

Mountain farming systems efficiency and sustainability

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Introduction

- The efficient use of resources and farming inputs is considered a key factor for sustainability in agriculture
- The ecological limitations of the productivity in mountains make the study of efficiency in agricultural systems in these areas even more crucial
- Based on these assumptions, we present in this study the preliminary results of efficiency analysis of farming systems, in mountain regions of Portugal

Material and methods

Four farming systems

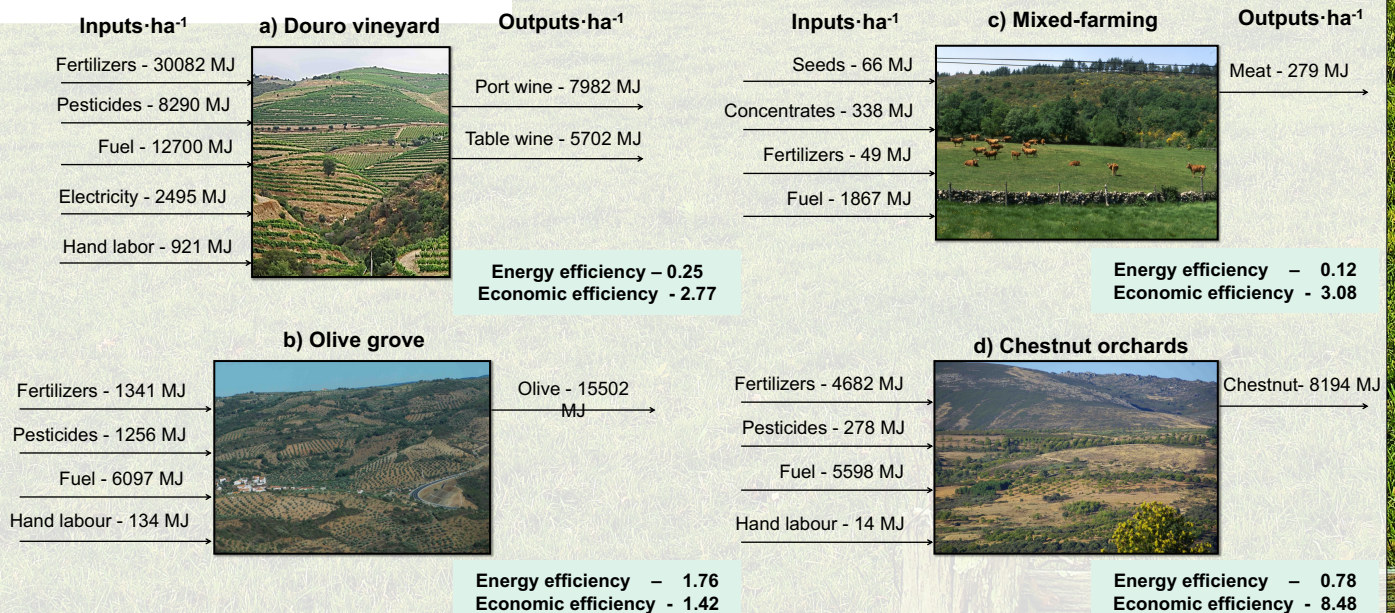
Designation	Farm (ha)	N° blocks	Latitude (N)	Longitude (W)	Altitude (m a.s.l.)	Plantation age N° of years	Plants·ha ⁻¹ or LU·ha ⁻¹	Varieties/cultivars or cattle breed*	Grassland (ha)
a) Douro vineyards	60	1	41° 11'	7° 31'	170	23	4550	T. Nacional, Rabigato, ...	-
b) Olive grove	15	13	41° 27'	6° 50'	570	15 - 200	140 - 220	Cobrançosa	-
c) Mixed-farming	36	33	41° 36'	7° 55'	950	-	0.52*	Barrosã*	34.5 ⁽¹⁾
d) Chestnut orchards	10	18	41° 54'	6° 50'	823	10 - ≥30	95	Judia, Cota, Zeive	-

⁽¹⁾ - Meadows, annual forages (rye and maize), shrubs and forest

Data considered in this preliminary study

- All the external inputs in the farming system (fertilizers, pesticides, fuel, electricity, concentrates, seeds, hand labor)
- All the external outputs (port and table wine, olive, beef cattle and chestnut)
- Both inputs and outputs were converted into energy (MJ) applying values referred in the bibliography and, into monetary unit (€), applying the prices of the national statistics.
- The economic and energy efficiency (output/input ratios) were calculated for each farming system

Results



Conclusions

- The energy consumption in all systems but Douro vineyards is low, compared with other results referred in bibliography;
- However it is necessary to further improve their energy efficiency;
- Excluding hand labour, the prices of energy inputs ranged from €0.017 MJ (fuels) and €0.17 MJ (seeds), and energy outputs ranged from €0.048 MJ for olives and €0.808 MJ for table wine;
- The replacement of fuels by other energy sources, should be based on renewable sources;
- The economic efficiency and sustainability of the systems depends on the prices of the output energy, rather than on the amount and prices of the inputs energy.

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