

## INCREDIBLE

### Innovation Networks of Cork, Resins and Edibles in the Mediterranean basin

Project no. 774632

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Duration of project: 36 months

Coordination and Support Action H2020-RUR-2017-1

Thematic Networks compiling knowledge ready for practice

#### D2.4 Submission of Practice and Research Abstract

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**Authors:** Joana Paulo, Teresa Sampaio (ISA); Eduard Mauri, Sarah Adams (EFI); Benjamin Chapelet (CNPFF)

**Reviewers:** Inazio Martinez de Arano (Project Coordinator), Sarah Adams (EFI)

Coordinator



Partners



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## 1. Introduction

The present deliverable 2.4, entitled “Submission of Practice and Research Abstract”, aims at:

- describing the methodology of task 2.1 Collection of knowledge (**chapter 2**);
- presenting a calendar for task 2.1 Collection of knowledge, organised in 3 stages (included in **chapter 2**);
- listing the factsheets available in stage 1, as an example of what should be the full collection of knowledge, in the form of factsheets accessible from the open flexible knowledge repository (task 2.3), at the end of the task at month 35 (**chapter 3**);
- filling in the EIP-AGRI common format for Horizon 2020 multi-actor projects and thematic networks, as an example of what should be the full collection EIP-Agri Practice abstracts, at the end of the task at month 35 (**chapter 4**);
- presenting the structure and layout of the factsheets, the individual pieces of information of Task 2.1 Collection of knowledge from research and practice (**chapter 5**).

Deliverable 2.4 relates to Deliverables 2.1 (Compilation of co-developed ready-to-implement innovative knowledge) and D2.2 (Web-based knowledge platform with associated long-term sustainability), and its content was defined in order to guarantee the visibility of the workflow between tasks 2.1 and 2.3.

D2.1 will be the full collection of knowledge (in the form of factsheets and practice abstracts) and D2.2 will be the repository from where the factsheets will be accessible (while practice abstracts will be accessible from the EIP-Agri practice abstracts database).

## 2. Collection of knowledge (Task 2.1)

This chapter reproduces the text included in the “User’s manual for the collection of knowledge from research and practice (Task 2.1) and upload in the knowledge repository (Task 2.3)”, developed in order to guide INCREDIBLE partners with the role of author or editor of the factsheets in task 2.1. It was updated in July 2019 (Figure 1), to include relevant topics or questions.

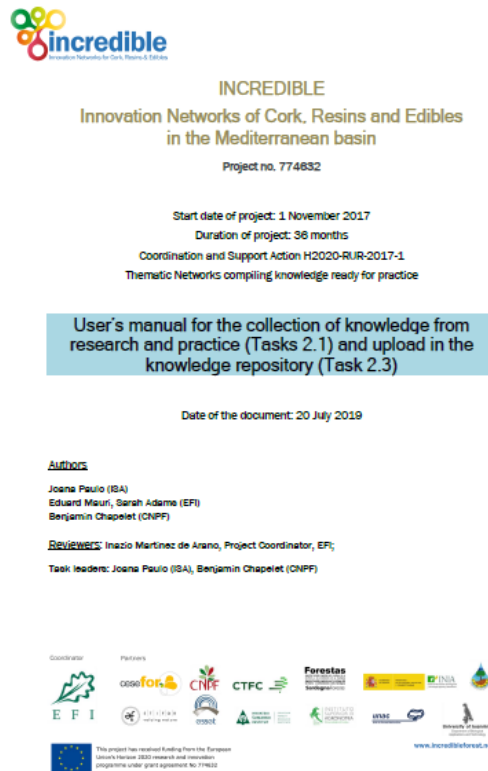


Figure 1. Cover from the ‘User’s manual for the collection of knowledge from research and practice (Tasks 2.1) and upload in the knowledge repository (Task 2.3)’.

### 2.1 Procedure in a nutshell

This document includes information regarding the steps for the collection of knowledge (Task 2.1), that will take place during the project and, in particular, for the events organised in Task 2.2, and that will finally be uploaded in the knowledge repository (Task 2.3). This information will be used for the development of two key deliverables of the project: **INCREDIBLE factsheets and practice abstracts**.

The creation of the INCREDIBLE project factsheet has five steps:

1. Creation of the factsheet content in the Excel file “INVENTORY DATA TEMPLATE\_20190423\_v2.xlsx” stored in the project extranet.

