thresholds through the accumulation of the magnitudes or dimensions of each of the projects considered.

- Those included in the scope of application of the simplified environmental assessment, when so decided on a case-by-case basis by the environmental body, in the environmental impact report.
- Projects included in the simplified environmental impact assessment, when requested by the promoter.

Projects subject to an environmental impact assessment that are not subject to an ordinary environmental impact assessment will be subject to a simplified environmental assessment.

To obtain approval from the administrative body, the characteristic features of the change in land use will be the following:

- That it is non-catalogued forest land
- Subsequent implantation of agricultural species
- Subsequent agricultural crop treatment
- Use through continuous mowing or fruit collection
- Generally, non-conservation of the characteristics of the soil:
    - Earth movement
    - Subsoiling
    - Ploughing
    - Root extraction
- Maximum slope of the forest land of 20 % (slopes or changes in slope between plots that exceed the established slope will have to maintain vegetation)
- The land ceases to be forest to become considered agricultural

Behind the authorisation there must also be compliance with a series of technical characteristics that allow the clearing to be carried out. The area where it is intended to be carried out cannot occupy spaces where natural water flows out and should preferably be carried out in old crop fields, easily accessible areas and areas that break the continuity of the forest mass to have the function of a defense area in the event of a forest fire. To fulfill this defense function, the land use change zones should be strategically located and not dispersed, preferably connected to other crops or located on ridges considering their orientation with reference to the dominant winds. The break must not lead to the irreversible loss of any unique species or endanger the balance of the ecosystems that surround it, nor lead to the destruction of any listed property of public interest. The surface area of the break zone is recommended not to exceed 7-8 %

of the forest area of the property, but it can increase up to 14 % in the case of burned forest lands. In the latter case, it will be necessary to verify that it is indeed possible to change the use of the land in burned areas, as there may be regulations that limit this action. The slope is the most limiting factor for the implementation of crops in forest land and it is not recommended to do so on land that exceeds 20 % of the slope. The risk of erosion must be zero at the bottom. In areas where the slope is high (10-20 %), if necessary, a soil conservation plan will be established and must be followed. It must be carried out in areas that are not prone to waterlogging and that the soil has good retentive power.

The slope of the land is what will largely determine the corrective measures that must be carried out to prevent erosion:

- Slope ≤ 3. There will be no limitation for the installation of any crop and it implies the practice of some simple conservation practice such as work according to the contours, simple drainage operations or fertilization.
- Slope of 3 to 10 %. It presents some limitations and will require conservation methods that are more difficult to use and maintain such as cultivation in strips, construction of terraces, drainage channels, drainage, internal fertilization and destoning.
- Slope of 10 to 20 % (or lower if the risk of erosion is higher, the soil depth and fertility are lower or there is high stonyness). Intensive measures are required to avoid erosion such as mandatory terraced construction, cultivation in strips within the terraces in cases of high risk of erosion, drainage channels, drainages or internal fertilization.

To decide on the corrective measure in each case, it is necessary to take into account, in addition to the intrinsic characteristics of the land, whether economically that crop allows its establishment to be profitable by minimizing the amortization period (especially for terraces). Otherwise, authorization for the change of land use could be ruled out.

Finally, once the plot is finished, it must present the following characteristics:

- Maximum slope of 10 % so that terracing is not necessary (depending on the type of soil and the length of the field, the slope must be lower)
- The slopes must be revegetated to avoid soil loss due to erosion, either by sowing the same species cultivated directly on the slope or with hydroseeding. If the characteristics of the terrain justify it, the slopes can be protected with retaining walls in the case of terrace construction.
- Drainage channels can be used if they are already naturally open, but they must be adjusted to the new hydrological conditions and their progressive degradation must be protected. If the construction of terraces or terraces negatively alters the natural drainage network, artificial drains will have to be made.

3.4.3.1. Vineyard plantation authorization regime

Vineyard planting is regulated by regulations in the European Union, so it is necessary to request authorization to carry it out.

A farmer can obtain authorization to plant a vineyard in two different ways:

- Applying for a new planting authorisation. The granting process, called the safeguard mechanism, and regulated on the basis of admissibility and priority criteria, allows member states a maximum annual increase of 1 % of the area planted with vines in order to ensure orderly growth of the sector during the period 2016-2045.
- Requesting a replanting authorization. This is the case for those winegrowers who have uprooted a vineyard with the aim of replanting to improve their operation.

Regulation (EC) No. 1308/2013 establishes a system for the management of vineyard plantations in the European Union based on an authorisation regime. This system aims to ensure an orderly growth of vineyard plantations during the period 2016-2030. This regulation is implemented in Commission Delegated Regulation (EU) No 2018/273 of 11 December 2017 and Commission Implementing Regulation No 2018/274 of 11 December 2017. Some aspects of this European regulation, at the Member State level, are specified in Real Decreto 1338/2018, which regulates the potential for wine production and its modifications.

In the case of new plantings, each Member State may grant annual authorisations for an area of up to 1% of the total planted area calculated on 31 July of the previous year. This percentage can never be 0 %, there must always be a slight increase. The issuance of authorisations at regional level may be limited for DO areas, always with prior justification in order to avoid risks of excessive supply or devaluation of quality figures. The period to request a new plantation through the safeguard mechanism will be from January 15th to the last day of February of each year, both inclusive.

