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Achieving Water Security - Cyprus Case

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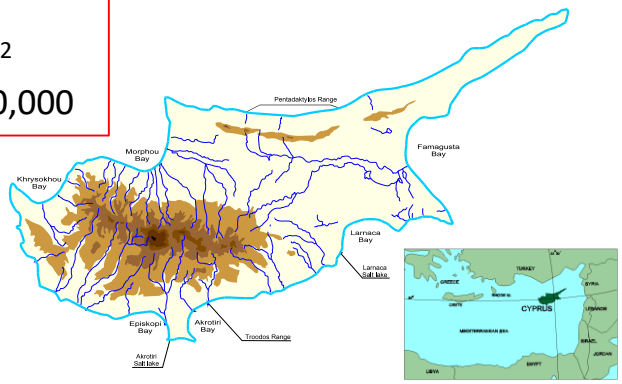
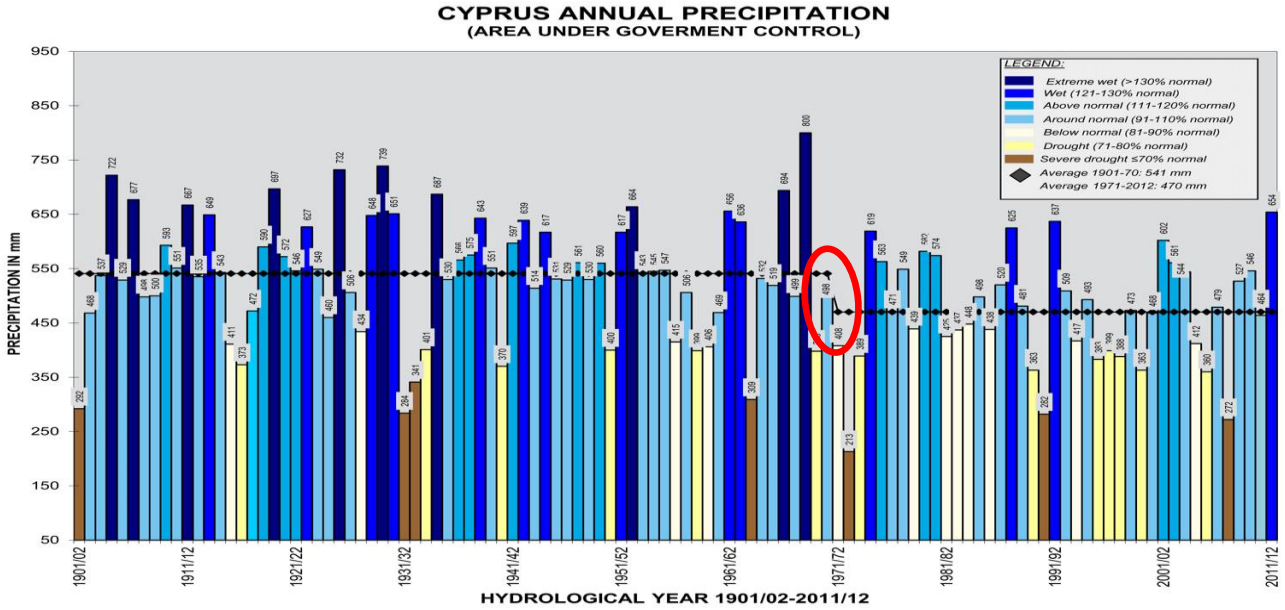
Water Availability Challenge in Cyprus

Location: Eastern Mediterranean
Area: 9,250 Km^2
Population: 850,000



- **According to IPCC, Cyprus is highly vulnerable to the impact of climate change and classified as one of the global "hotspots"**
- **Limited water resources**
  - Depend mainly on rainfall
  - Scarce & expensive to exploit
  - **Water Stress Index ~73%**

