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Introduction- Objective



The enhancement of water efficiency and the support of the shift towards climate resilient agriculture are very important nowadays. LIFE AgroClimaWater project focuses on both of these objectives through the development and implementation of Water Management Adaptation Strategies (WMAS) at Farmers' Organizations (F.ORs) in Mediterranean countries. AgroClimaWater adapts the EWS standard of the European Water Partnership (EWP) to the agricultural sector and implements it in three F.ORs. The standard is based on 4 Principles: Sustainable Water Abstraction, Good Water System Status, High Conservation Value Area Protection and Equitable Water Governance. Key element of the WMAS is the promotion of agricultural practices that increase water efficiency in the cultivation of perennial crops.

In this paper preliminary results are presented from the Agricultural Cooperative Partnership "Mirabello Union S.A." located at Havgas-Milatos sub-basin in eastern Crete-Greece at the Municipality of Agios Nikolaos.

Description of agricultural sector in Mirabello

Mirabello Union SA is one of the F.ORs that participate in AgroClimaWater. Within Havgas-Milatos sub-basin olive tree cultivation accounts for 37.4% of total land use and is almost the exclusive tree crop cultivated in the area (Table 1).

Agricultural practices along with mean annual productivity, average annual water use, use of PPPs and fertilizers were recorded at 101 olive orchards in the area:

- The **agricultural practices** and **mean annual productivity** are presented in Fig.1 and Table 2, respectively
- **Irrigation water** applied in **11%** of orchards (average annual water use: **271 mm**)
- **Fertilizers** are applied in **39.6%** of all orchards (average annual application in kg/ha: N=91.2, P=61.8 and K=91.6)
- **PPPs** are used in **32.7%** of olive orchards (only authorized substances at appropriate doses are used)

Impacts on water quantity

Three groundwater bodies are providing irrigation water: "Coastal karst aquifer of Sisi-Milatos-Elounda", "Karst aquifer of Fourni-Elounda" and "Fractured aquifer of Dikti".

- **Water consumption:**
 - ✓ **66%** of total water consumption for **irrigation**
 - ✓ average annual irrigation water within the consumption limits set by the regional Water Directorate of Crete
- **Quantitative status:** **good** with no increasing trend for further decline
- **Groundwater levels:** **stable** in annual basis. Local over exploitation and increased salinization (mainly to natural reasons) during summer on 2 of the 3 systems concerned, but systems recover in winter
- **No significant environmental or socioeconomic impacts** on the water bodies

Table 2. Characteristics of the 101 olive orchards.

Olive Orchards	
Num. of orchards	101
Organic	10.9%
Conventional	89.1%
Mean annual productivity* (conventional & organic)	4.6 & 3.6
Mean annual productivity * (Irrigated & rainfed)	5.6 & 4.5