The award procedure applies admissibility and priority criteria. Regarding the admissibility criteria , on the date of the opening of the application period (January 15):

- The applicant must have at their disposal, in ownership, or under a lease or partnership regime, demonstrating through a document that has paid the corresponding taxes, the surface area where they want to plant.
- Appropriate professional skills and competencies.
    - Have 5 years, out of the last 10 years, of accredited professional experience that can be justified:
    - Be registered with the Agricultural Social Security
    - Being the owner of the operation in the Sistema de Información de Explotaciones Agrarias (SIEX) of Catalonia

- Be the owner of the plot(s) in the Registre Vitivinícola de Catalunya (RVC)
    - Professional experience can also be accredited through a certificate of attendance at agricultural training courses or seminars with a duration of 30 teaching hours per year accredited for a maximum of 3 years.
- Be in possession of an agricultural qualification: Professional training, Higher Technician or have completed installation courses in the agricultural company with a minimum duration of 150 hours.
- Have a favorable resolution in the first installation aid for young farmers with a date prior to the opening of the application period.
- Be member of the Equips d'assessorament i orientació psicopedagògica (EAP) with a resolution before 15/1 of the year of the application.
- When the applicant is a legal entity and the above conditions cannot be directly verified, the majority shareholder with effective control must meet one of the above criteria, or, for at least 3 of the last 5 years, the legal entity has had a natural person hired who meets the conditions for agricultural title. It can also be fulfilled with a contract with a legal entity or professional for the provision of services for 3 consecutive years of the last 5.

- The applicant must not have vineyard plantations without authorization or without plantation rights, at the time of the application or at the time of the concession.

In the event that the new plantation is in a geographical area delimited by a DO, and that in the year of the application a surface limitation is applied for new plantation authorizations in this DO, for the application to be admissible: the applicant must indicate in their application whether or not the production of this surface will be used to produce wine with this DO.

- The wine produced will be destined for a DO, therefore, the admissible requested area will be counted towards the limit set by this DO.
- The wine produced will not be destined for DO, therefore, the applicant will commit until December 31, 2045 to:
    - Do not use or market the grapes to produce wine with the DO with limitations.
    - Do not uproot or replant the vines of the new plantation with the intention of making the replanted area eligible for wine production with the DO with limitations.

Priority criteria to be applied in order to grant new plantations:

- That the applicant is a natural person, who is no more than 40 years old in the year of submission of the application, is a new winegrower, who plants vineyards for the first time without having been the owner of any plot registered in the Wine Registry.

In the case of a legal entity, it must have as a partner a new winegrower who exercises effective control over the company and who complies with the previous point.

- That the applicant is a winegrower who is no more than 40 years old in the year of submission of the application, does not have vineyard plantations without authorization or without planting rights, at the time of the application or at the time of the concession and, in addition, does not have any authorization for new vineyard plantation previously granted without being used.
- That it has not had any abandoned vineyard plantations in the Wine Registry for 8 years and has not failed to comply with the commitments of the DO restrictions that apply for the given year.
- That the applicant, at the time of submitting the application, is the owner of a vineyard plantation, without vineyards dedicated to self-consumption, experimental vineyards or nurseries' mother plants being counted.
- Winegrowers with small or medium-sized holdings:
    - In order to be able to award one of the scores included in Annex III of Real Decreto 1338/2018, the size of the wine-growing holding will be verified:
    - All hectares of vineyards planted throughout the State are counted
    - Score based on the Autonomous Community where most of the farm's planted vineyard area is located.
    - In Catalonia:
        - Small holding ≥ 0.5 - ≤ 8 hectares of vineyard
        - Medium farm - > 8 ≤ 20 hectares of vineyard
- Scoring of established criteria:
    - Young new wine grower (article 10.1 a): 1
    - Young winegrower with good previous behavior: 0.5
    - Winegrower with small holding (article 10.1 c) ≥0.5 to ≤8 ha of vineyard: 2
    - Winegrower with medium- sized holding (article 10.1 c) >8 to ≤20 ha of vineyard: 3

Authorizations for new plantations granted will be valid for a maximum of 3 years from the date of notification of the resolution of the authorization application. In any case, the validity period may not exceed December 31, 2045.

The plantation must be maintained in exploitation for a minimum period of 5 years and may not be sold or leased to another natural or legal person except for reasons of force majeure.

For the modification of the location of vineyard plantations, the article 23 of the Real Decreto 1338/2018 specifies that:

- In duly justified cases, modifications to the surface area for which the planting authorization has been granted may be authorized, provided that the new surface area is of the same size.
- The aforementioned surface to be planted must be at the applicant's disposal in ownership, lease or partnership, which must be demonstrated by means of a document showing payment of the corresponding taxes at the time of submitting the modification request and at the time of communication.

In the case of the application for a concession for a new vineyard plantation (safeguard regime), the applicant must justify that at the time of submitting the application to be modified, they already had the new surface area for which the modification is requested.

The location of authorizations that are valid for 6 years cannot be modified due to having requested to plant in the same location as the start.

There are some exemptions from the authorization regime:

- Planting of areas intended for experimental purposes, the establishment of collections of vine varieties intended for the conservation of genetic resources or the cultivation of mother plants.
- Areas where the wine or wine products obtained are intended exclusively for the winegrower's own consumption. Provided that the area does not exceed 0.1 ha and that the winegrower is not engaged in the production of wine or other wine products for commercial purposes.
- Areas for new plantations resulting from expropriations for reasons of public utility under national legislation.

3.5. Acknowledgements

Thanks to all the farmers who have dedicated their time and shared all the information requested in this study.

The knowledge acquired thanks to the experience of all these people has been extremely valuable in understanding the situation of woody crop cultivation in the mountains and of the primary sector in general.

