

## Supplemental material for

“A Future for Mountain Terraces: Experiences from Mediterranean Wineries”, by Christos Zoumides, Adrianna Bruggeman, Elias Giannakis, and Nikolina Kyriakou, published in *Mountain Research and Development* 42(3), 2022. (See <https://bioone.org/toc/mred/42/3>)

### APPENDIX S1 Questionnaire

#### 1. General Information

Name of farmer	
Winery location	
Location of vineyards	
Age	
Education level <i>Primary, Secondary, Tertiary</i>	
Farm education <i>Yes/No</i>	
Main occupation <i>Specify type and hours per week</i>	
Other occupation <i>Specify type and hours per week</i>	
Household size <i>No. of people</i>	
Full-time employees <i>No. of people, specify if family members</i>	
Part-time employees <i>No. of people, specify if family members</i>	
How was the winery obtained? <i>Family-owned business/new establishment/bought</i>	
Has any future successor been identified? <i>Specify family relation, if any</i>	

## 2. Holding characteristics

Owned land ( <i>hectares</i> )	
Rented land ( <i>hectares</i> )	
Organic farming ( <i>% or hectares</i> )	
Irrigated land ( <i>% or hectares</i> )	
Which grape varieties do you grow?	
Do you produce certified products? ( <i>quality label, regional appellation etc.</i> )	
Plants density ( <i>dimensions or no. of plants per hectare</i> )	
Do you sell produce to other farmers or producer groups? <i>If yes, specify % that is sold to others</i>	
Changes in land use the last decade ( <i>hectare + or -</i> )	
Expansion plans in the next 10 years ( <i>hectare</i> )	

## 3. Terraces

### 3.1 Are your vineyards on terraces supported by dry-stone walls;

Yes	No

### 3.2 If yes,

What's the average dimension of dry-stone walls ( <i>height and width</i> )?	
What's the average length of dry-stone walls ( <i>running meters per hectare</i> )?	

### 3.3 Have you constructed new terraces with dry-stone walls over the last 10 years?

Yes	No

**3.3.1 If yes, what is the establishment cost of new terraces?**

Labour cost ( <i>€/meter or €/hectare</i> )	
Material cost, e.g., stones ( <i>€/meter or €/hectare</i> )	

**3.3.2 Why did you construct new terraces;**

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**3.3.3 If no, for which reasons you did not construct new terraces?**

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**3.4 Have you maintained/reconstructed existing terraces with dry-stone walls over the last ten years?**

Yes	No

**3.4.1 If yes, what's the maintenance cost?**

Labour cost ( <i>€/meter or €/hectare</i> )	
Material cost, e.g., stones ( <i>€/meter or €/hectare</i> )	

**3.4.2 Why did you maintain/reconstruct existing terraces;**

**3.4.3 If no, for which reasons you did not maintain existing terraces?**

**3.5 How much time do you spent in maintaining terraces, on average (min/max), each year;**

**3.6 “*Agricultural terraces are gradually abandoned*”. Do you agree with this statement? If yes, what are the main barriers for terrace maintenance?**

**3.7 Are you concerned about degradation of surrounding land? Yes/No? Please explain your answer.**

**3.8 If neighbouring land owners abandon their fields, would you be willing take over their land? Yes/No? Please explain your answer.**

**3.9 “Land managers do not have the skills or knowledge to construct or maintain agricultural terraces”. Do you agree with this statement? If yes, what can be done to overcome this barrier?**

**3.10 What can be done to revitalize the rural mountain communities and terrace farming? Please rank the following in order of importance, where 1 = most important:**

<b>Options</b>	<b>Ranking</b>
Communal (volunteer) terrace rehabilitation	
More or different agricultural subsidies	
Financial incentives for improved agro-tourism facilities	
Better farm education / training	
Low-cost loans for terrace construction and maintenance	
Legal framework that supports the renting or selling of unused land	

**3.11 Why do you construct or maintain terrace walls? Please score the following benefits from 1-5**

**1: Not Important, 2: Slightly Important, 3: Moderately Important, 4: Important, 5: Very Important**

<b>Options</b>	<b>Score</b>
Reduce erosion / soil loss	
Improve crop yield	
Improve farm income	
Reduce crop water demand	
Improve resilience to extreme events (droughts, storms, floods)	
Improve land cover	
Enhanced socio-cultural opportunities (e.g., landscape aesthetics, leisure, tourism)	
Subsidies (e.g., agro-environmental schemes)	
Facilitate agricultural works (e.g., ploughing, fertilization, crop protection, pruning etc.)	
Other, please specify:	

**4. Subsidies**

**4.1 Do you receive subsidies (e.g., from the current Rural Development Plan)? Have you received any specific funding to construct or maintain terraces? Please list the schemes from which you have received funding.**

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**5. Irrigation**

**5.1 Do you irrigate your vineyards?**

<b>Yes</b>	<b>No</b>

**5.2 If yes, what's the main water source you use?**

Private borehole	Government source	Communal source	Recycled water

**5.3 What's the yield and the cost of the water you are using?**

Yield (e.g., m <sup>3</sup> /hour)	
Cost (e.g., €/m <sup>3</sup> or €/hectare)	

**5.4 Have you ever experienced any water supply issues (e.g. water shortage)?**

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**5.5 Are you concerned about water pricing? Yes / No? Please explain your answer.**

