

# ADAGIO Country Report

## Greece



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IERSD: [www.meteo.noa.gr](http://www.meteo.noa.gr)

# About IERSD/NOA



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- National Observatory of Athens (NOA) is the oldest research institution in Greece; IERSD is a research institute of NOA
- [www.meteo.gr](http://www.meteo.gr) (displays weather forecasts in Greek covering 160 Greek cities and 30 points over the Greek seas) and also [www.eurometeo.gr](http://www.eurometeo.gr) (EU cities)  
<http://www.noa.gr/forecast> (BOLAM and MM5 models)
- Scientific activities include Air Pollution/Quality, Climate, weather water and Sustainability, Atmospheric Research and Climate Change modeling, Radar meteorology and Remote Sensing, Environmental Impact Studies, GIS and others.

# Overview of Greece



# Overview of Land and Water



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- 75% of the country area is mountainous
- 37% of the total is agricultural land
- 30,1% of the total is active agricultural land
- Irrigated Area/Active Agr. Area=0.33
- Tourism and agriculture are big consumers, during the same period (during hot season)
- More than 80% (87%) of water consumed is used in irrigation (Source: Ministry of Agriculture/online documents)



# Precipitation figures

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- **Variability of precipitation within the country**
- **Attica receives 400mm Precipitation approximately**
- **Northwest of the Country, Ipiros receives 1200mm and up precipitation**
- **Country Average Precipitation: 652mm (Source:AQUASTAT)**
- **Total Precipitation: 86,08 cubic Km/year (Source:AQUASTAT)**



# Water Use

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Agricultural water withdrawal as part of total (%)	80,44
Domestic water withdrawal as part of total (%)	16,34
Industrial water withdrawal as part of total (%)	3,22
Total water withdrawal: per capita (m <sup>3</sup> /inhab/yr)	708,3
Ag water withdrawal as perc of total renewable water resources (a) (%)	8,42
Total water withdrawal as perc of total renewable water resources (a) (%)	10,46
Source: AQUASTAT	