Thank you for the great work you do, often poorly compensated as it should be, to keep the rural territory alive and active.

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3.7. Appendices

3.7.1. Annex I. Informed Consent

Dear participant,

Horizon 2020 research and innovation program under grant agreement number 101037419, you are invited to participate in the activity:

Name: Socio-economic costs survey
Place:
Date:
Expected participation: Answer the relevant survey questions.
Objective: Provide data on the costs of a vineyard and/or apple farm in order to generate a database that will subsequently allow the identification of the requirements that possible plots will have where this activity is intended to be promoted.
Risks or inconveniences: Not applicable

What does your participation in the project entail?

Your participation in this research study is voluntary. You may choose not to participate. If you decide to participate in this activity, you may withdraw at any time. If you decide not to participate in this activity or if you withdraw from participation at any time, you will not be penalized.

What will happen to the information that concerns you?

All personal data is processed in accordance with EU Regulation No. 679/2016 (GDPR) and national legislation. The legal basis for the processing of your personal data is this consent to the processing of personal data.

Personal data will be routinely processed primarily in the European Union. The data will not be transferred to any country or international organization outside the European Union.

The recipients of the data are the persons responsible for the data processing activities. The person responsible for the processing carried out is the INSTITUTE OF AGRO-FOOD RESEARCH AND TECHNOLOGY, with headquarters at Ctra. C-59 Km. 12.1 [BV-1424, Km. 0] - Torre Marimon, 08140 (Caldes de Montbui). Tel. (+34) 93 467 40 40.

Email address: irta@irta.cat Website: https://www.irta.cat/

Personal data will be kept for the time necessary to carry out the purposes for which they were collected and/or the time necessary to comply with the *applicable Organic Law 7/2021.* Once this period has elapsed, the data will be deleted.

Can you request to modify or delete your data?

At any time, you have the right to request access to your personal data, to correct or delete such data, or to limit its processing. In addition, you have the right to data portability, as well as the right to file a complaint with a supervisory authority. When the processing of data is based on consent, you have the right to withdraw this consent at any time. You can also

exercise all other rights in accordance with current data protection regulations (art. 15 et seq. GDPR) by writing to the email address: dpo@irta.cat

CONSENT - PROCESSING OF PERSONAL DATA

The undersigned _____ declares to have read the Information on the processing of personal data and is aware of this notice drawn up in accordance with Reg. 679/2016 and national legislation and CONSENTS to the processing of his/her personal data.

Place, date: Signature _____ ____

CONSENT – VOLUNTARY PARTICIPATION

The undersigned declares to have understood the contents and objectives of the aforementioned project and to participate voluntarily in the project.

Consent can be revoked in writing at any time without giving reasons, with the consequence that the interview will no longer be used. Publications that have already taken place are not affected by the revocation.

Place, date: Signature _____

CONSENT - PHOTOGRAPHY, AUDIO AND VIDEO RECORDING AUTHORIZATION FORM

The undersigned authorizes the Institute of Agro-Food Research and Technology (and any person acting under the authority of the Institute of Agro-Food Research and Technology) to take photographs (including group photos), video and sound recordings of the undersigned during the *Socio-Economic Cost Survey event,* which will take place on the date and space specified in the signature. and that it can be used in any way or medium, including use on web pages for dissemination and publication.

The undersigned grants authorization to the Institute of Agro-Food Research and Technology to use the photographs, videos and audio recordings free of charge for an unlimited period of time. The undersigned declares that he will have no claim against the Institute of Agro-Food Research and Technology with respect to the above and waives all rights, claims and/or actions arising from this authorization.

Place, date: Signature _____

CONSENT - SURVEYS

The undersigned declares to have understood the contents and objectives of the aforementioned project and to participate voluntarily in the project.

The undersigned has been selected as a farm of interest to participate in a socio-economic study for which you will be asked to answer a survey and interview lasting between 120 – 180 minutes. The set consists of several sections in order to collect all possible information regarding your farm (annual costs and benefits, recurring problems, obstacles overcome, etc.).

The data collected by the FIRE-RES project (Horizon *2020* , number 101037419) have academic research objectives and do not represent any commercial interest. All information collected in the survey will be used solely for research. Its confidentiality is fully guaranteed and will never be disclosed to third parties. It is not necessary to provide information that you do not want to disclose, and you can stop answering any question.

Place, date: Signature _____

3.7.2. Annex II. Socioeconomic survey

SURVEY FOR THE COLLECTION OF DATA ON SOCIO-ECONOMIC COSTS OF VINEYARDS AND/OR APPLE ORCHARDS

Dear participant,

The objective of this survey is to collect real evidence of socio-economic costs in vineyard and/or apple orchards. The objective is to create a database that allows estimating the requirements and limitations that a newly established plot may have according to its characteristics.

The questionnaire is part of the European project FIRE-RES (n° 101037419) which has a duration of 4 years (2021 – 2025). The main objective of this initiative, with many areas of action, is to provide the European Union with the capacity to avoid collapse in the face of extreme forest fires, by developing and implementing a set of actions to address in an integrated way the three phases of fire management: prevention, response and restoration. To implement this, formulas will be proposed to make these innovations economically viable, so that they are promoted and implemented in all regions of the EU, with the participation of public and private actors.

The processing of data from this survey is carried out in accordance with all the information detailed in the "Informed Consent" document provided at the first instance of this meeting.

The requested data is divided into three main groups:

- Explanation of personal experience regarding socio-economic problems raised
- Description of the characteristics of the farm (plots, varieties, management, etc.)
- Taking data on production and costs for what was considered an average year

If you have any questions or require clarification to complete the survey, do not hesitate to contact us.