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**6. Production, Cost and Trading**

**6.1 What is the annual cost of wine production;**

Total Cost (€)	
Cost per bottle (€/bottle)	
Wholesale price per bottle (€/bottle)	

**6.2 Annual production output and revenue (€/year)**

Type	Production	Sales €	Revenue €/year
Grape production ( <i>kg</i> )			
Wine production ( <i>bottles or litres</i> )			
Other grape products:			
Other grape products:			
Total subsidies			
Other revenue: catering			
Other revenue: wine tasting			
Other revenue (specify):			
Other non-agricultural income ( <i>specify</i> ):			

**6.3 Do you purchase grapes from other farmers for wine-making? Yes/No. If yes, (a) why, (b) how much do you pay (e.g., €/ton)?**

**6.4 Do you think that the designation of origin label is helpful in marketing your products?**



**6.5 Which channels you use for trading your products?**

Trading channels	%
Direct sales at the winery	
Selling agreements with local stores	
Exports (e.g., private agreements, co-op agreements)	
Other trading channels, please specify:	

**6.6 What is your most important support in farm management decisions? Please score the following from 1-5 according to importance.**

**1: Not Important, 2: Slightly Important, 3: Moderately Important, 4: Important, 5: Very Important**

Type of support	Score
Established traditions	
Modern organization/management techniques	
Advisory services	
Governmental departments (e.g., Department of Agriculture)	
Farmer's unions	
Other (please specify):	

**6.7 In the last 5 years have you made any deliberate attempt to improve the environmental conditions on your farm? Please check accordingly (yes/no) and explain why:**

Environmental actions	Yes / No	Why?
Reduce nitrogen and phosphorous fertilizers		
Reduce pesticides		
Reduce water use		
Reduce energy use		
Soil protection		
Protect biodiversity		
Invest in environment friendly machinery etc.		

**7. Do you consider your agro-business to be successful and financially viable? If yes, what factors determine its success? If not, what impedes its success?**

**8. As a rural business what are your major concerns? Please score the following from 1-5 according to importance**

**1: Not Important, 2: Slightly Important, 3: Moderately Important, 4: Important, 5: Very Important**

Concerns	Score
Marketing of products and revenue	
Cost of labour	
Availability of labour	
Soil health / fertility	
Climate change	
Water scarcity	
Availability of good quality raw material (grapes)	

**9. What is your future (2030) vision for mountain terrace agriculture?**

**Questionnaire (completed in 2020 for clarification and verification purposes)**

<b>Vineyard management and grape production cost</b>			
a)	Owned land	hectares	
b)	Rented land	hectares	
c)	Grape production from own vineyards	tons	
d)	Grapes purchased from other farmers	tons	
e)	Total cost of wine grapes purchased from other producers	€	
f)	Full-time employees for grape production, incl. family members	No. people	
g)	Part-time employees for grape production, incl. family members	No. people & days	
h)	Total labour cost for grape production	€	
i)	Total maintenance cost for terraces	€	
j)	Other costs, e.g., mechanical costs (fuel, service), fertilisers, pest control, pruning, irrigation, etc.	€	
k)	Total variable cost of grape production ( $\eta + \theta + \iota$ )	€	
l)	Subsidies	€	
<b>Annual revenue and cost of wine production</b>			
m)	Wine production	Bottles (750 ml)	
n)	Full-time employees for wine production, incl. family members (wine-making, sales, reception, etc.)	No. people	
o)	Part-time employees for wine production, incl. family members (wine-making, sales, reception, etc.)	No. people & days	
p)	Total labor costs for operation and winemaking	€	
q)	Other expenses for wine production and operation (e.g., packaging, operating expenses, taxes)	€	
r)	Total variable costs for wine production ( $o + \pi$ )	€	
s)	Wine sales	Bottles (750 ml)	
t)	Total revenue from wine sales	€	
u)	Other revenue (e.g., catering, wine tasting, etc.)	€	
v)	Wine stock	Bottles (750 ml)	
w)	Value of wine stock	€	

**TABLE S1** Grape varieties per mountain winery

	Grape variety	Chandria	Kyperounta	Farmakas	Pelendri	Statos – Agios Photios	Ayia Mavri	Koilani	Omodos	Panayia	Vasa Koilaniou	Malia
Red, local	Lefkada					x						
	Maratheftiko	x			x	x		x	x	x	x	x
	Mavro	x		x	x	x	x		x	x		
	Yiannoudi				x			x	x	x		x
Red, international	Agiorgitiko							x				
	Black Muscat						x					
	Cabernet Franc	x										x
	Cabernet Sauvignon	x	x		x		x	x	x		x	x
	Grenache				x							
	Mataro				x				x		x	
	Merlot		x		x			x			x	
	Pinot noir	x										
Shiraz	x			x	x	x	x	x			x	
White, local	Malaga	x					x					
	Morokanella								x	x		
	Muscat						x					
	Promara				x			x			x	
	Spourtiko								x	x		
	Xynisteri	x	x	x	x	x	x	x	x	x		x
White, international	Assyrtiko	x										
	Chardonnay		x		x	x		x			x	x
	Riesling								x			
	Sauvignon Blanc	x			x			x				
	Viognier										x	