# Greece Corine Land Cover

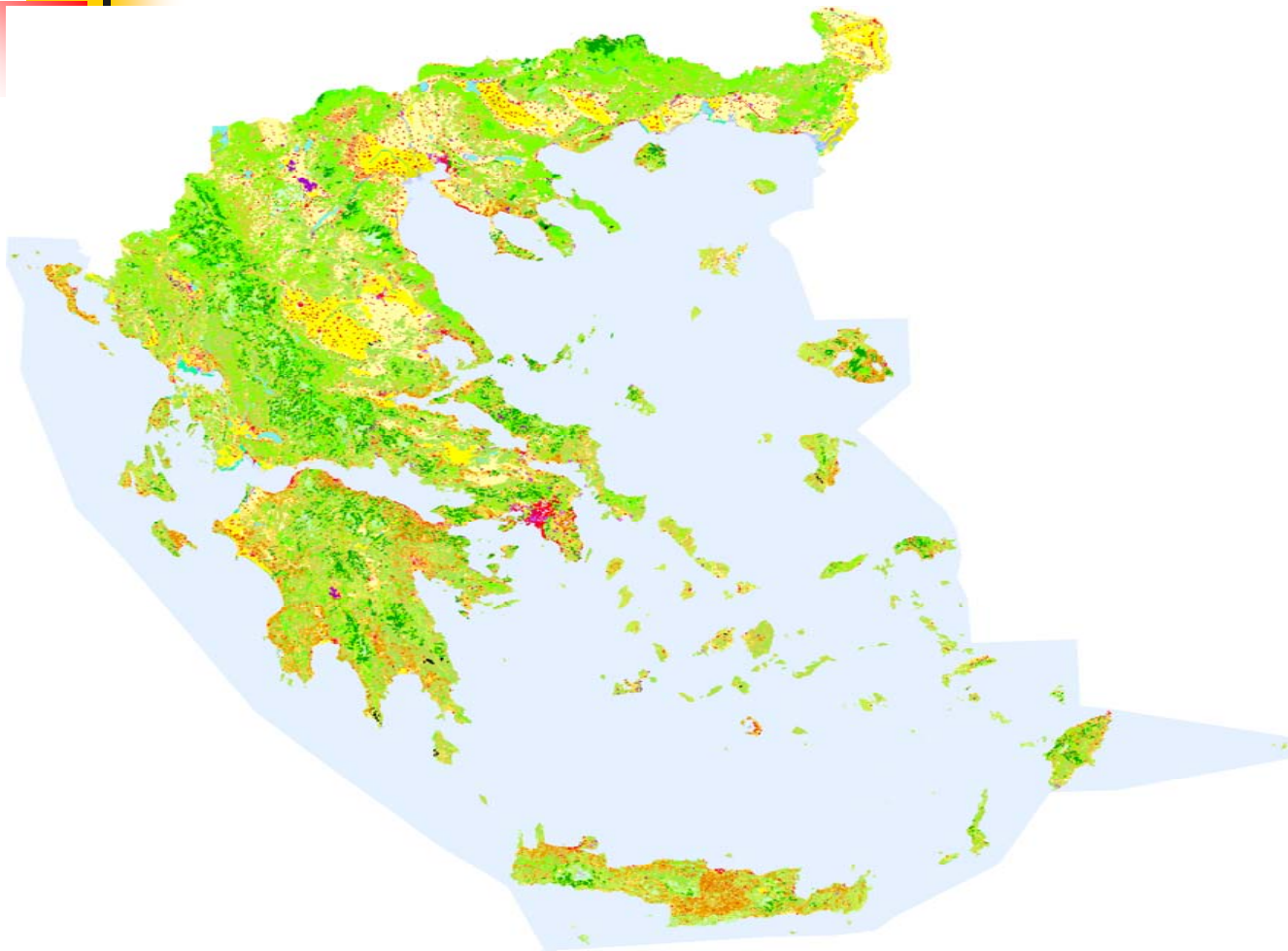


Image map as accessed online from the website of the European Environment Agency at <http://www.eea.europa.eu/>




# Main Agricultural Crops (2003)

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■ Tillage Agriculture	2.176.200 Ha
■ Wheat	72.130 Ha
■ Maize	24.100 Ha
■ Tobacco	56.000 Ha
■ Cotton	370.000 Ha
■ Sugar Beet	36.000 Ha
■ Trees	1.002.000 Ha
■ Olive Orchards	780.000 Ha
■ Vineyards	131.000 Ha
■ Vegetables	116.300 Ha

Source: Ministry of Rural Development and Food at [www.minagric.gr](http://www.minagric.gr)





# Agricultural Population Trends

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- 1980: 35% of workforce on agricultural sector
- 2000: 17% of workforce on agricultural sector
- 2002: 16,2% of workforce on agricultural sector
- 2004: 12,6% of workforce on agricultural sector which is still high compared with the EU 15 average of 3,8%

Source: Final Draft on the National Plan for the Agricultural Development Strategy for the Period of 2007-2013-Ministry of Rural Development and Food at [www.minagric.gr](http://www.minagric.gr)

# Agricultural Areas – Social and Geographic Issues



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- 30,1% of country total is active agricultural areas (including grazing lands) while the EU25 average is 42%
- From this 30,1% of the country, 82,7% is classified as LFA
- LFA: Less Favored Areas: Regulation 75/268 EC which classifies national administration units of the NUTS 5 level

Source: Ministry of Rural Development and Food at [www.minagric.gr](http://www.minagric.gr)



# Agricultural Areas – Social and Geographic Issues

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- Mean Agricultural parcel surface: 0,7 ha
- Mean total surface per/unit: 4,8 ha, compared with 15,8 ha of EU-25
- 99,9% of agricultural businesses are family type, 0,1 of commercial ownership
- 2000: 40% of agricultural workforce is above 55 years old

Source: Ministry of Rural Development and Food at [www.minagric.gr](http://www.minagric.gr)

# Administration of water resources



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- **Regional Authorities manage agricultural water usage, such as water well licensing to farmers**
- **Prefecture authorities – Departments of Land Reclamation**
- **Ministry of Agriculture, Ministry of Environment (and associated agencies) are involved in water use decision making and applications, in public works relevant to reservoirs and irrigation measures**



# Last 100 year trends - NOA

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- Cold period between 1960-1980 and the last 3-4 decades in general.
- Differentiation of Greece with the rest of Europe, even with neighboring areas
- Most importantly, low temperatures especially during the winter period
- But, decrease of winter temperature was observed and extreme values were observed too.