Thank you very much for your collaboration.

SUMMARY OF THE EXPLOITATION

PERSONAL EXPERIENCE TOWARDS SOCIO-ECONOMIC PROBLEMS

1. Access to land

   1.1. What size, on average, are your plots?

   1.2. Have you encountered problems acquiring plots larger than one hectare?

1.3. Is there an available market for buying, selling or renting plots in your area?

1.4. Have you benefited from any assistance for young people to access land?

1.4.1. For which crops?

1.5. What tool(s) do you think could help you remedy the situation regarding access to land?

2. Agricultural activity

2.1. What is your point of view regarding the difficulty currently faced by producers who want to seek continuity in their farms? (whether because they retire, change jobs, etc.).

2.1.1. If there are any, why do you think there are no heirs for the current plantations?

3. Rural exodus

3.1. Do you see this happening in your area?

3.1.1. How is it affecting the abandonment of farmland? Are people abandoning it, or are they keeping it but abandoning its use?

3.2. Where do people usually go?

3.3. Can grape and/or apple cultivation help keep people in the territory?

4. Socioeconomic factors that affect your activity (describe the ones more seriously affecting)

Impact factors
Urban/industrial development and competition for land
Urban/industrial development and competition for water
Renewable energy development and competition for land
Increased recreational activities that disturb livestock and pastures
Increase in wildlife

Illegal harvesting on my property
Lack of political stability and long-term policies
Competition in EU markets
Competition in international markets
Restrictions related to protected areas
Lack of skilled labour
Inadequate infrastructures
Change of activity
Increase in poverty and rural depopulation
Supply chain disruption
Other (specify)

5. Support tools

   5.1. Do you have tools that help you develop your activity, making it more viable and competitive? (e.g. cooperatives, training programs, financing, local promotion, etc.)

6. Main challenges

   6.1. What are the most significant obstacles you encounter in developing your activity?

7. Other contributions

3.7.3. Annex III. Economic survey – Vineyard

PRODUCTION COSTS IN A FULL PRODUCTION PLOT (AVERAGE OR NORMAL YEAR) *Complete only dark gray boxes (when applicable)*						COMMENTS
Name		Name of the plot				
Municipality		Postal code				
Variety		Plantation area (ha)		Irrigation or Rainfed		
Plantation year		Plant density (tree/ha)	#¡DIV/0!	Cup or Trellis		
Grape destiny (Winery, Coop., Sale, etc.)		Row width (m)		Management (Conventional, Organic, etc.)		
Grape use (Table, DOP, IGP, Pago, etc.)		Distance between plants (m)		Priority explotation? (Yes/No)		

VINEYARD PRODUCTION AND INFORMATION					COMMENTS
Production (€/ha)	#¡DIV/0!	Wine production (€/ha)	#¡DIV/0!		
Yield (kg/ha)		Bottle 1 (nº)			
Losses (kg/ha)		Price (€/bottle 1)			
Price received (€/kg)		Bottle 2 (nº)			
Additional income (€/ha)	#¡DIV/0!	Price (€/bottle 2)			
Regular subsidies (€/ha)		Bottle 3 (nº)			
Agro-tourism (€)		Price (€/bottle 3)			
Agro-tourism (€/ha)	#¡DIV/0!				

LABOUR SALARY					COMMENTS
Salary 1 (€/h)	#¡DIV/0!	Temporal salary 1 (€/h)	#¡DIV/0!		
Pay (€/week, month)		Pay (€ yearly per task)			
Worked hours (h/week, month)		Hours worked (h yearly per task)			
Salary 2 (€/h)	#¡DIV/0!	Temporal salary 1 (€/h)	#¡DIV/0!		
Pay (€/week, month)		Pay (€ yearly per task)			
Worked hours (h/week, month)		Hours worked (h yearly per task)			

A. FIXED COSTS	LABOUR, MACHINERY, OBJECT employed in each task or service			RAW MATERIALS AND RESOURCES and intermediate consumption			TASK OR SERVICES	COST	COST	COMMENTS
	€/h, unit	h, unit/ha	€/ha	€/l, kg, m, unit	kg, m, unit/ha	€/ha	number	€/ha	%	
Land								#¡DIV/0!	#¡DIV/0!	
Renting								#¡DIV/0!	#¡DIV/0!	
Adquisition								#¡DIV/0!	#¡DIV/0!	
Interest								#¡DIV/0!	#¡DIV/0!	
Bureaucracy								#¡DIV/0!	#¡DIV/0!	
Planting right								#¡DIV/0!	#¡DIV/0!	
Permissions								#¡DIV/0!	#¡DIV/0!	
Other (specify)								#¡DIV/0!	#¡DIV/0!	
Structure			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
Poles						€ -		#¡DIV/0!	#¡DIV/0!	
Wires						€ -		#¡DIV/0!	#¡DIV/0!	
Anti-hail net			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
Installation			€ -					#¡DIV/0!	#¡DIV/0!	
Anti-ice candles			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
Other (specify)			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
Plantation			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
Soil analysis						€ -		#¡DIV/0!	#¡DIV/0!	
Soil leveling/terrace creation			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
Soil preparation			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
Soil disinfection			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
Soil fertilization			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
Grafted plant						€ -		#¡DIV/0!	#¡DIV/0!	
Tutors						€ -		#¡DIV/0!	#¡DIV/0!	
Remove stones			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
Cultivator			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
Plants						€ -		#¡DIV/0!	#¡DIV/0!	
Plantation			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
Other (specify)			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
Machinery			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
Adquisition						€ -		#¡DIV/0!	#¡DIV/0!	
Maintenance			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
Reparation			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
Renting			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
Other (specify)			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
Irrigation			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
Study								#¡DIV/0!	#¡DIV/0!	
Connection to water point			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
Material (water point to parcel)						€ -		#¡DIV/0!	#¡DIV/0!	
Head and fertigation equipment						€ -		#¡DIV/0!	#¡DIV/0!	
Distribution network (parcel)						€ -		#¡DIV/0!	#¡DIV/0!	
Instalation			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
Other (specify)			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
Space conditioning						€ -		#¡DIV/0!	#¡DIV/0!	
Works			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
Other (specify)			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
Machinery (cellar)						€ -		#¡DIV/0!	#¡DIV/0!	
Sheller						€ -		#¡DIV/0!	#¡DIV/0!	
Press						€ -		#¡DIV/0!	#¡DIV/0!	
Pump and hoses						€ -		#¡DIV/0!	#¡DIV/0!	
Deposits						€ -		#¡DIV/0!	#¡DIV/0!	
Barrels						€ -		#¡DIV/0!	#¡DIV/0!	
Bottling plant						€ -		#¡DIV/0!	#¡DIV/0!	
Maintenance			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
Other (specify)			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
A. TOTAL FIXED COSTS								#¡DIV/0!		