2. Upload of the factsheet content (made by the author or person responsible for the factsheet) in the Knowledge repository (KR) database (in Oppla<sup>1</sup>)
3. Editorial review
4. Author's revision until final agreement of contents with editor
5. Publishing

Figure 2, below, represents this process.

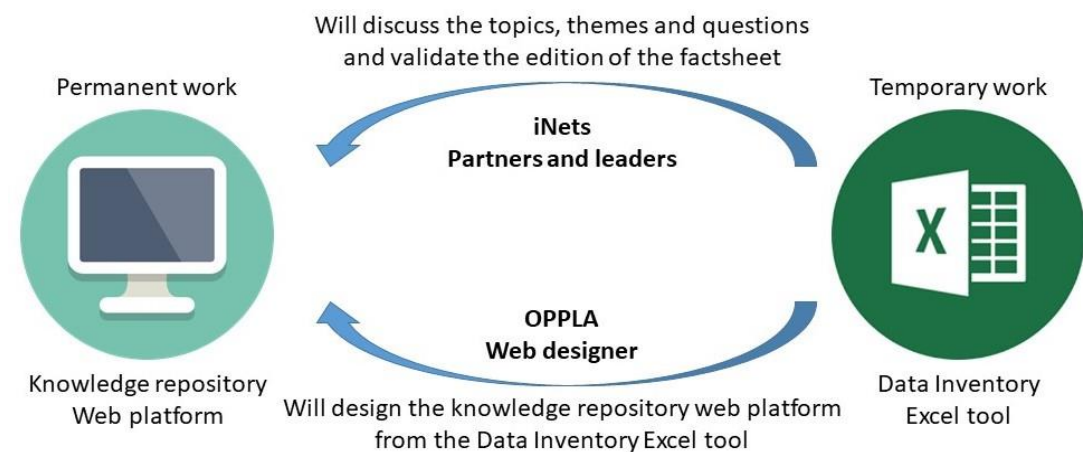


Figure 2. Summary of the procedure for the collection of knowledge and upload in the knowledge repository (Tasks 2.1 and 2.3).

The next sections present details about the steps and tools to use: the “Data Inventory Excel tool” and the “Knowledge repository web platform”<sup>2</sup>. Please take a few minutes to read them. Contact the task leaders if you have any questions.

## 2.2 Factsheets’ distribution and calendar of task 2.1

**The 250 factsheets are expected by the end of June 2020. These will be included in Deliverable 2.1 (M35: September 2020).** In order to monitor the completion of this production, CNPF and ISA will regularly keep track of the number of factsheets edited with the iNet leaders. In order to avoid delays, and in order to account for sufficient time slots for the editing and upload processes, the following calendar should be taken into account (Table 1):

<sup>1</sup> Oppla (<https://oppla.eu/>) is the online platform where the open flexible knowledge repository (task 2.3) will be developed and hosted.

<sup>2</sup> Although the use of the “Knowledge repository web platform” is described in the user’s manual, it will be presented in D2.2 “Web-based knowledge platform with associated long-term sustainability” as it is part of the task 2.3 Development of an open flexible knowledge repository.

Table 1. Calendar for the collection of knowledge (in Excel – Task 2.1).

Stage	Date	Number of factsheets (ready and uploaded in OPPLA)	Comments
1	31 July 2019	25 (5 per iNet)	To be included in D2.4
2	31 December 2019	125 (25 per iNet), 150 in total	
3	30 June 2020	100 (20 per iNet), 250 in total	All to be included in D2.1

In order to produce 250 factsheets, the distribution rules are as follows:

- Even number of factsheets per iNet (= 50)
- Even number of factsheets per country. The effort will not be the same for each partner since there might be more than one partner per country. And some other partners are involved in more than one iNet.
- Among each partner's factsheets, we expect about 60% from Research and 40% from Practice.
- Any change regarding these distribution rules must be discussed among the iNet members and leader and agreed with the WP leaders.

Table 2 includes the final distribution of the factsheets that has been agreed on by all partners.

Table 2. Distribution of the 250 factsheets by INCREDIBLE partners.