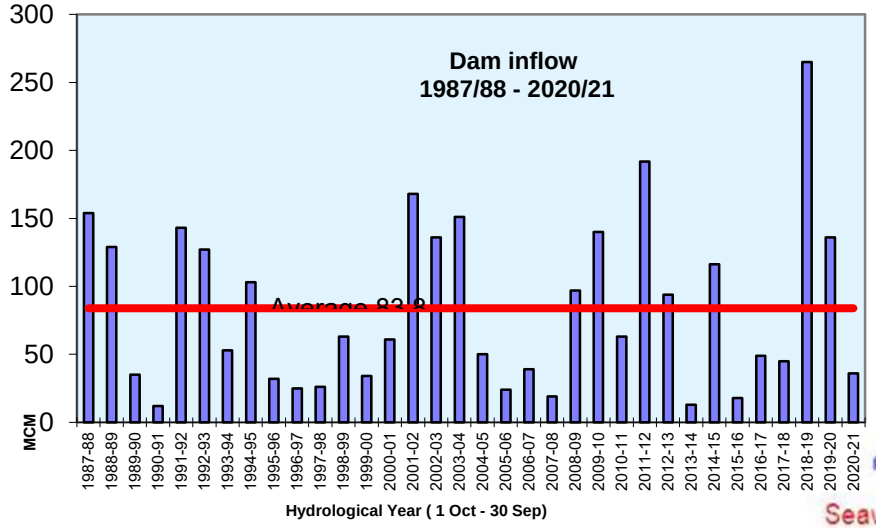


Statistical analysis reveals a stepped drop of 15% in precipitation since the early 70's, resulted in a **drop of 40% in river runoff**

Available Fresh Water Reduced….

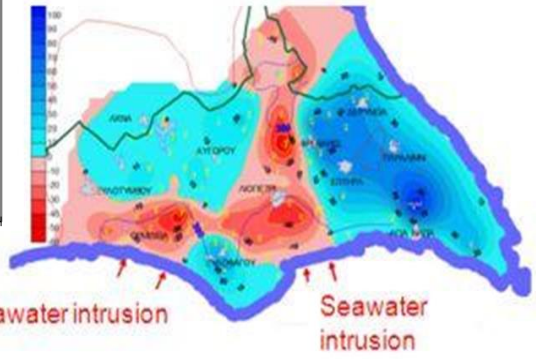
…. Water Rationing …

High variability in runoff from year to year



...Groundwater Depleted and Deteriorated…

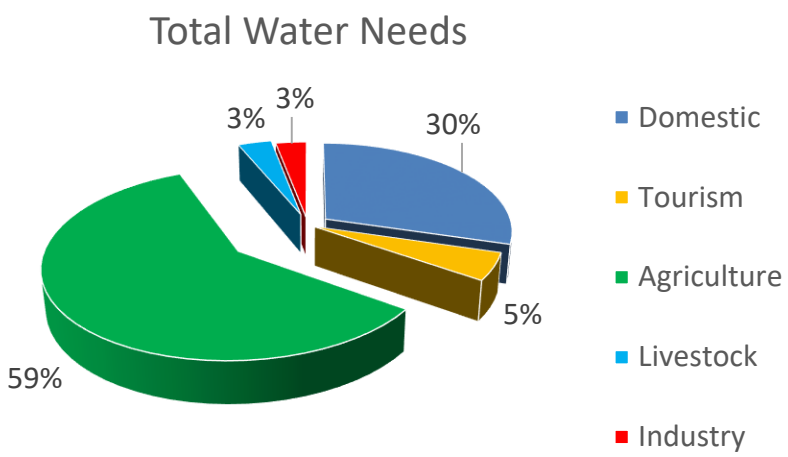
Seawater intrusion into coastal aquifers



YEAR 2008:

- Agriculture: almost 100% ban on water supply
- Drinking water: supply to households (36hrs/week)