Source: National Observatory of Athens, [www.noa.gr](http://www.noa.gr)



# Last 100 year trends-NOA

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- This cold period related to the observation frequency increase and to the time increase of high pressure systems above Greece.
- Increase of temperature in summer period
- Decrease in precipitation and increase in agriculture water usage for the last 30 years

Source: National Observatory of Athens, [www.noa.gr](http://www.noa.gr)



# Climate Modelling

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- Results are from daily output data through runs of a coupled atmosphere-ocean general circulation model (GCM) HadCM3.
- Reference period: 1961-1990
- Projected period: 2031-2060

Source: National Observatory of Athens, [www.noa.gr](http://www.noa.gr)



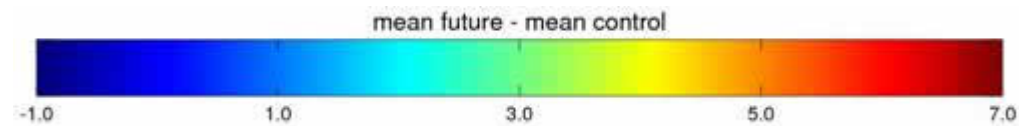
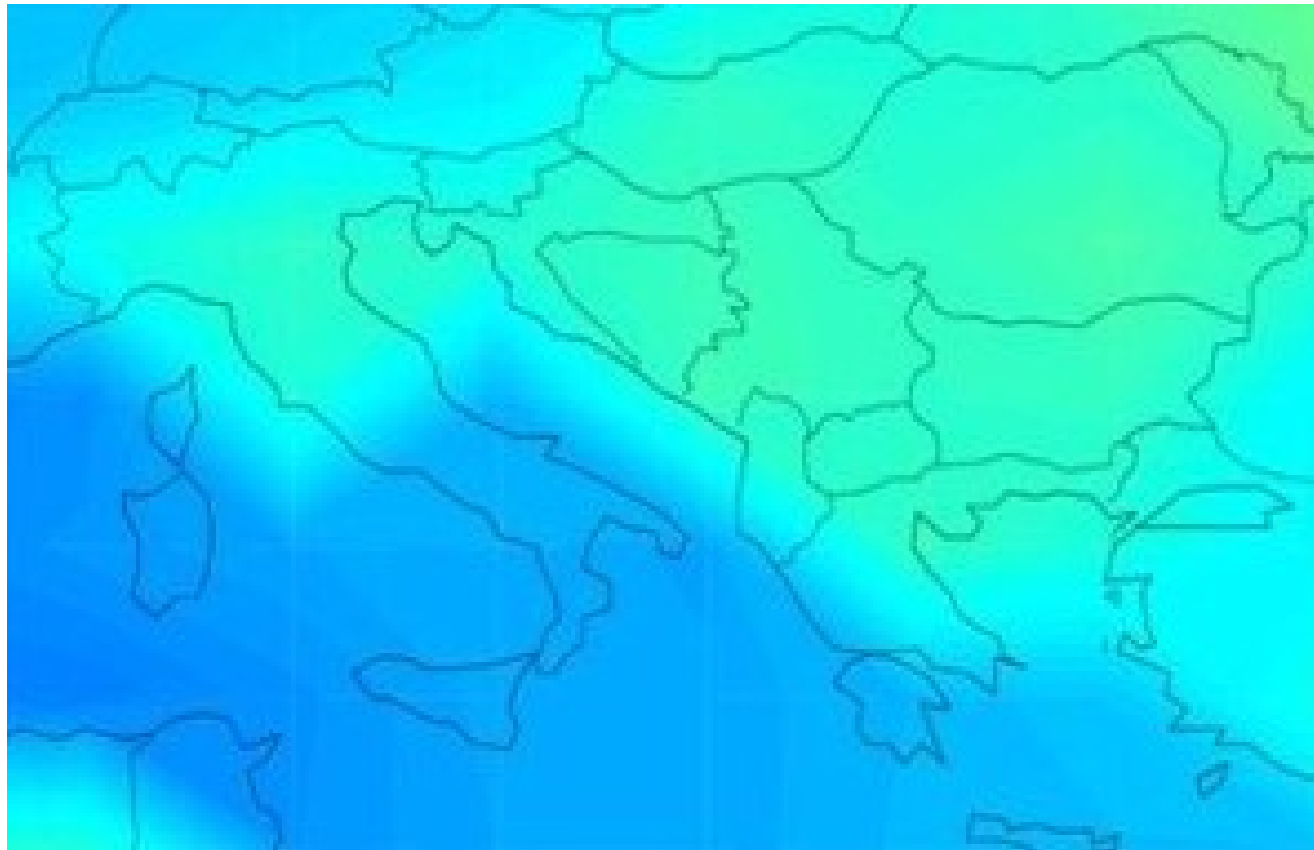
# Annual Temperature Change

