cover & Land Use	11,6
Topography & Geomorphology	6,3
Socio-Economy	6,2
Management	4,7
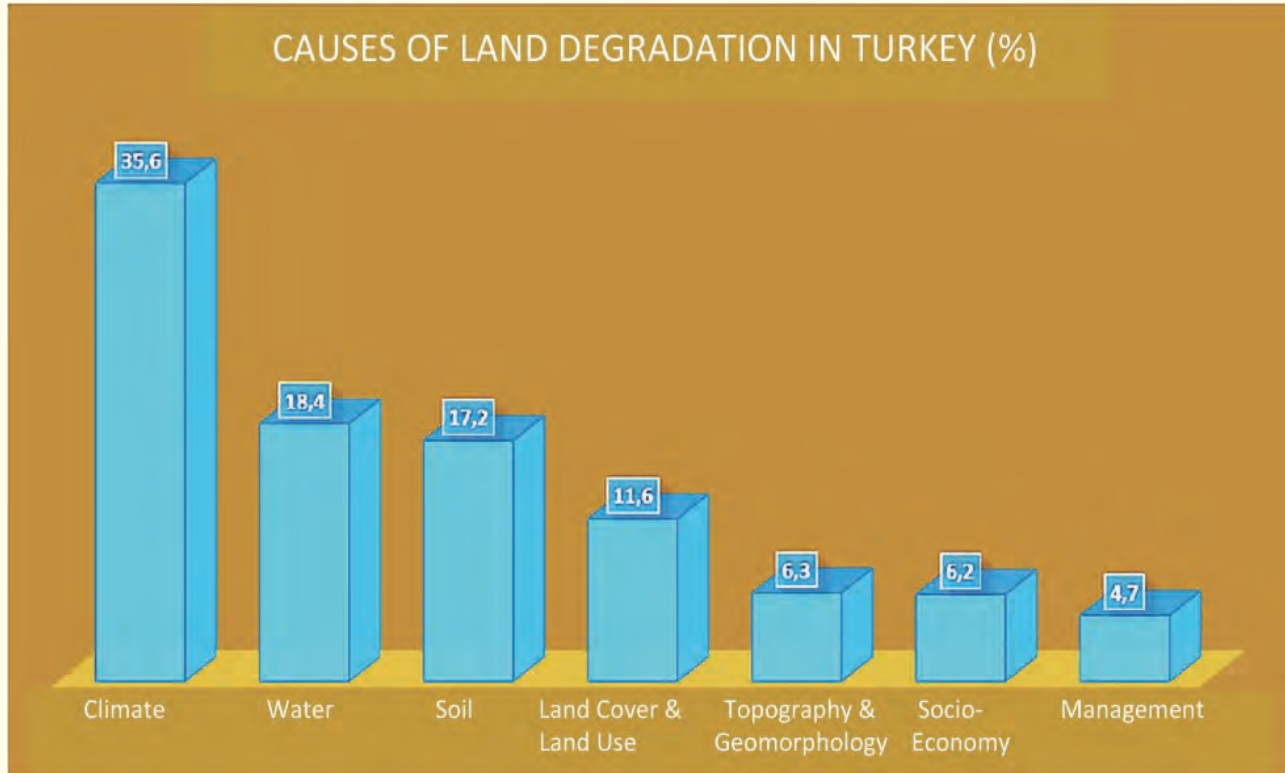
Identification of land degradation drivers

- **In forestlands;**
    - Forest fires
    - Illegal logging
    - Cropland clearing
    - Grazing
    - Pests and diseases
    - Natural disasters
- **Allocation of forestlands to be re-purposed as settlements, tourism areas, mining, energy permissions and such.**
- **Construction of dams and ponds**

- **In agricultural lands;**
    - Downsizing of establishments and their multipartite structures
    - Inappropriate tillage-seeding-planting on highly steep and marginal lands
    - Misuse of agricultural lands
    - Salinization due to over and uninformed irrigation
    - Insufficient land rehabilitation works
    - Wide-spread stubble fires
    - Overuse of fertilisers and pesticides
    - Pollution of agricultural lands
- **In pasture lands;**
    - Uncontrolled, inappropriately timed, and over grazing, misuses and invasions

