DEVELOPING A DECISION SUPPORT TOOL FOR SUSTAINABLE VITICULTURE: INSIGHTS ON THE AGROECOLOGICAL ASSESSMENT OF PRACTICES IN CRETAN VINEYARDS

SESSION 6: AGROECOLOGY AND DIGITALISATION

SOTIRIOS PILAFIDIS
MAICH-CIHEAM
CRETE, GREECE
ECOVINEGOALS

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Developing a Decision Support Tool for sustainable viticulture: Insights on the agroecological assessment of practices in Cretan vineyards

Vineyard farmers

Life Cycle Assessment

Cretan vineyards practices

Decision Support Tool

Energy use

GHG emissions
Cretan vineyards in this study

- 30 vineyards
- 2 prefectures
- Altitude ranged from 0m - 800m.
- Vineyards under study total area: 122 ha average size was 4.1 ha
- Land fragmentation and ageing population problems

- Syrah was the most common variety
- Local varieties: Romeiko, Vidiano
- Other: Kotsifali, Cabernet Sauvignon, Sauvignon blanc, Chardonnay, Malagouzia, Razaki, Asyrtiko, Agiorgitiko, Liatiko, Moschato Spinas, Mandilaria, Malvazia and Vilana.
Life cycle analysis

- Structured questionnaire
- 2 harvesting seasons (2019 and 2020)
- Key stages of viticulture: all practices, inputs and equipment use.
- Application rates, machinery owned, used, rented, operation hours, workers
- Simplified life-cycle approach, cradle-to-farm gate
• Fossil fuels accounted for 52% of the total energy use, fertilisers 40%, labour (4%), pesticides (3%)
• Average energy use: 1,188 GJ/ha
• Average energy intensity: 5.9 MJ/ha/kg of grapes
Fertilisers 38%, fossil fuels 37%, burning of the pruning residues 25%

- Average carbon footprint: 0.39±0.07 CO2-eq/kg of grapes
- Literature reports carbon footprint ranges from 0.2 - 2 CO2-eq/kg of grapes (Ferrara et al. 2018).
Organic vs conventional vineyards

- Conventional vineyards had an average of 86% more total GHG emissions and 39% more energy consumption.
- Higher GHG emissions of conventional vineyards mainly due to burning of pruning residues.
Development of ECO2Vine 1.0 decision support tool

- Java® language for low installation complexity.
- DST’s output (HTML) that can be viewed using any web browser.
ECO2Vine 1.0 decision support tool

- Energy use and GHG emissions/tonne of grapes produced
- Production hotspots
Conclusions

• Fossil fuels consumed by machinery, and the use of synthetic fertilisers, were the main practices related to high energy consumption and GHG emissions.

• Burning of the pruning residues accounts for 25% of GHG emissions.

• Discontinuing/substituting this practice can significantly reduce the carbon footprint of a vineyard.

• ECO2VINE DST enables farmers to have an overview and experiment with alternative practices and input amounts to improve energy efficiency and carbon footprint.

• Directly supports action towards SDG 11, SDG 12, SDG 13, SDG 15.
Thank you for your attention

Sotirios Pilafidis
spilafidis@eie.gr
@mycognostix

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