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- Greece will have a 1- 2 Degrees Celsius change on the average annual temperature changes for the period of 2031-1060, according to climate model projections.



# Annual Temperature Change



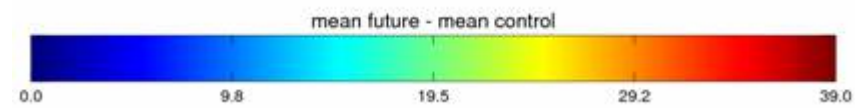
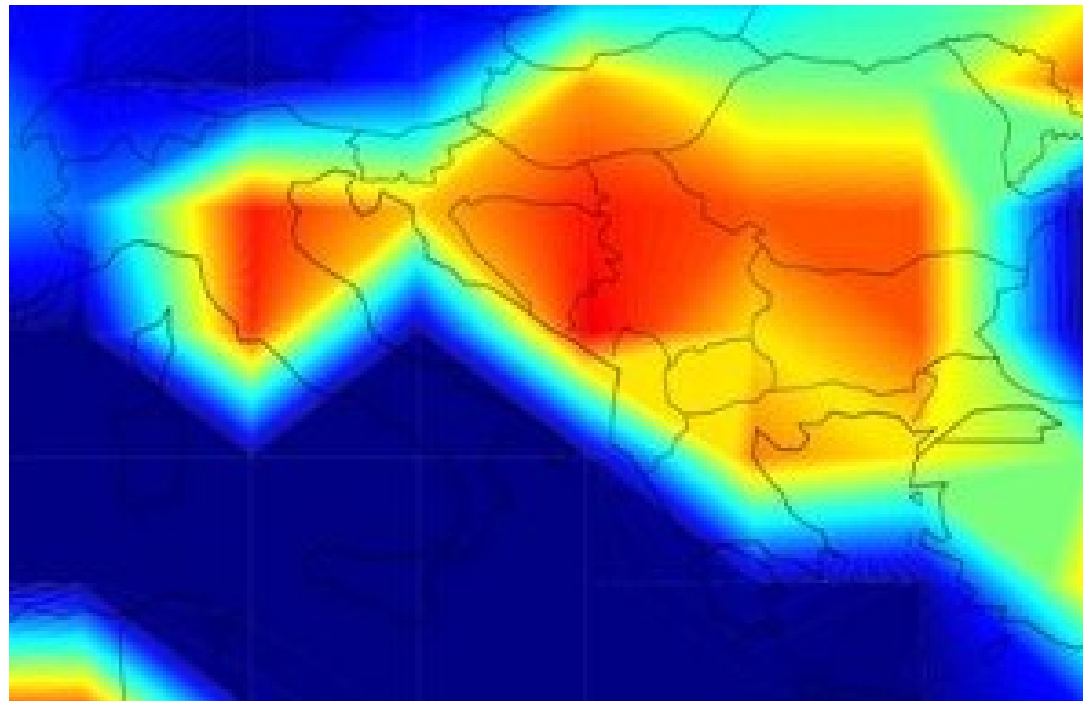


# Hot days for 2031-2060

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- Hot days: this climate variable will change more in the inland and northern parts of the country than in the southern areas