B. OPERATIONAL COSTS										
	LABOUR, MACHINERY, OBJECT employed in each task or service			RAW MATERIALS AND RESOURCES and intermediate consumption			TASK OR SERVICES	COST	COST	COMMENTS
	€/h, unit	h, unit/ha	€/ha	€/l, kg, m, unit	kg, m, unit/h	€/ha	number	€/ha	%	
Structural			€ -			€ -		€ -	#¡DIV/0!	
Maintenance of trellis			€ -					€ -	#¡DIV/0!	
Tie rods			€ -					€ -	#¡DIV/0!	
Lower wires			€ -					€ -	#¡DIV/0!	
Rise wires			€ -					€ -	#¡DIV/0!	
Repair/Maintenance equipments			€ -					€ -	#¡DIV/0!	
Irrigation			€ -					€ -	#¡DIV/0!	
Other (specify)			€ -			€ -		€ -	#¡DIV/0!	
Soil management			€ -			€ -		€ -	#¡DIV/0!	
Plowing			€ -			€ -		€ -	#¡DIV/0!	
Mowing			€ -			€ -		€ -	#¡DIV/0!	
Sowing			€ -			€ -		€ -	#¡DIV/0!	
Mulching			€ -			€ -		€ -	#¡DIV/0!	
Green cover			€ -			€ -		€ -	#¡DIV/0!	
Grass removal (machine or hand)			€ -			€ -		€ -	#¡DIV/0!	
Other (specify)			€ -			€ -		€ -	#¡DIV/0!	
Vines			€ -			€ -		€ -	#¡DIV/0!	
Pre-prunning (machine or hand)			€ -			€ -		€ -	#¡DIV/0!	
Prunning			€ -					€ -	#¡DIV/0!	
Brunch support			€ -					€ -	#¡DIV/0!	
Remove and eliminate shoots			€ -					€ -	#¡DIV/0!	
Clarify bunches			€ -			€ -		€ -	#¡DIV/0!	
Remove bottom rails			€ -					€ -	#¡DIV/0!	
Replenish			€ -					€ -	#¡DIV/0!	
Harvest			€ -			€ -		€ -	#¡DIV/0!	
Grape transport to winery			€ -			€ -		€ -	#¡DIV/0!	
Other (specify)			€ -			€ -		€ -	#¡DIV/0!	
Fertilizers			€ -			€ -		€ -	#¡DIV/0!	
Organic			€ -			€ -		€ -	#¡DIV/0!	
Chemical			€ -			€ -		€ -	#¡DIV/0!	
Other (specify)			€ -			€ -		€ -	#¡DIV/0!	
Treatments			€ -			€ -		€ -	#¡DIV/0!	
Herbicide spray			€ -			€ -		€ -	#¡DIV/0!	
Mildew			€ -			€ -		€ -	#¡DIV/0!	
Oidium			€ -			€ -		€ -	#¡DIV/0!	
Cluster moth (chemical)			€ -			€ -		€ -	#¡DIV/0!	
Cluster moth (pheromone difuser)			€ -			€ -		€ -	#¡DIV/0!	
Botrytis			€ -			€ -		€ -	#¡DIV/0!	
Other (specify)			€ -			€ -		€ -	#¡DIV/0!	
B. TOTAL OPERATIONAL COSTS								€ -		

C. WINERY COSTS										
	LABOUR, MACHINERY, OBJECT employed in each task or service			RAW MATERIALS AND RESOURCES and intermediate consumption			TASK OR SERVICES	COST	COST	COMMENTS
	€/h, unit	h, unit/ha	€/ha	€/l, kg, m, unit	kg, m, unit/h	€/ha	number	€/ha	%	
Material			€ -			€ -		€ -	#¡DIV/0!	
Bottle						€ -		€ -	#¡DIV/0!	
Cork						€ -		€ -	#¡DIV/0!	
Etiquette						€ -		€ -	#¡DIV/0!	
Wine products						€ -		€ -	#¡DIV/0!	
Boxes						€ -		€ -	#¡DIV/0!	
Other (specify)			€ -			€ -		€ -	#¡DIV/0!	
Vinification			€ -			€ -		€ -	#¡DIV/0!	
Enology services			€ -			€ -		€ -	#¡DIV/0!	
Winemaking tasks			€ -			€ -		€ -	#¡DIV/0!	
Cleaning			€ -			€ -		€ -	#¡DIV/0!	
Other (specify)			€ -			€ -		€ -	#¡DIV/0!	
C. TOTAL WINERY COSTS								€ -		