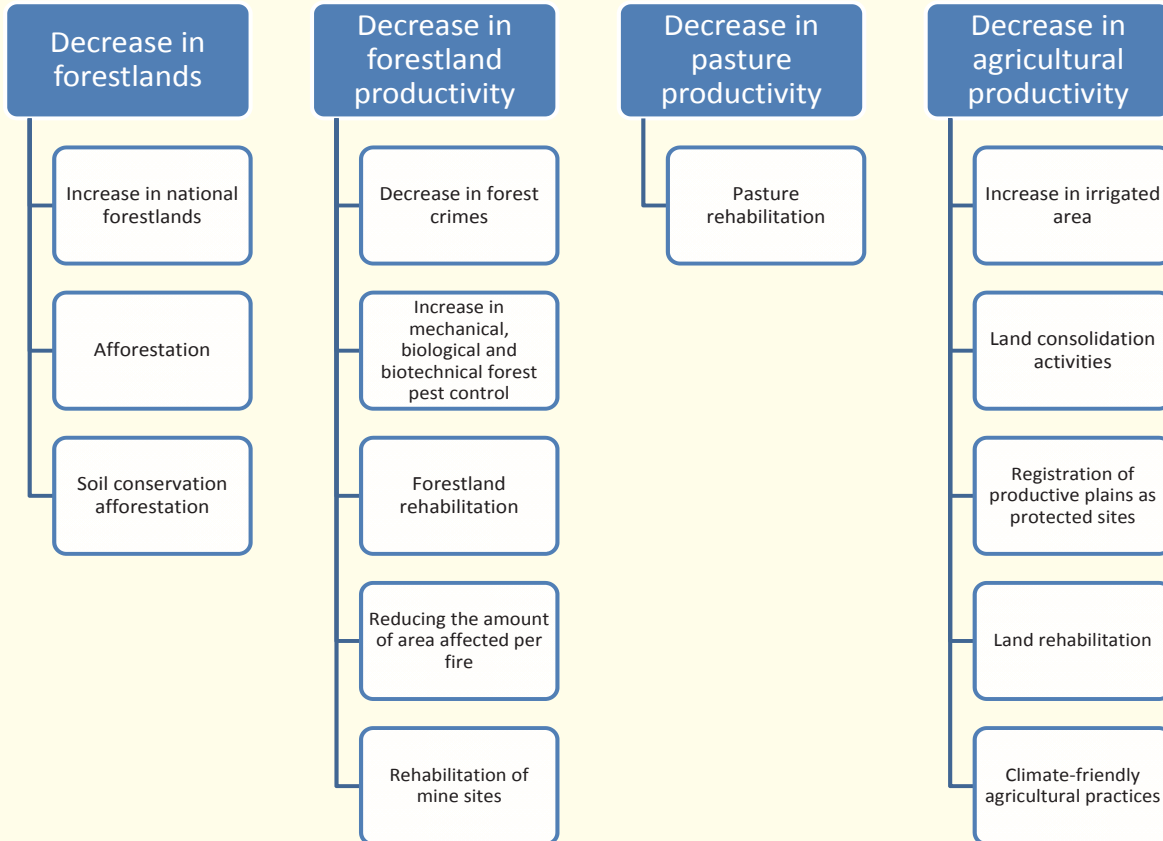# Identification of necessary measures to achieve LDN targets

1. Measures against human-induced changes:
   a) Afforestation,
   b) Rehabilitation,
   c) Pasture rehabilitation,
   d) Erosion control,

2. Measures against natural phenomenon including climate change, drought, and climate characteristics:
   a) Selection of species resilient against drought, salinization and extreme climate conditions
   b) Dams – water collection system (53% of nation-wide irrigation is provided by dams.)
   c) Climate-friendly agricultural practices
      i. Switching from open channel irrigation systems to piped irrigation systems
   d) Efficient water use in agriculture
   e) Switching from dry farming to irrigated farming