Uses of Water



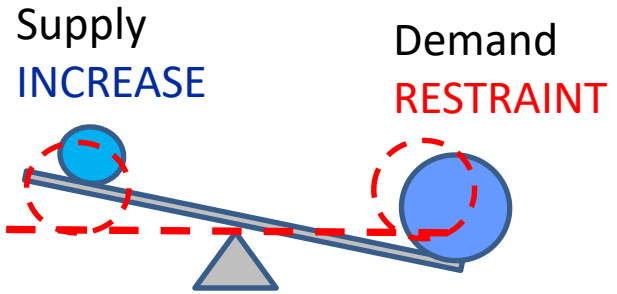
- Increasing demand for domestic sector (population, tourism, lifestyle)
- Sharp decrease in fresh water allocation to agriculture (could reach up to 70%)

Fresh water availability: 206 MCM
Demand: 266 MCM

Deficit 60MCM

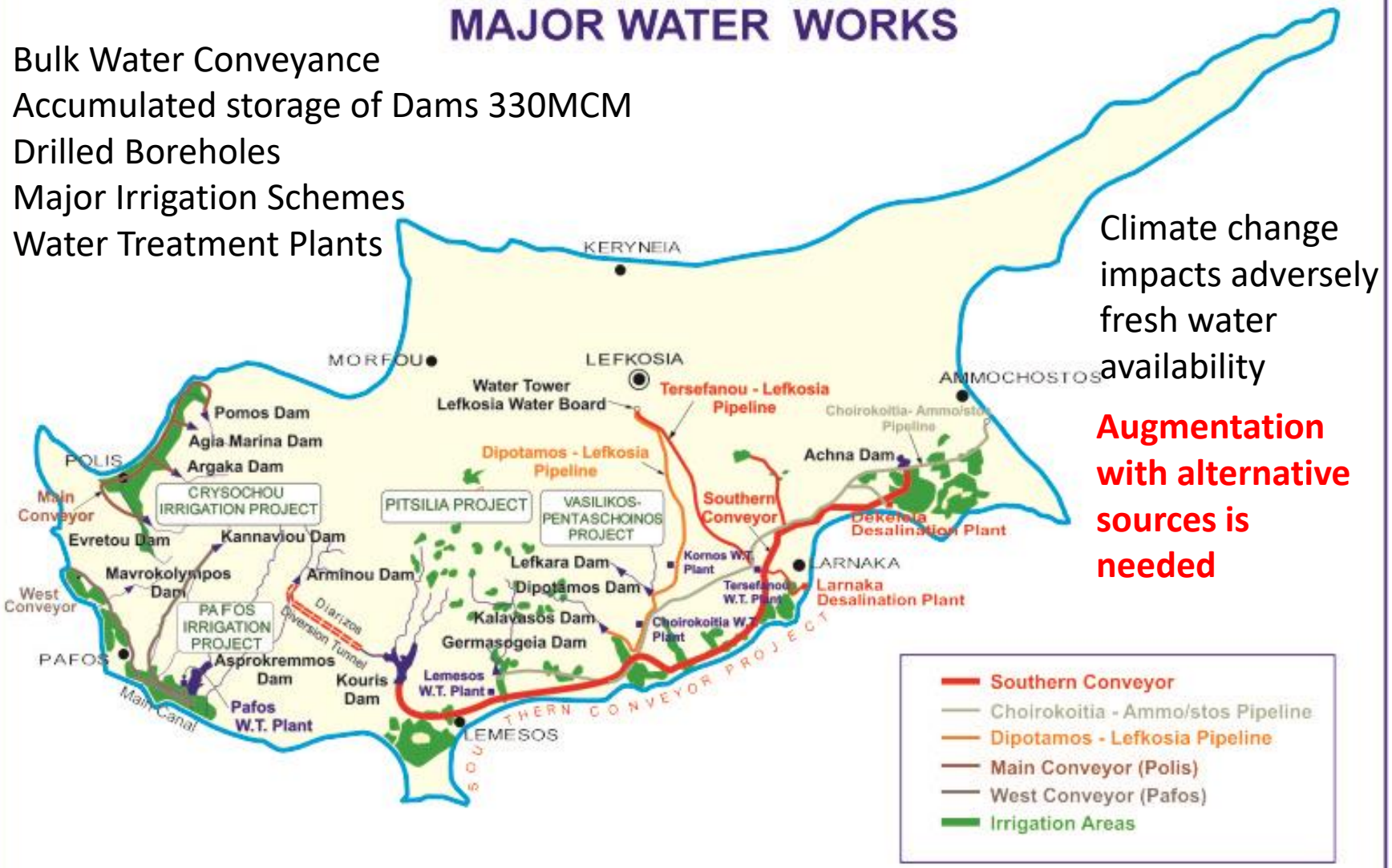
Total water demand is higher than availability and irrigation needs are rarely satisfied
- since 1996, water demand for irrigated agriculture was satisfied only twice, in 2004 and in 2020, when dams were full