D. INFRASTRUCTURE COSTS										
	LABOUR, MACHINERY, OBJECT employed in each task or service			RAW MATERIALS AND RESOURCES and intermediate consumption			TASK OR SERVICES	COST	COST	COMMENTS
	€/h, unit	h, unit/ha	€/ha	€/l, kg, m, unit	kg, m, unit/h	€/ha	number	€/ha	%	
Energy			€ -			€ -		€ -	#¡DIV/0!	
Electricity			€ -					€ -	#¡DIV/0!	
Fuel			€ -					€ -	#¡DIV/0!	
Gas			€ -					€ -	#¡DIV/0!	
Solar			€ -			€ -		€ -	#¡DIV/0!	
Other (specify)			€ -			€ -		€ -	#¡DIV/0!	
Water			€ -			€ -		€ -	#¡DIV/0!	
Irrigation			€ -					€ -	#¡DIV/0!	
Sanitary waste			€ -					€ -	#¡DIV/0!	
Other (specify)			€ -			€ -		€ -	#¡DIV/0!	
Transport			€ -			€ -		€ -	#¡DIV/0!	
Machinery						€ -		€ -	#¡DIV/0!	
Material						€ -		€ -	#¡DIV/0!	
Export			€ -			€ -		€ -	#¡DIV/0!	
Import			€ -			€ -		€ -	#¡DIV/0!	
Other (specify)			€ -			€ -		€ -	#¡DIV/0!	
Comercialization			€ -			€ -		€ -	#¡DIV/0!	
Professional services			€ -			€ -		€ -	#¡DIV/0!	
Other (specify)			€ -			€ -		€ -	#¡DIV/0!	
Security			€ -			€ -		€ -	#¡DIV/0!	
Alarm			€ -			€ -		€ -	#¡DIV/0!	
Fence			€ -			€ -		€ -	#¡DIV/0!	
Other (specify)			€ -			€ -		€ -	#¡DIV/0!	
D. TOTAL INFRASTRUCTURE COSTS								€ -		

E. OTHER COSTS										
	LABOUR, MACHINERY, OBJECT employed in each task or service			RAW MATERIALS AND RESOURCES and intermediate consumption			TASK OR SERVICES	COST	COST	COMMENTS
	€/h, unit	h, unit/ha	€/ha	€/l, kg, m, unit	kg, m, unit/h	€/ha	number	€/ha	%	
Insurance			€ -					€ -	#¡DIV/0!	
Certification			€ -					€ -	#¡DIV/0!	
Regulatory Council			€ -					€ -	#¡DIV/0!	
Real estate tax (IBI)			€ -					€ -	#¡DIV/0!	
Consulting			€ -					€ -	#¡DIV/0!	
Other (specify)			€ -					€ -	#¡DIV/0!	
E. TOTAL OTHER COSTS								€ -		

RESUM			
	TOTAL	TOTAL	COMMENTS
	€/ha	%	
COSTS	#¡DIV/0!		
A. FIXED COSTS	#¡DIV/0!	#¡DIV/0!	
B. OPERATIONAL COSTS	€ -	#¡DIV/0!	
C. WINERY COSTS	€ -	#¡DIV/0!	
D. INFRASTRUCTURE COSTS	€ -	#¡DIV/0!	
E. OTHER COSTS	€ -	#¡DIV/0!	
INCOME	#¡DIV/0!		
PRODUCTION (GRAPEVINE)	#¡DIV/0!	#¡DIV/0!	
PRODUCTION (WINE)	€ -	#¡DIV/0!	
ADDITIONAL	#¡DIV/0!	#¡DIV/0!	
SUMMARY	#¡DIV/0!		

3.7.4. Annex IV. Economic survey – Apple orchard

APPLE PRODUCTION COSTS PER PRODUCTIVE HECTARE (AVERAGE OR NORMAL YEAR) *Complete only the dark gray boxes (when applying)*							COMMENTS
Brand or production name				Plot name			
Municipality				Postal code			
Variety		Total plantation area (ha)			Irrigated or dry land?		
Planting year		Planting density (tree/ha)		#¡DIV/0!	Support structure?		
Apple destination (Coop., sale, etc.)		Street width (m)			Management (Conventional, ecological, etc.)		
Use of the apple (Direct consumption, juice, etc.)		Distance between trees (m)			Priority exploitation? (Yes/No)		

APPLE ORCHARD PRODUCTION AND INFORMATION			
Production (€/ha)	#¡DIV/0!		COMMENTS
Yield (kg/ha)			
Losses (kg/ha)			
Price received (€/kg)			
Additional income (€/ha)	#¡DIV/0!		
Regular subsidies (€/ha)			
Agro-tourism (€)			
Agro-tourism (€/ha)	#¡DIV/0!		