Country	Organisation	Aromatics & Medicinal Plants	Cork	Wild Mushrooms & Truffles	Wild Nuts & Berries	Resin	Total
Belgium	ESSET						0
Spain	EFI						0
Croatia	CFRI	6 Research 4 Practice		6 Research 4 Practice			20
France	CNPF	6 Research 4 Practice	6 Research 4 Practice	6 Research 4 Practice	8 Research 5 Practice	8 Research 5 Practice	56
Greece	UOI	6 Research 4 Practice		6 Research 4 Practice			20
Italy	ETIFOR			6 Research 4 Practice			10
	FORESTAS		6 Research 4 Practice				10
Portugal	UNAC		3 Research 2 Practice		4 Research 2 Practice		11
	ISA		3 Research 2 Practice		4 Research 2 Practice	8 Research 5 Practice	24
Spain	INIA		6 Research 4 Practice		3 Research 1 Practice	4 Research 2 Practice	20
	CTFC	6 Research 4 Practice		3 Research 2 Practice	3 Research 1 Practice		19

Country	Organisation	Aromatics & Medicinal Plants	Cork	Wild Mushrooms & Truffles	Wild Nuts & Berries	Resin	Total
	CESEFOR			3 Research 2 Practice	3 Research 1 Practice	4 Research 2 Practice	15
<b>Tunisia</b>	INRGREF	6 Research 4 Practice	6 Research 4 Practice		8 Research 5 Practice	8 Research 5 Practice	45
<b>Total</b>							250



### 2.3 The Data Inventory Excel file tool: how to complete it

The Data Inventory Excel file is located on the project extranet that can be edited by several people at the same time. This way will allow all the partners and the coordinator to follow up on the writing process in real time, to know what is going on in each iNet, and to make comments as required.

The Data Inventory Excel file tool is meant to allow all iNet members, acting as “authors”, to collect the relevant information on NWFP innovation (research, success stories, good practices, data bases, technical reports, policies). This will be the source to produce a basis of **250 factsheets** that will be available on an open flexible knowledge repository (T2.3), namely Oppla web platform.

To use it please follow the steps described below:

#### **STEP 1: selection of the theme and question**

The topics chosen as title/subject of one factsheet must answer themes and questions that have arisen from the workshops, seminars and other events, and later on validated by the iNet partners and leader. A total of 80 questions are listed in the STEP\_1-v2 sheet of the excel file, grouped by themes:

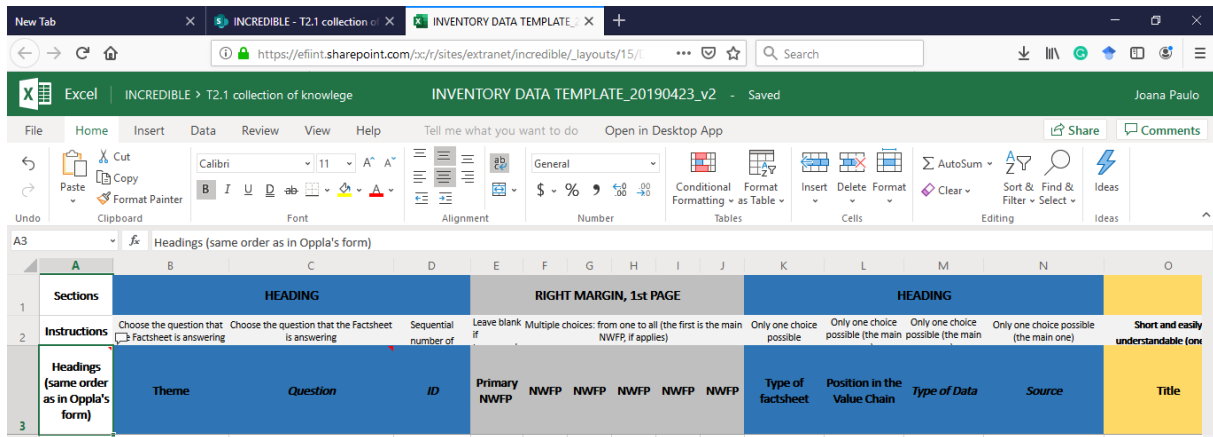
1. Enhancement of production
2. Profitability
3. Improvement of the working conditions and training
4. Climate change adaptation & forest health
5. Forest multifunctionality
6. Forest management considering biodiversity conservation
7. Ecosystem services
8. Development of new products and derivatives
9. Certification, labels, standards and traceability
10. Marketing
11. Legal framework
12. Knowledge transfer & communication

Please carefully consider the information you are preparing and select the theme and questions that it helps to answer. This is the first step. Using drop down menus, select your iNet, theme and question your factsheet will answer. You will insert this info in the next step.