MUST reduce water imbalance



MAJOR WATER WORKS

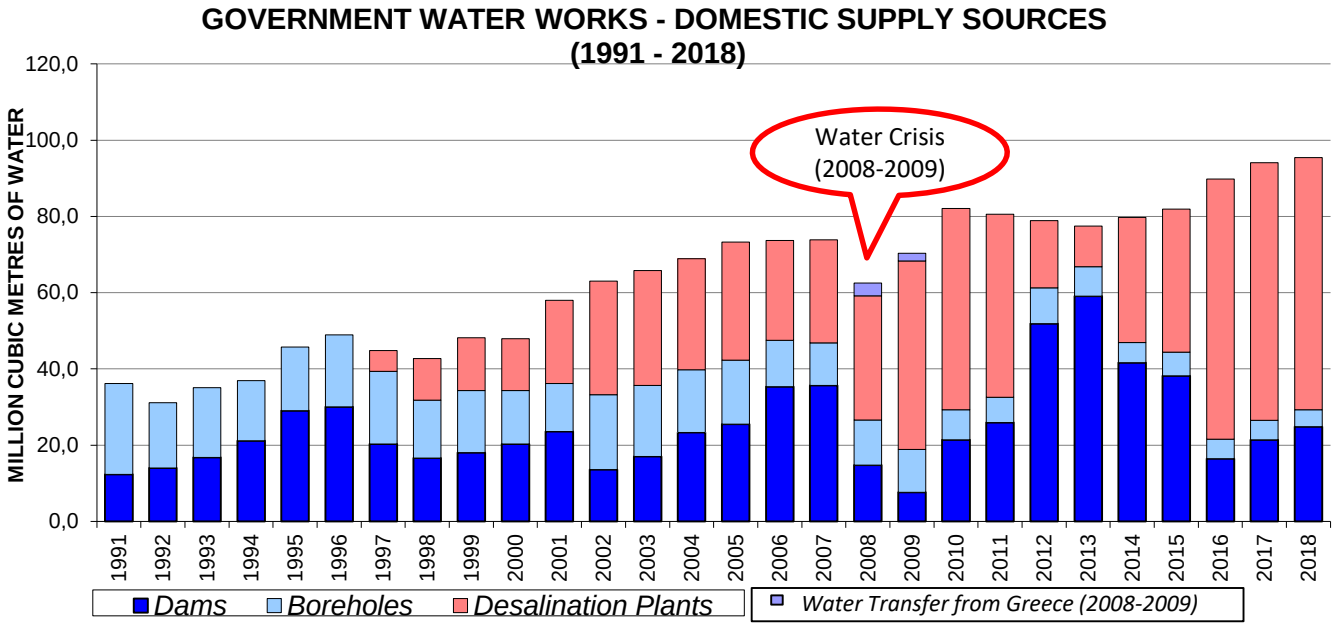
Bulk Water Conveyance
Accumulated storage of Dams 330MCM
Drilled Boreholes
Major Irrigation Schemes
Water Treatment Plants



Climate change impacts adversely fresh water availability

Augmentation with alternative sources is needed

Address the challenge for domestic water



The Government introduced Desalination Plants to eliminate the dependency of domestic water supply on groundwater abstraction and annual rainfall

