Sustainable Agricultural Production and Water Use in Cyprus under Global Change

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The Eastern Mediterranean region
You can grow almost anything in Cyprus... if you add water!
Results: groundwater over-exploitation!

< 1 Sustainable (WDD, 2011)
> 1 Over-extraction

Zoumides, Bruggeman, Zachariades.2013. WaRM
Main project objectives

- To provide recommendations for climate change adaptation for the agricultural sector in Cyprus and the wider Mediterranean region;
- To establish a consortium of excellence in natural resource management research in Cyprus for tackling the challenges posed by climate change on agriculture in the Mediterranean region.
Consortium of Excellence → Integration

WP8: Cyprus Green-Blue Water Model and Scenario Modelling (The Cyprus Institute)

WP7: Climate Change Projections (The Cyprus Institute)

WP4: Agro-climatic Zones and Database (Cyprus Meteorological Service)

WP5: Climate resilient agricultural production systems (Agricultural Research Institute)

WP6: Policy options and economic scenarios (Cyprus Univ. of Technology)

WP3: Soil Mapping (Geological Survey Dept.)
Stakeholder involvement
Climate projections

Digital soil mapping

Agricultural water use modelling

Scenarios, policies and prices
Modeling: assessing scenarios and uncertainties

Relation between precipitation and green water use in cropland in Cyprus, 1994/95-2008/09

- $y = 0.33x + 123$
  - $R^2 = 0.754$

- $y = 0.26x + 119$
  - $R^2 = 0.579$

Precipitation (mm)

Green water use (mm)

Run3: AWC 40-150 mm

Run4: AWC 150 mm

Bruggeman et al., 2012

EEWRC
The effect of rainfall distribution

![Graph showing distribution of monthly precipitation and reference evapotranspiration (ETo), Cyprus.](image)

- Precip, 2002/03
- Precip, 2003/04
- Precip, 30-yr average
- ETo, 30-yr average

Precipitation or ETo (mm/mo) from October to September.
Yields: research trials vs national statistics - barley Cyprus

Data: D. Fasoula, ARI; CyStat
Conclusions

- Cyprus has high agro-biodiversity, both natural and anthropogenic
- With irrigation we can grow almost anything!
- Irrigation water demand exceeds sustainable use of water resources
- Barley is a highly drought-tolerant rain-fed crop and covers about 30% of the crop area in Cyprus
- It can be harvested for grain (wet years) or biomass (dry years)
- Good soils and agricultural management can improve yields
- In very dry years (2 out of 10) we harvest nothing!
- We need to consider turning the drier areas of Cyprus into natural pastures with small ruminant grazing
Thank you