#### **STEP 2: Insert information, collaborative process and review from editors and project coordinator**

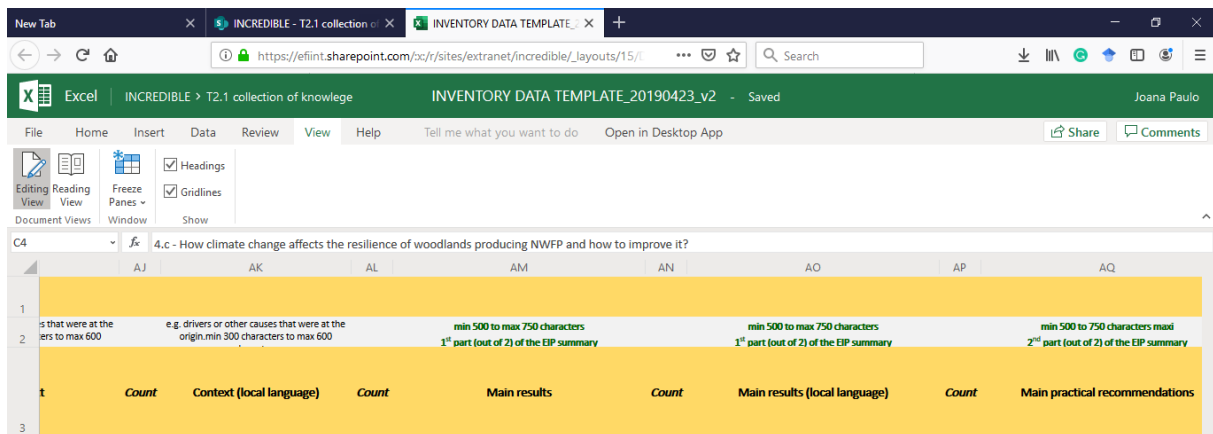
Start inserting information in the Excel file, at the STEP\_2-v2 sheet (Figure 3 and Figure 4). The Excel file, and in particular this sheet, is useful as a collaborative place where you can exchange ideas and/or comments with other authors (of the same iNet or of different iNets) about “in progress” factsheets. Take advantage of this INCREDIBLE team! Note that this “in progress” collaborative work is not possible (or much more difficult) in Oppla. However, the platform has the advantage of recording the information respecting fixed parameters, preventing unexpected alteration by others and automatically producing the factsheets in HTML and PDF. You will read about this in the next pages.

Authors should carefully read the details and information available in the first three rows of this sheet. It contains a clear explanation for each one of the required fields, and the maximum number of characters (including spaces) available (A/N: readers of this deliverable shall also consult Table 4 for the complete list of fields in the “STEP\_2-v2” sheet). Please respect these instructions to avoid future errors during the upload process. Figures below show part of this information.



Sections	HEADING	RIGHT MARGIN, 1st PAGE	HEADING	
Instructions	Choose the question that Factsheet is answering	Choose the question that the Factsheet is answering	Sequential number of	Leave blank if
Headings (same order as in Oppla's form)	Theme	Question	ID	Primary NWFP
				NWFP
				NWFP
				NWFP
				NWFP
				NWFP
				NWFP
				Type of factsheet
				Position in the Value Chain
				Type of Data
				Source
				Title

Figure 3. Partial view of the excel file developed for the collection of knowledge (task 2.1). Fields for the identification of questions and iNet.



Count	Context (local language)	Count	Main results	Count	Main results (local language)	Count	Main practical recommendations

Figure 4. Partial view of the excel file developed for the collection of knowledge (task 2.1). Fields for the collection of knowledge (for factsheet and practice abstract usage).

This file has another purpose: there, editors can also evaluate the pertinence of a factsheet or the need to recommend collaboration or merging of two similar factsheets “in progress”. If this occurs, editors should contact the authors of the factsheets directly and discuss with them how to proceed. Editors, in particular iNet coordinators, have a crucial role here.