Identification of necessary measures to achieve LDN targets

Decrease in forestlands	Decrease in forestland productivity	Decrease in pasture productivity	Decrease in agricultural productivity
Increase in national forestlands	Decrease in forest crimes	Pasture rehabilitation	Increase in irrigated area
Afforestation	Increase in mechanical, biological and biotechnical forest pest control		Land consolidation activities
Soil conservation afforestation	Forestland rehabilitation		Registration of productive plains as protected sites
	Reducing the amount of area affected per fire		Land rehabilitation
	Rehabilitation of mine sites		Climate-friendly agricultural practices

Changes in Forestland Areas based on National Data

Total Forestland Area	Unit	1973		2004		2015	
	ha/%	20,199,296	26.1%	21,188,747	27.2%	22,342,935	28.6%
Total Forestland Volume	m3	935,512,150		1,288,124,772		1,611,774,193	
Increase in Forestland Volume	m3	28,063,205		36,282,291		45,904,083	
Productivity	%	44		50		57	

Republic of Turkey
The Ministry of
Forestry and Water
Affairs

| Change | Area | | Corrective Measures | LDN Targets | | | Investment Amount |
	Collect Earth (2001-2015) (km^2)	(EC-JRC) (2000-2010) (km^2)		Unit	Amount	Duration (year)	(Million Dollars)
Decrease in Forestlands	+11.542 (based on 2000-2015 Forest Management Plan) (1)	388	Increase in national forestlands	%	5 (2)	2030	
			Afforestation	km^2	6,000		900
			Soil conservation afforestation	km^2	9,000		630
Decrease in forestland productivity	460	2,125	Decrease in forest crimes	Adet	1,416 (3)	2017	
			Increase in mechanical, biological and biotechnical forest pest control	%	2.7 (4)		
			Rehabilitation of forestlands	km^2	15,000	2030	450
			Reducing the amount of area affected per fire	ha	0.5 (5)		3.060
			Reducing the number of fires caused by human activities	%	3 (6)		
			Rehabilitation of mine sites	km^2	58	2019	58
Decrease in pastureland productivity	3,710	2,582	Pasture rehabilitation	km^2	7,500	2030	150
Decrease in agricultural land productivity	1,250	5,045	Increase in irrigated area	km^2	22,000	2030	10,266
			Land consolidation activities	km^2	140,000	2023	3,000
			Identification of plains of significant agricultural potential and registering them as agricultural lands	km^2	55,000	2023	0.3
			Amount of rehabilitated lands	km^2	20,000	2030	266
Total	**+6,122**	**10,140**			**274,558**		**18,780.30**

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Upscaling LDN in land use planning

For each action foreseen, an action plan was prepared.
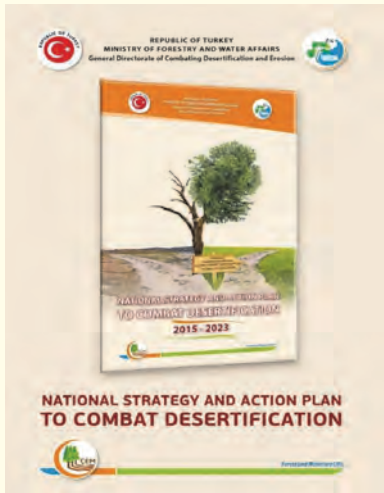
- National Watershed Strategy and Action Plan
- National Drought Strategy and Action Plan
- National Agricultural Drought Strategy and Action
- National Strategy and Action Plan to Combat Desertification
- Impacts of Climate Change on Water Resources and Drought Risk Assessment in Watersheds

Upscaling LDN in land use planning

- A **transformative** project that establishes upscaled mechanisms regarding tools, organisation, cooperation, and stakeholders was initiated.
- The project identifies **implementation methodologies** that define targets and the pathways leading to them.
- **Upper Sakarya Basin** was selected as the implementation site for this project that will include all measures against LDN, and will thus set an example to all future LDN projects.

Şekil 1. Yukarı Sakarya Havzası.

Attaining National LDN Targets

In order to ensure nation-wide achivement of LDN;

- National Development Plans
- Government Programmes
- Strategy Documents
- Action Plans
- Monitoring Systems
  - Activity monitoring
  - Other monitoring systems

Monitoring and Reporting

- Workshops are organised,
- A model software is developed to monitor and report LDN activities.

**TURKEY
LAND DEGRADATION NEUTRALITY**

National Report
2016-2030

Turkey
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the potential

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