* Mean annual productivity in tn olive fruit/ha

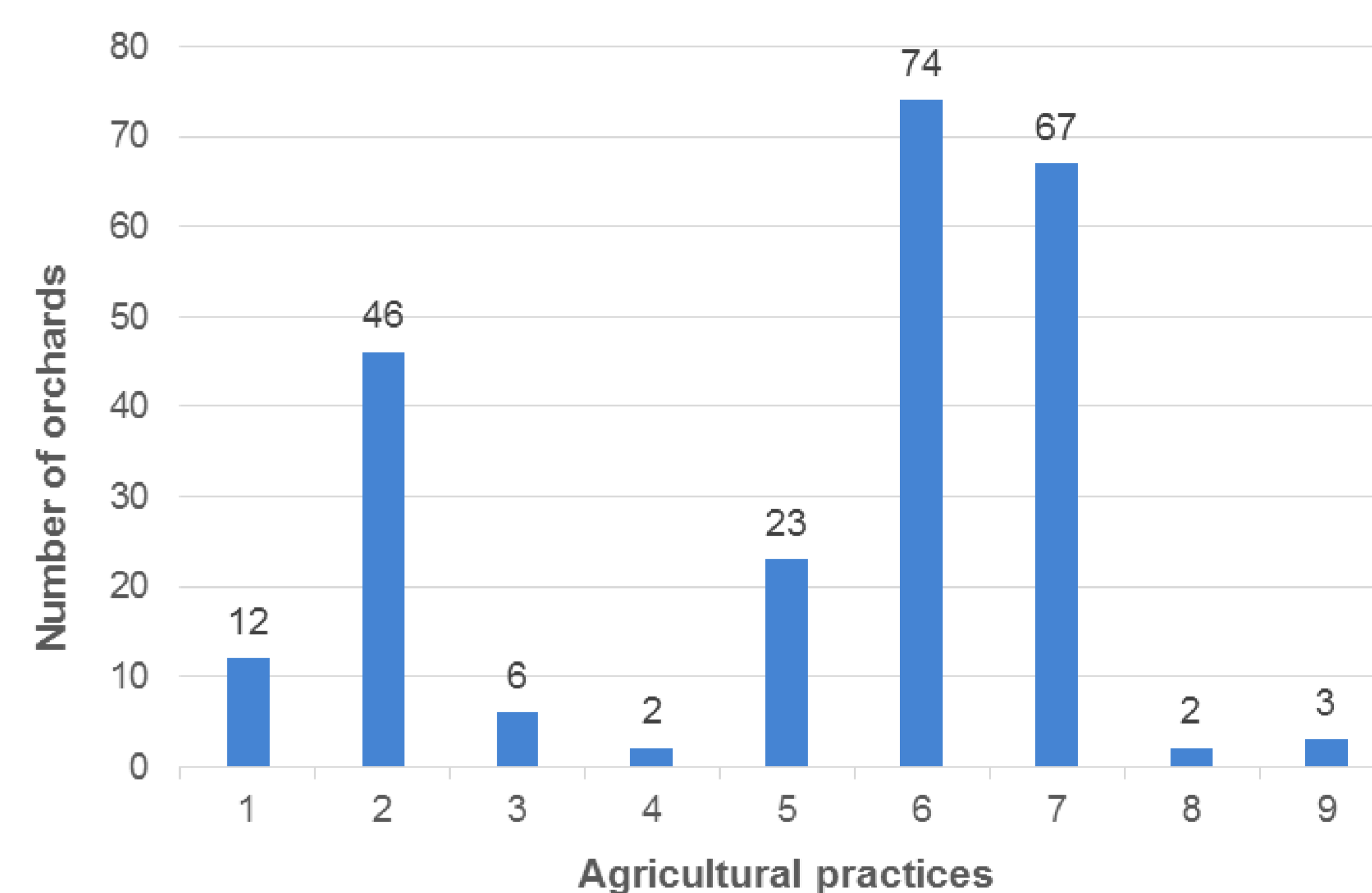
Conclusions

Based on the initial assessments, it is clear that the applied practices in the selected olive orchards could be improved towards water efficiency enhancement. To this end, the strategy and governance that will be applied in the area are developed according to the 4 principles of the EWS standard.

In that framework, a wide range of good agricultural practices were identified and combined in farm specific actions plans which will be implemented at 10 pilot farms, aiming mainly at improving water efficiency at farm scale.

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- 1: Soil cultivation
2: Weed mowing
3: Cover crops
4: Chemical control of weeds
5: Grazing by livestock
6: Pruning
7: Burning of pruning
8: Shredding/dispersion of pruning
9: Organic material spreading

Figure 1. Agricultural practices at the 101 olive orchards.

Table 1. Main characteristics of the area.

Greater area	Mirabello
Sub-basin	Havgas-Milatos
Total area	29 sq.km
Employed population per economic activity	• 30.3% in accommodation & food services • 5.2% in agriculture
Hydrographic network	• 3 rd category streams Out of the scope of WFD
Water sources for water uses	3 groundwater bodies
Water consumption	66% potable 34% irrigation