The main fields regarding the text to be included in the factsheet are described in the supplementary materials section. All of these contents are introduced in English and in the author native language.

### STEP 3: preview of the factsheet

When STEP 2 is complete, you can have a preview of your factsheets (approximately only) for a more comfortable assessment of the final result (Figure 5 and Figure 6 as supplementary material at the end of the document).

As the file is in the project extranet, no copies need to be created (or at least this common file should be the only one in the project extranet) and several people can edit it (and collaborate, via the chat function) at the same time when open in Excel online.

Unfortunately, Oppla platform does not read the Excel files, **so** automatic upload of the information in its database is not possible. You will have to transfer the information manually (copy-paste) to OPPLA, once your information is complete and ready to send to the editor. Details about this will be present in the next pages of this document.

Notes:

- Please do not create copies of the file in the project extranet
- Please do not create copies of the file sheets, except the one for the visualisation (STEP 3)
- Please do not change the sheet named 'Categories drop down lists'. It includes info on the categories from the drop-down lists.
- Please do not change the file or cells format
- Sheet Data Review (EDITOR ONLY) is not in use. The revision process is made inside the OPPLA platform
- For questions please email task coordinators Joana Amaral Paulo ([joanaap@isa.ulisboa.pt](mailto:joanaap@isa.ulisboa.pt)) and Benjamin Chapelet ([benjamin.chapelet@cnpf.fr](mailto:benjamin.chapelet@cnpf.fr))

### 3. List of the URL links for the available factsheets in stage 1 (31 July 2019)

Table 3. List of URL to the available INCREDIBLE factsheets in 31 July 2019 (step 1/3 for the collection of 250 factsheets).

Responsible partner	Title	URL
<b>Resins</b>		
CESEFOR	ResinApp: A Web/Android App for logistics and natural resin traceability	Currently being uploaded
CESEFOR	Resin: Conservation tool for our pine forests	Currently being uploaded
ISA	SiResin - Resin Information System	<a href="https://oppla.eu/casestudy/19826">https://oppla.eu/casestudy/19826</a>
<b>Aromatic &amp; Medicinal Plants</b>		
INRGREF	The co-management of forest resources in Tunisia: A new approach for sustainable development in the sector of AMP	<a href="https://oppla.eu/casestudy/19836">https://oppla.eu/casestudy/19836</a>
INRGREF	Essential oils value chain in Tunisian forests: Conflicts between inclusiveness and marketing performance	<a href="https://oppla.eu/casestudy/19835">https://oppla.eu/casestudy/19835</a>
<b>Cork</b>		
ISA	Which is the effect of postponing cork extraction under severe and prolonged drought events?	<a href="https://oppla.eu/casestudy/19845">https://oppla.eu/casestudy/19845</a>
INIA	DIAMANT® an innovative solution to the smell of cork in wine	<a href="https://oppla.eu/casestudy/19833">https://oppla.eu/casestudy/19833</a>
ISA	Inter-tree competition patterns in undebarked cork oak stands in Portugal	<a href="https://oppla.eu/casestudy/19843">https://oppla.eu/casestudy/19843</a>
ISA	How management systems affect the soil quality of cork oak woodlands? A case study of south Portugal	<a href="https://oppla.eu/casestudy/19829">https://oppla.eu/casestudy/19829</a>
ISA	Influence of cork oak seed origin on budburst and leaf pest damage	<a href="https://oppla.eu/casestudy/19828">https://oppla.eu/casestudy/19828</a>
<b>Wild Mushrooms &amp; Truffles</b>		
ETIFOR	“Il Fungo di Borgotaro”: the first P.G.I. (Protected Geographic Indication) labelled wild mushroom	<a href="https://oppla.eu/casestudy/19799">https://oppla.eu/casestudy/19799</a>