# Hot Days



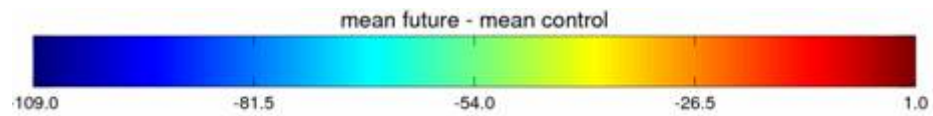
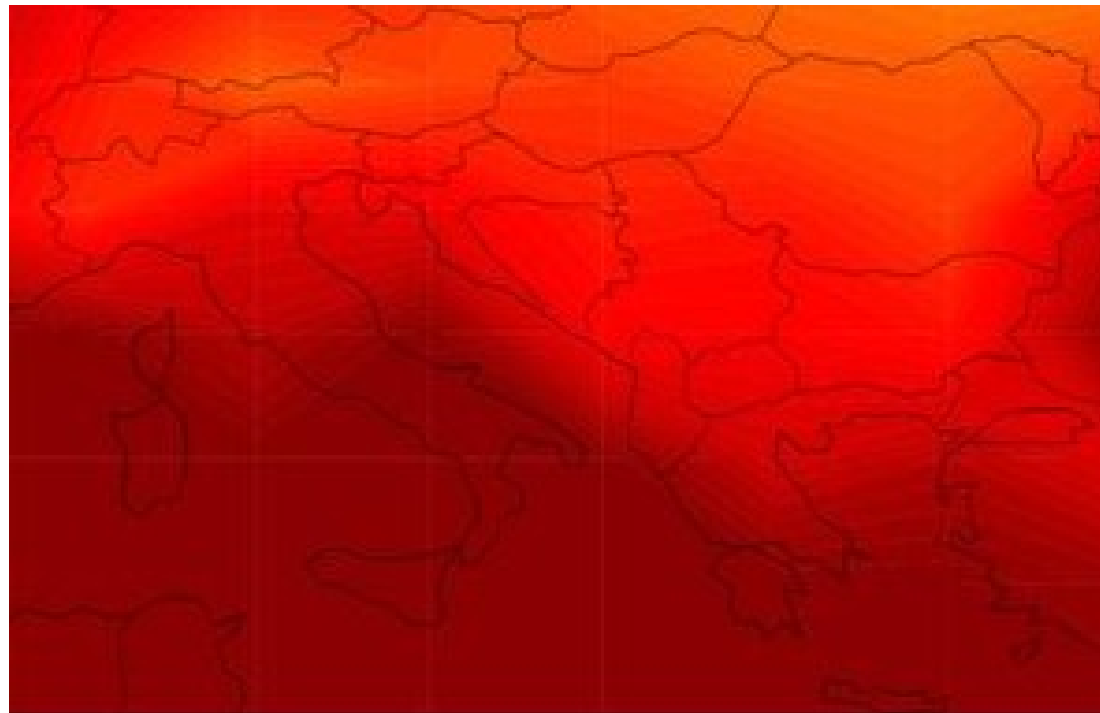


# Frost Days

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- The frost days will not have a significant change for the future period at the coastal and south areas of Greece, but will be reduced for 1-3 weeks at the northern regions
- Coastal and south regions of Greece do not have even at present a significant number of frost days