LABOUR SALARY					COMMENTS
Salary 1 (€/h)	#¡DIV/0!	Temporal salary 1 (€/h)	#¡DIV/0!		
Pay (€/week, month)		Pay (€ yearly per task)			
Worked hours (h/week, month)		Hours worked (h yearly per task)			
Salary 2 (€/h)	#¡DIV/0!	Temporal salary 1 (€/h)	#¡DIV/0!		
Pay (€/week, month)		Pay (€ yearly per task)			
Worked hours (h/week, month)		Hours worked (h yearly per task)			

A. FIXED COSTS	LABOUR, MACHINERY, OBJECT employed in each task or service			RAW MATERIALS AND RESOURCES and intermediate consumption			TASK OR SERVICES	COST	COST	COMMENTS
	€/h, unit	h, unit/ha	€/ha	€/l, kg, m, unit	kg, m, unit/ha	€/ha	number	€/ha	%	
Soil								#¡DIV/0!	#¡DIV/0!	
Rental								#¡DIV/0!	#¡DIV/0!	
Acquisition								#¡DIV/0!	#¡DIV/0!	
Interests								#¡DIV/0!	#¡DIV/0!	
Bureaucracy								#¡DIV/0!	#¡DIV/0!	
Other (specify)								#¡DIV/0!	#¡DIV/0!	
Support and protection			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
Tutors						€ -		#¡DIV/0!	#¡DIV/0!	
Anti-stone network						€ -		#¡DIV/0!	#¡DIV/0!	
Installation			€ -					#¡DIV/0!	#¡DIV/0!	
Anti-freeze candles			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
Anti-freeze spraying system			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
Heaters			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
Windmills			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
Other (specify)			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
Plantation			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
Soil analysis						€ -		#¡DIV/0!	#¡DIV/0!	
Leveling/Terracing			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
Stone extraction			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
Soil preparation			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
Soil disinfection			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
Soil fertilization			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
Cultivator			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
Plants						€ -		#¡DIV/0!	#¡DIV/0!	
Plantation			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
Other (specify)			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
Agricultural machinery			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
Acquisition						€ -		#¡DIV/0!	#¡DIV/0!	
Maintenance			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
Repair			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
Other (specify)			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
Irrigation			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
Study								#¡DIV/0!	#¡DIV/0!	
Connection to the water point			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
Material (from the water point to the plot)						€ -		#¡DIV/0!	#¡DIV/0!	
Fertigation head and equipment						€ -		#¡DIV/0!	#¡DIV/0!	
Distribution pipes for the plot						€ -		#¡DIV/0!	#¡DIV/0!	
Installation			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
Other (specify)			€ -			€ -		#¡DIV/0!	#¡DIV/0!	
A. TOTAL FIXED COSTS								#¡DIV/0!		

B. OPERATIONAL COSTS										
	LABOUR, MACHINERY, OBJECT employed in each task or service			RAW MATERIALS AND RESOURCES and intermediate consumption			TASK OR SERVICES	COST	COST	MATERIAL AND MACHINERY AVAILABLE AT THE OPERATION / COMMENTS
	€/h, unit	h, unit/ha	€/ha	€/l, kg, m, unit	kg, m, unit/h	€/ha	number	€/ha	%	
Structural			€ -			€ -		€ -	#¡DIV/0!	
Equipment repair/maintenance			€ -					€ -	#¡DIV/0!	
Irrigation repair/maintenance			€ -					€ -	#¡DIV/0!	
Other (specify)			€ -			€ -		€ -	#¡DIV/0!	
Land management			€ -			€ -		€ -	#¡DIV/0!	
Plow			€ -			€ -		€ -	#¡DIV/0!	
Mowing vegetation cover			€ -			€ -		€ -	#¡DIV/0!	
Sow			€ -			€ -		€ -	#¡DIV/0!	
Quilting			€ -			€ -		€ -	#¡DIV/0!	
Weed control (machine, chemical, by hand)			€ -			€ -		€ -	#¡DIV/0!	
Other (specify)			€ -			€ -		€ -	#¡DIV/0!	
Cultivation tasks			€ -			€ -		€ -	#¡DIV/0!	
Pre-pruning or winter pruning (machine or by hand)			€ -			€ -		€ -	#¡DIV/0!	
Management of spruce firewood			€ -			€ -		€ -	#¡DIV/0!	
Green pruning			€ -					€ -	#¡DIV/0!	
Fruit clarification			€ -					€ -	#¡DIV/0!	
Remove leaves			€ -					€ -	#¡DIV/0!	
Rest the dead			€ -					€ -	#¡DIV/0!	
Harvest			€ -			€ -		€ -	#¡DIV/0!	
Apple transportation			€ -			€ -		€ -	#¡DIV/0!	
Other (specify)			€ -			€ -		€ -	#¡DIV/0!	
Fertilizers			€ -			€ -		€ -	#¡DIV/0!	
Organic			€ -			€ -		€ -	#¡DIV/0!	
Chemicals			€ -			€ -		€ -	#¡DIV/0!	
Other (specify)			€ -			€ -		€ -	#¡DIV/0!	
Treatments			€ -			€ -		€ -	#¡DIV/0!	
Herbicide			€ -			€ -		€ -	#¡DIV/0!	
Fungicides			€ -			€ -		€ -	#¡DIV/0!	
Insecticides			€ -			€ -		€ -	#¡DIV/0!	
Clarifiers			€ -			€ -		€ -	#¡DIV/0!	
Foliar fertilizers			€ -			€ -		€ -	#¡DIV/0!	
Other (specify)			€ -			€ -		€ -	#¡DIV/0!	
B. TOTAL OPERATING COSTS								€ -		

