

Field data (Each questionnaire refers to one crop species cultivated per field)

Municipality : \_\_\_\_\_

Latitude : 37.322831

Longitude : -121.687012



Field Size (ha) \_\_\_\_\_

- Crop Species
- |                                     |                                    |                                     |   |
|-------------------------------------|------------------------------------|-------------------------------------|---|
| <input type="checkbox"/> olives     | <input type="checkbox"/> vineyards | <input type="checkbox"/> apples     | <input type="checkbox"/> pears              |
| <input type="checkbox"/> peaches    | <input type="checkbox"/> apricot   | <input type="checkbox"/> nectarine  | <input type="checkbox"/> plum               |
| <input type="checkbox"/> cherries   | <input type="checkbox"/> oranges   | <input type="checkbox"/> tangerines | <input type="checkbox"/> lemons             |
| <input type="checkbox"/> grapefruit | <input type="checkbox"/> hazelnuts | <input type="checkbox"/> chestnuts  | <input checked="" type="checkbox"/> almonds |

Variety of crop \_\_\_\_\_

Age of crop 25

Density of crop (trees/ha) 360

Width between cultivated rows (m) 6.7

Distance between trees (m) 4.9

Crop form

Crop forms for vineyard



Vase



Espalier



Marquee

Crop forms for Olive



Ancient olives



Vase (1 stem)



Vase (2-3 stems from soil)



Bush (intensive 250-600 trees/ha)



Superintensive (>1500 trees/ha)

Crop forms for fruit trees



Natural



Vase



Bush/Globe (very small trees)



Spindle/Pyramid



Palm/Fan



Epsilon transversal

Slope (%)

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Soil Cover



Bare.No grass cover.  
Tillage several times per  
year



Seasonal occurrence.  
Herbicides+mowing <50%  
soil cover



>50% grass cover.  
Mowed several times per  
year



100% Grass cover.  
Mowed several times per  
year

## Crop Yield

Average Crop yield (t/ha) 2.31

Irrigation  rain fed  partial irrigation  fully irrigated

Intensification degree  organic  low  intermediate  
Specify the amount of fertilizer and pesticides  high

## Plantation Removal Information

Were the plants removed at a typical age for such crops ?  Yes  Older than typical  
 Younger than typical  Don't know

Reason for plantation removal  Old age (renovation)  Change of crop  
 Change of variety  Change of planting pattern  
 Plant disease

Equipment for uprooting  Felling with chainsaws  Uprooting with excavators

### Intended use of the plantation

Check how do you manage/use the plantation removal wood for each part of the plantation. Check as many as apply

	Roots	Stems	Thick branches	Fine branches
Abandoned at field side	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Burnt in fires at open air	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mulched as soil cover	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shredding and integration to soil	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Firewood	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Energy	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Specify the minimum diameter you consider for 'thick' branches used as firewood (mm) \_\_\_\_\_

Cost for removing 1 hectare when contracted to a company (€/ha) \_\_\_\_\_

Date of Measurement  
(DD/MM/YY)

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Mode of measurement  
Specify the method used for  
plantation removal measurement

**Per tree**



One or several single trees selected. Biomass per tree collected manually and weighted

**Per parcel (e.g. 100m<sup>2</sup>) in bags**



One or several parcels selected. Each parcel several trees. Biomass per parcel collected manually and weighted

**Per several rows (or in whole field)**



On large parcel, or a whole field is selected. Biomass collected and loaded to a truck. Weight of the load taken on a scale for trucks

**Amount of plantation removed**

Specify the tonnes per hectare of plantation removed and measured. Specify the moisture content if available. Check which part of the plantation is measured and the form of the material-"A":whole piece, "B":chips. Check as many as apply

	Part of plantation measured	Amount (t/ha)	Moisture content (%)	Form of material:	
				A	B
Full tree (high content of soil)	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>
Full tree (low content of soil; roots have been cleaned/shaked)	<input checked="" type="checkbox"/>	35.7	32	<input type="checkbox"/>	<input type="checkbox"/>
Only tree base and root (with much soil)	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>
Only the tree base and root (high content of soil)	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>
Only aerial part (stem+branches)	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>
Only stem	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>
Only branches	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>
Only stem + thick branches	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>

Losses of biomass after harvesting

(%) \_\_\_\_\_ or (tonnes/ha) \_\_\_\_\_

## Contact Data

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## References-External links:Provide references on which the information is based on or highlight any comments

1. Alissa Kendall, Elias Marvinney, Sonja Brodt, Weiyuan Zhu (2015) Life Cycle–based Assessment of Energy Use and Greenhouse Gas Emissions in Almond Production, Part I: Analytical Framework and Baseline Results. Journal of Industrial Ecology 19(6): 1008-1018, DOI: 10.1111/jiec.12332
2. Communication with authors: Alissa Kendall & Elias Marvinney (March 2017)

According to the authors, the final biomass removal quantity at clearing includes all above-ground biomass and a significant proportion of below-ground biomass. California almond production practices tend to result in shallow-rooted trees, and although some root material is left behind, the bulk of the below-ground biomass is removed.

The crop yield of 2.31 t/ha refers to kernel and is the weighted average of irrigated and non-irrigated plantations from year 7 till the end of the plantation life (year 25).