Responsible partner	Title	URL
ETIFOR	"Save the Truffle": protect and safeguard truffle ecosystems	<a href="https://oppla.eu/casestudy/19800">https://oppla.eu/casestudy/19800</a>
CFRI	An example of good practice in the development of the truffle sector	<a href="https://oppla.eu/casestudy/19805">https://oppla.eu/casestudy/19805</a>
CFRI	Forest management adaptation to the production of equally worth non-wood forest products – a practical opinion	<a href="https://oppla.eu/casestudy/19814">https://oppla.eu/casestudy/19814</a>
CNPF	Amycoforest : Developing mycosylviculture	<a href="https://oppla.eu/casestudy/19645">https://oppla.eu/casestudy/19645</a>
CNPF	Mapping the potential for truffle production in a natural environment. Development of a method suited to the private forests of the Mont Ventoux (France)	<a href="https://oppla.eu/casestudy/19807">https://oppla.eu/casestudy/19807</a>
<b>Wild Nuts &amp; Berries</b>		
ETIFOR	A trademark for local specialties, including wild bilberries, in a territory famous for European labelled parmesan cheese	<a href="https://oppla.eu/casestudy/19802">https://oppla.eu/casestudy/19802</a>
INIA	A methodology for optimizing <i>Pinus pinea</i> stands from the economic point of view	<a href="https://oppla.eu/casestudy/19831">https://oppla.eu/casestudy/19831</a>
INIA	Registered elite clones for grafted stone pine orchard plantations	
ISA	Quantifying carbon stocks in <i>Pinus pinea</i> stands: simple allometric models using easily measurable tree variables	<a href="https://oppla.eu/casestudy/19818">https://oppla.eu/casestudy/19818</a>
INIA	Predicted impacts of climate change on growth and production of Mediterranean stone pine	<a href="https://oppla.eu/casestudy/19832">https://oppla.eu/casestudy/19832</a>
INRGRAF	Contribution of Non-Wood Forest Products to household income and livelihood improvement in Tunisia: The case of Aleppo Pine	<a href="https://oppla.eu/casestudy/19837">https://oppla.eu/casestudy/19837</a>
<b>Transversal</b>		
ETIFOR	The Val di Non and Val di Sole Apples and Flavours route: a successful territorial marketing strategy	<a href="https://oppla.eu/casestudy/19801">https://oppla.eu/casestudy/19801</a>

## 4. Practice abstracts for EIP-Agri

As a Thematic network, the INCREDIBLE project must support the EIP-Agri and connect to Operational groups in order to share results. Therefore, the Data Inventory Excel tool that will be used to generate the factsheets, described in Chapter 2, includes several fields that will be used to fill in the EIP-Agri practice abstracts (see Table 4):

- Title
- Title (local language)
- Main results
- Main results (local language)
- Main practical recommendations
- Main practical recommendations (local language)

Therefore, each factsheet will have its equivalent practice abstract and this will not suppose an extra effort to INCREDIBLE project partners.

This deliverable is providing a first set of practice abstracts using the EIP-Agri common format for Horizon 2020 multi-actor projects and thematic networks (as in <https://ec.europa.eu/eip/agriculture/en/eip-agri-common-format>). They are being submitted by the project coordinator (EFI). There is one file per iNet, as the common format only accepts 100 practice abstracts and the target of the INCREDIBLE project is to produce 250.

## 5. Supplementary material

This chapter includes the fields (Table 4) and layout of the factsheets, the individual pieces of information of Task 2.1 Collection of knowledge from research and practice.

*Table 4. Fields included in the INCREDIBLE factsheet.*

Field	Details
Theme	Choose the theme that the Factsheet is answering
Question	Choose the question that the Factsheet is answering
ID	Sequential number of factsheets (from 1 to 200)
Primary NWFP	Select from list
Multiple NWFP (if applies)	For transversal factsheets only. This field appears only if you have selected more than one NWFP (iNet) in the “NWFP” previous field. Among the “NWFP” fields, choose which one is the “primary”. Example: if your factsheet concerns M&T, N&B and AMP, but AMP is the source of information (e.g. knowledge applicable to all edible NWFP of the project), select the 3 of them in “NWFP” field and then select also AMP in “Primary NWFP” field. Do not select M&T in N&B in field “NWFP” and then AMP in field “Primary NWFP”. If no “primary” NWFP (e.g. territorial marketing, governance issues... select “transversal”).
Type of factsheet	Select one from: Practice or Research
Position in the Value Chain	Select from list
Type of Data	Select from list
Source	Select from list
Title <sup>a, b</sup>	Short and easily understandable (one key sentence on the project; max 150 characters, word count – no spaces)
Figure 1 caption and credit <sup>a</sup>	
Figure 2 caption and credit <sup>a</sup>	
Location	Chose the most representative point on the map (write it here to remember, e.g. town or natural area)
Objective <sup>a</sup>	What problems/opportunities does the project address that are relevant for the practitioner/end-user, and how will they be solved? - (min 300 characters to max 600 characters, word count – no spaces)

