

DROUGHT AND IRRIGATION CHALLENGES IN GREECE

INTRODUCTION

Agriculture in Greece is highly vulnerable to drought and depends heavily on irrigation. Extended periods of low rainfall, rising temperatures and changing precipitation patterns increase water stress across the country. These conditions intensify demand on surface and groundwater bodies, many of which already face overexploitation or declining quality.

Drought conditions also lead to growing uncertainty for farmers, public water agencies and local authorities, while ageing irrigation infrastructure and inefficient conveyance systems intensify losses. The combination of environmental and structural pressures makes sustainable water-resource management a central challenge for agricultural and climate policy.

Climate projections indicate an increased likelihood of higher evapotranspiration, longer dry spells and more variable rainfall patterns. These trends highlight the urgent need for a strategic framework that supports more resilient irrigation practices and improves the overall management of water resources.

Key Messages

- Greece faces increasing drought risk, placing pressure on irrigation-dependent agriculture.
- Water scarcity, ageing irrigation infrastructure and fragmented governance limit the country's ability to respond effectively.
- Improving irrigation efficiency, soil-water conservation and crop planning can strengthen climate resilience.
- Stronger governance and better coordination among authorities are essential for sustainable agricultural water use.
- Digital monitoring tools can support more informed decisions and promote long-term water security.

IRRIGATION AND WATER RESOURCE PRESSURES IN GREECE

Irrigation accounts for the majority of freshwater consumption in Greece. In many areas, farmers rely on groundwater abstraction, leading to declining aquifers and local saline intrusion. Surface-water irrigation networks, where they exist, often suffer from leakages, outdated hydraulics and lack of metering.

Key challenges include:

- High water demand from water-intensive crops
- Dependence on groundwater pumping during dry years
- Limited monitoring of irrigation volumes
- High losses in conveyance and field application
- Lack of coordinated planning across water users

In this context, improving irrigation efficiency and modernizing infrastructure represent essential steps toward climate resilience and long-term water sustainability.

BUILDING CLIMATE RESILIENCE IN THE AGRICULTURAL SECTOR

Climate resilience requires the adoption of practices that maintain agricultural productivity while reducing vulnerability to water stress. Such practices include:

Irrigation efficiency

- adoption of precision-irrigation systems
- better scheduling based on crop water needs
- pressure management and reduction of leakage in distribution systems

Crop and land-use choices

- drought-tolerant or lower-water-use crop varieties
- adjustment of planting dates and crop rotations
- targeted reduction of water-intensive crops in critical basins

Soil-management practices that improve soil structure, water retention and infiltration

- reduced tillage
- mulching
- organic matter enhancement

Water governance and planning

- basin-level coordination for equitable water allocation
- monitoring of withdrawals and irrigation volumes
- integration of digital tools and models

These measures reduce vulnerability to climate impacts and improve long-term sustainability.

POLICY DIRECTIONS FOR SUSTAINABLE WATER AND IRRIGATION MANAGEMENT

Modernise irrigation infrastructure through targeted investments in conveyance systems, metering and precision technologies.

Strengthen integrated water resources management at the river-basin level to balance agricultural, urban and environmental needs.

Support farmers in adopting water-saving practices through CAP eco-schemes, financial incentives and advisory services.

Apply drought preparation planning, including early-warning indicators and seasonal water-allocation guidelines.

Promote regenerative agricultural practices that enhance water retention and reduce erosion.

Increase data availability and coordination among national, regional and local authorities to improve transparency and adaptive management.

THE ROLE OF DIGITAL TOOLS IN WATER GOVERNANCE

Digital platforms that integrate Earth Observation data, meteorological information and agro-hydrological modelling can support evidence-based decision-making. Such tools help:

- identifying vulnerable areas and emerging water-stress conditions
- estimating irrigation demand more accurately
- supporting water-allocation decisions
- evaluating the potential impacts of climate scenarios

By providing transparent and accessible information, digital tools can strengthen policy coherence and improve coordination between national and local decision-makers across sectors and governance levels.

CONCLUSION

Water scarcity and drought represent growing threats to Greek agriculture. Ensuring sustainable water-resource management requires coordinated policies that prioritise irrigation efficiency, climate-smart farming practices and improved hydrological governance.

Strengthening monitoring systems and adopting modern technologies can support more resilient agricultural systems, safeguard water resources and enhance national preparedness for future climatic conditions.