Currently water demand is covered by around:
58% from desalination plants
37% from surface water
5% from groundwater

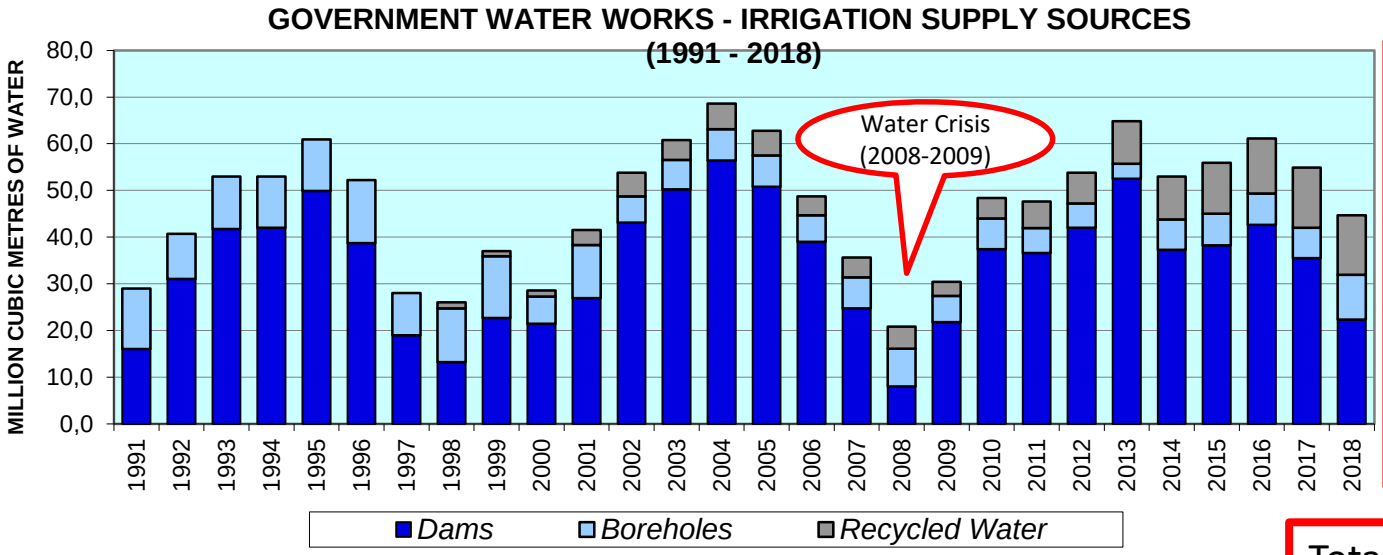
PPP BOOT Desalination Contracts

5 Plants, Total Capacity = 110 MCM/yr

Energy intensive solution

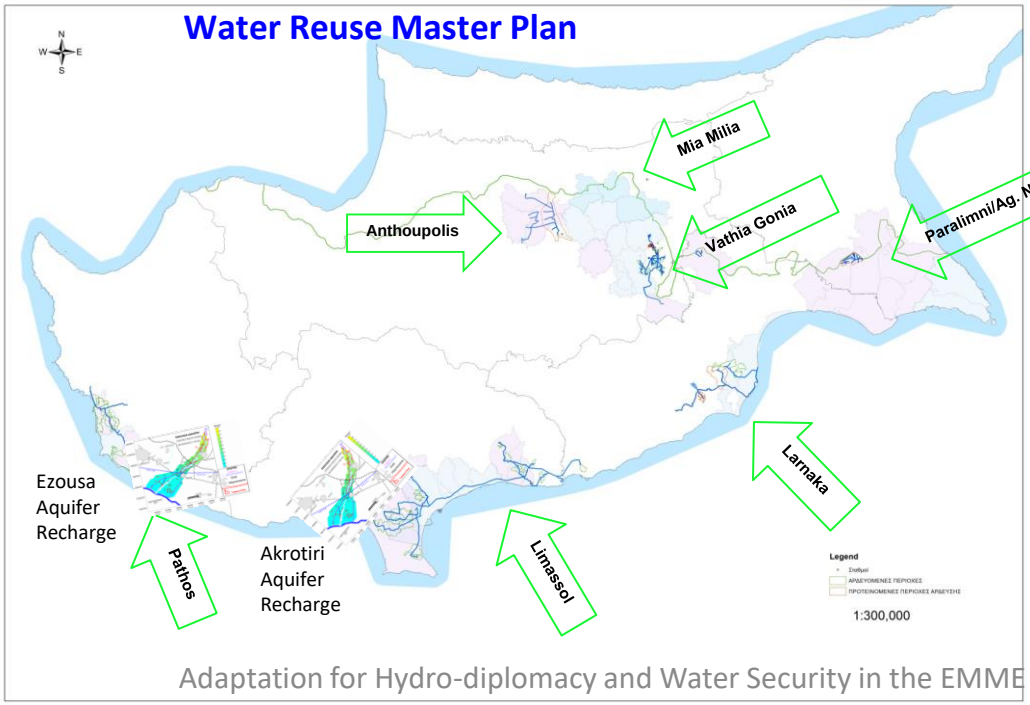
Desalination efficiency E= 4,5 KWH/CM

Address the Challenge for Irrigation Water



Today, 28 MCM of tertiary treated recycled water are being produced (by 2030 will be 65MCM)

- 77% direct irrigation
- 20% aquifer recharge
- 3% discharge to dam or sea



Total Irrigation Demand :

- 160 MCM/Year

(%) of irrigation demand satisfied by water reuse:

- **Today 17%**
- **By 2030: 40%**

Demand Management Measures

The management of demand is the most important factor of the water policy

Long Term Measures

- **Legislation**
  - Integrated Water Management Law (2010)
- **Incentive water pricing**
  - Metering is applied to all users
  - Volumetric pricing and rising block tariffs
- **Leakage reduction in distribution networks** (telemetry, pipe replacement)
- **Improve irrigation efficiency**
  - On farm advanced irrigation systems and techniques (95% of irrigated area)