C. INFRASTRUCTURE COSTS										
	LABOUR, MACHINERY, OBJECT employed in each task or service			RAW MATERIALS AND RESOURCES and intermediate consumption			TASK OR SERVICES	COST	COST	COMMENTS
	€/h, unit	h, unit/ha	€/ha	€/l, kg, m, unit	kg, m, unit/h	€/ha	number	€/ha	%	
Energy			€ -			€ -		€ -	#¡DIV/0!	
Electricity			€ -					€ -	#¡DIV/0!	
Fuel			€ -					€ -	#¡DIV/0!	
Gas			€ -					€ -	#¡DIV/0!	
Solar			€ -			€ -		€ -	#¡DIV/0!	
Other (specify)			€ -			€ -		€ -	#¡DIV/0!	
Water			€ -			€ -		€ -	#¡DIV/0!	
Irrigation			€ -					€ -	#¡DIV/0!	
Sanitary waste			€ -					€ -	#¡DIV/0!	
Other (specify)			€ -			€ -		€ -	#¡DIV/0!	
Transportation			€ -			€ -		€ -	#¡DIV/0!	
Machinery						€ -		€ -	#¡DIV/0!	
Material						€ -		€ -	#¡DIV/0!	
Export			€ -			€ -		€ -	#¡DIV/0!	
Import			€ -			€ -		€ -	#¡DIV/0!	
Other (specify)			€ -			€ -		€ -	#¡DIV/0!	
Commercialization			€ -			€ -		€ -	#¡DIV/0!	
Professional services			€ -			€ -		€ -	#¡DIV/0!	
Other (specify)			€ -			€ -		€ -	#¡DIV/0!	
Security			€ -			€ -		€ -	#¡DIV/0!	
Alarm (cameras, system, etc.)			€ -			€ -		€ -	#¡DIV/0!	
Fence			€ -			€ -		€ -	#¡DIV/0!	
Other (specify)			€ -			€ -		€ -	#¡DIV/0!	
C. TOTAL INFRASTRUCTURE COSTS								€ -		

D. OTHER COSTS										
	LABOUR, MACHINERY, OBJECT employed in each task or service			RAW MATERIALS AND RESOURCES and intermediate consumption			TASK OR SERVICES	COST	COST	COMMENTS
	€/h, unit	h, unit/ha	€/ha	€/l, kg, m, unit	kg, m, unit/h	€/ha	number	€/ha	%	
Insurance			€ -					€ -	#¡DIV/0!	
Certifications			€ -					€ -	#¡DIV/0!	
Regulatory Council			€ -					€ -	#¡DIV/0!	
Real estate tax (IBI)			€ -					€ -	#¡DIV/0!	
Consulting			€ -					€ -	#¡DIV/0!	
Other (specify)			€ -					€ -	#¡DIV/0!	
D. TOTAL OTHER COSTS								€ -		

SUMMARY			
	TOTAL	TOTAL	COMMENTS
	€/ha	%	
COSTS	#¡DIV/0!	#¡DIV/0!	
A. FIXED COSTS	#¡DIV/0!	#¡DIV/0!	
B. OPERATIONAL COSTS	€ -	#¡DIV/0!	
C. INFRASTRUCTURE COSTS	€ -	#¡DIV/0!	
D. OTHER COSTS	€ -	#¡DIV/0!	
BENEFITS	#¡DIV/0!	#¡DIV/0!	
PRODUCTION	#¡DIV/0!	#¡DIV/0!	
ADDITIONAL	#¡DIV/0!	#¡DIV/0!	
SUMMARY	#¡DIV/0!		

4. Design and field test of innovative silvicultural work systems

4.1. Rationale and Objective

In Europe, forest operations, particularly thinning, pruning, and biomass removal, are the primary means of modifying fuel structures and reducing forest biomass loads to mitigate wildfire risk (Yocom Kent et al., 2015). These practices not only lower the likelihood of ignition and fire intensity but also improve accessibility for firefighting crews (Mederski, 2006; Moskalik et al., 2017).

Forest management interventions often serve multiple silvicultural objectives beyond wildfire prevention. For instance, thinning and pruning can help create more fire-resilient forests while enhancing timber production (Eriksson & Lindroos, 2014; Williams & Ackerman, 2016), improving forest aesthetics, and increasing recreational value, especially in tourism-sensitive areas (Spinelli & Magagnotti, 2010).

However, for any treatment to be truly effective, it must be adapted to local ecological, economic, and social conditions and gain the support of key stakeholders, including forest owners, workers, and the general public (Bigot et al., 2012; Codd & Nieuwenhuis, 2008).

Within this context, the objective of this section is to assess the effectiveness of fuel-reduction silvicultural practices while exploring new value chain solutions to maximize the economic return from removed biomass (Ackerman et al., 2021; Mederski et al., 2018). These efforts aim to achieve multiple goals: enhance worker safety and ergonomics (without replacing manual labor), minimize environmental impacts, and return forests to structurally and aesthetically desirable conditions (Lazdiņš et al., 2016).

Ultimately, the mission is to improve the economic balance of forest operations, unlock underutilized biomass resources, and align practices with circular economy principles (Mederski, 2006; Moskalik et al., 2017).

4.2. Methodology

Forest operations, particularly biomass removal, are highly sensitive to local conditions. Factors such as vegetation type, climate, topography, soil characteristics, land ownership patterns, conservation constraints, workforce organization, and crew skill levels must all be considered when developing innovative forest management solutions.

To capture this variability, we tested innovative mechanical approached in three regions: Catalonia (Spain), Tuscany and Sardinia (Italy). Each Living Lab (LL) involved local leadership in the decision-making process. Technicians were tasked with identifying high-impact, site-specific silvicultural treatments relevant to wildfire risk mitigation. For each case, detailed information was collected regarding the treatment type, objectives,