# Frost Days



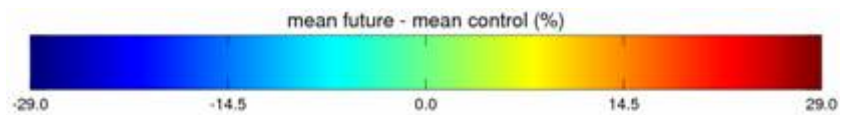
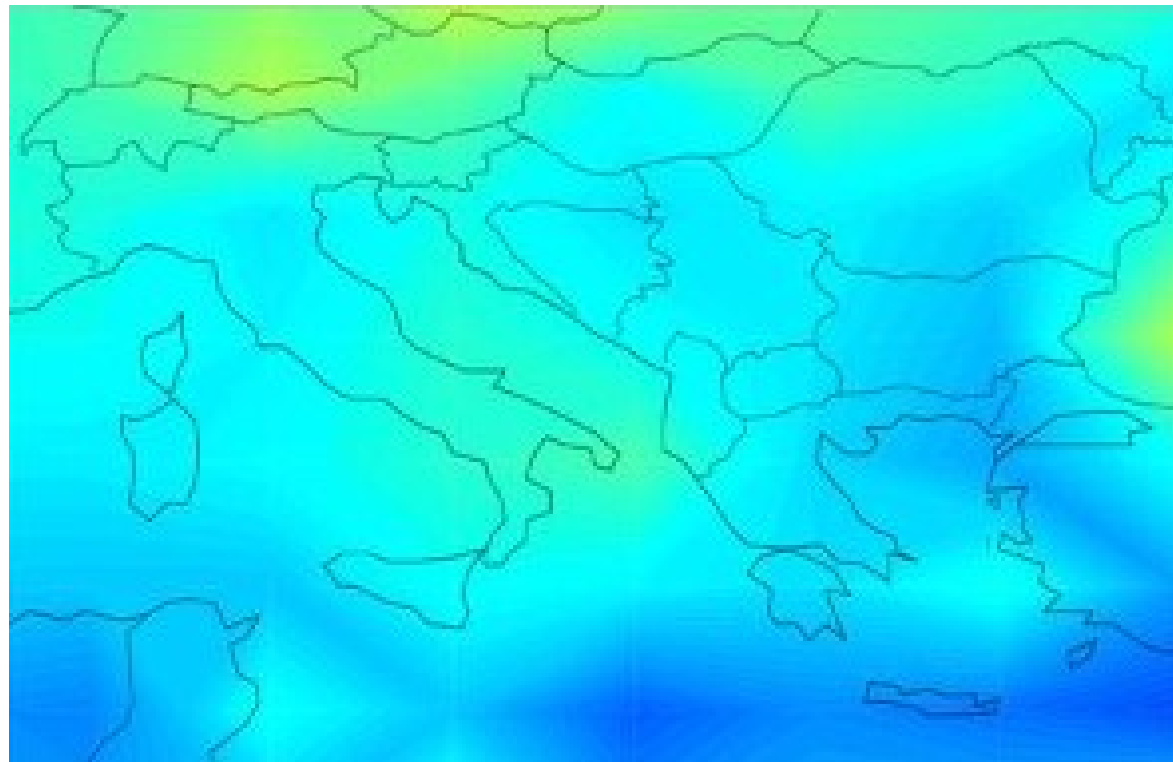


# Annual Rainfall Changes

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- The south regions of Greece will have a reduction of approximately 10%
- The north regions will have a change of 5% in comparison with today

# Annual Rainfall Changes



# Low Temp Agricultural Hazard

## Example



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- Winter of 2002 and 2003
- Cold wave even at some coastal and inland areas destroyed in very big percent the olive trees
- Olive trees need at least 5 years to recover in some areas where damage was high
- Old trees were cut, new trees were planted in their place in certain areas
- Agricultural Insurance Organization provided funds after inspection
- Local economy is negatively influenced



# Country and EU Policies



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- New CAP
- Reform of agricultural sector based on the new CAP
- Education of Agricultural Population
- “New Farmer” programs improve age structure of agricultural population
- National & Regional Management of Water Resources
- Country implementation of WFD

# Example Country Measures



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- Reduction of water loss through the improvement of irrigation efficiency.
- Reduction of water losses and demand in urban and industrial use.



# Example Country measures

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- Increase of water supply through
- (1) funding of programs for water recycling and reuse
- (2) studies for the risks associated with water shortage in threatening areas
- (3) restraint and storage of surface runoff water
- (4) transfer of surface water to areas threatened by desertification
- (5) forest watershed management
- (6) Reservoirs and artificial water storage systems



# ADAGIO Recommendations

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- Deployment and demonstration of climate models
- Implementations of GIS systems
- Plant growth models
- Seeding dates and other techniques
- AGRIDEMA Greek Project input in ADAGIO



# ADAGIO Recommendations

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- Demonstration of the quantitative techniques usage in agriculture
- Pilot Projects and working close with farmers, collecting their input on appropriate work packages

# General recommendations



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- New Crops
- Water charge already applied
- Efficiency of Water irrigation systems
- Water quality: mountainous and valley water resources, good quality
- Ministry of Rural Development and Food is regionally investigating agriculture and new crops and practices.



# Bibliography and Resources

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- [www.minenv.gr](http://www.minenv.gr)

# ADAGIO Country Report

## Greece

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Thank you,

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