- **Addressing illegal abstraction**
  - Permits, penalties
- **Cultivation of a water consciousness culture**
  - Public awareness campaigns, Public Participation activities, Web-site info

Short Term Actions

- **Drought Management Plan**
- **Yearly Allocation Scenarios** for the supply of water GWW using:
  - a quota system
  - overconsumption charges
- **Water allocation policy**
  - 100% satisfaction of domestic needs
  - Allow for water reserves in dams for the next 2 years
  - Agriculture (restrictions in irrigation, priority to permanent crops (40%-80%) and greenhouses (80-100%)

Pricing of Water Services

Domestic: Government

Bulk sell price : 0,82 Euro/ m^3

(Capital cost, (O&M), Depreciation, Environmental and Resource cost

Domestic: Water Utilities

Rising block tariff structure

Use (m^3) per month	Charge (Euro/m^3)
0 - 10	1.12
11 - 20	1.72
21 - 30	2.92
31 and over	6.16

Irrigation: Government

Based on a volumetric charge

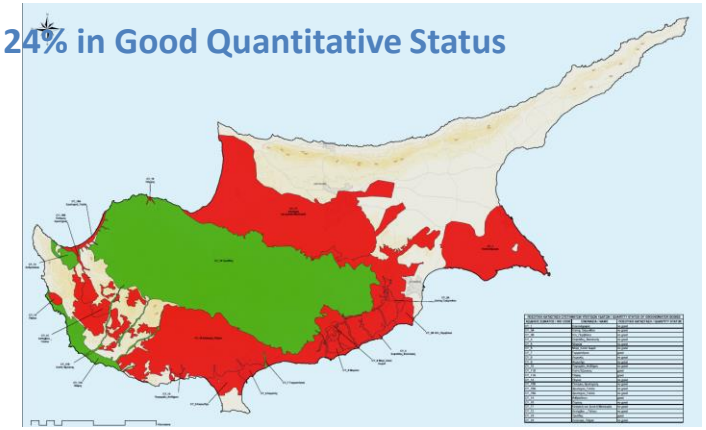
Sector	Raw water (Euro/m^3)	Reuse water (Euro/m^3)
Farmers	0.17	0.07
Green areas and parks	0.23	0.36
Over consumption	Doubled	Doubled

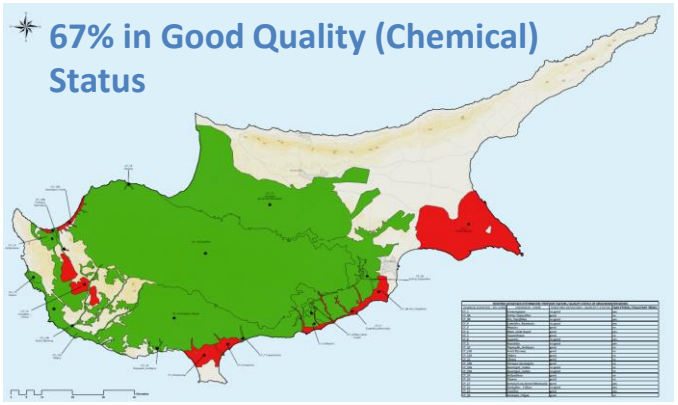
- ❑ Full cost recovery for domestic use
- ❑ Adequate contribution for Irrigation
- ❑ Incentives for reuse

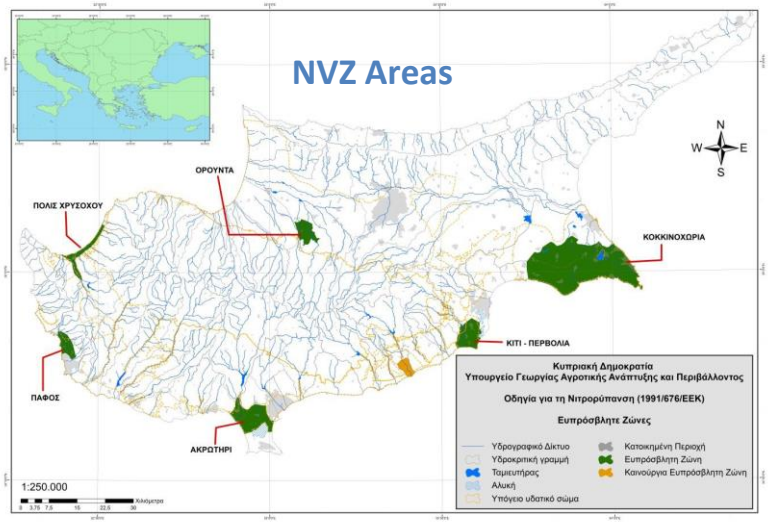
Address the Challenge - GWBs

GW serve;

- ❑ 10% - 15 % of the total drinking water
- ❑ Up to 60% of the total irrigation use







- ❑ **Regulate abstraction**
- ❑ Introduction of a more stringent procedure regarding borehole drilling and abstraction permits through the *Integrated Water Management Law*
- ❑ ***Penalties for non compliant***
- ❑ **Code of Good Agricultural Practice** compulsory for NVZ

However……. due to climate change

More intense and severe droughts are expected in the future

which will aggravate not only the availability but also the quality of water

Taking on the Challenge

IWRM is not enough → focus on Sustainable WRM to achieve water security and resilience

- New strategic direction is required:
  - **Recognize the limitations of water availability – educate to change consumption and lifestyles**
  - **Reflect the real value of water and the need for financial sustainability**
  - **Research & Innovation**
  - **Develop energy efficient desalination plants**
  - **Built climate change resilient utilities – upgrade the infrastructure**
  - **Enhance cooperation and knowledge exchange with water professionals, institutions and between EMME region**

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Thank you for your attention

http://www.moa.gov.cy/moa/wdd

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