Field	Details
Keywords	8 key words maximum, comma separated. Choose them from <a href="https://www.ask-valerie.eu/#/en_EN/search">https://www.ask-valerie.eu/#/en_EN/search</a>
Scale	Scale of aplicability of the factsheet. Possible values: one of many: Global, Continental, Subcontinental, National, Subnational, Local
Country	Country from where the information of the facthseet comes from. Must be the same of the organisation.
Region	Region from where the information of the facthseet comes from. Must be the same of the organisation.
Organisation	Organisation from where the information of the facthseet comes from. Must be located in the "Country" field.
Contact	Main contact that provided the information of the factsheet, from "Organisation": name, e-mail, website. Separated by commas as: John Smith, john-smith@un.org, www.un.org
Context <sup>a</sup>	e.g. drivers or other causes that were at the origin. min 300 characters to max 600 characters
Main results (to be included in <b>EIP AGRI practice abstracts</b> ) <sup>a, b</sup>	min 500 to 750 characters max, 1st part (out of 2) of the EIP-Agri practice abstract
Main practical recommendations (to be included in <b>EIP AGRI practice abstracts</b> ) <sup>a, b</sup>	min 500 to 750 characters max, 2nd part (out of 2) of the EIP-Agri practice abstract
Impacts and weaknesses <sup>a</sup>	min 300 to 600 characters max
Future developments <sup>a</sup>	min 300 to 600 characters max
Further information	List of references (scientific or grey literature), links to films or websites, etc. If a reference included, please follow the reference style of <a href="https://www.elsevier.com/journals/forest-ecology-and-management/03781127/guide-for-authors">https://www.elsevier.com/journals/forest-ecology-and-management/03781127/guide-for-authors</a>
Author name	Insert author name (contact information will be automatically retrieved from another database)
Organisation of the author	Insert the organization name

<sup>a</sup> Fields written in English and in native language

<sup>b</sup> Fields used to generate the EIP-Agri practice abstracts



# Postponing cork extraction under severe and prolonged drought events

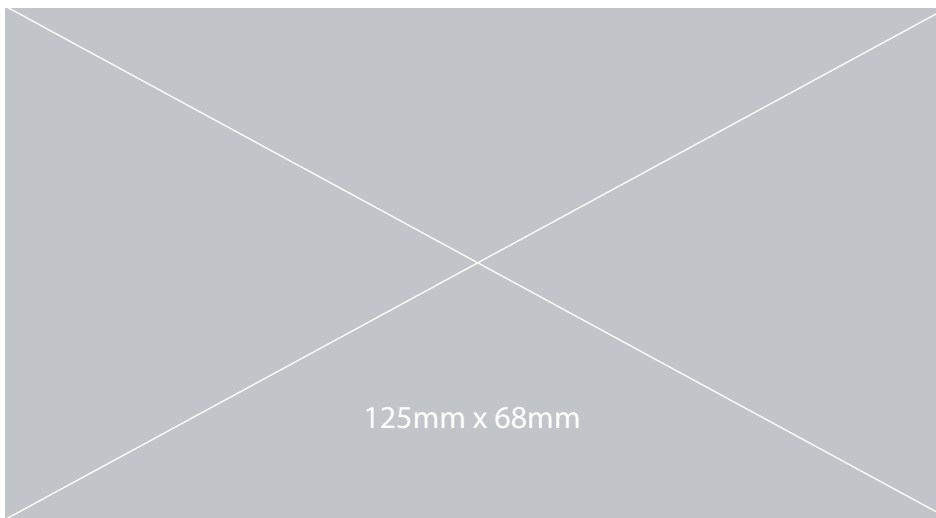


Image caption, photo source, rights

## NWFP

Cork

## Keywords

Precipitation

Cork caliper

Cork age

Debarking

Cork

## Scale

National

Subnational

## 🎯 Objective

Increase the cork market price of the extracted cork and the equivalent annual annuity of the farm

## 📍 Context

Cork thickness is one of the parameters considered for industrial classification of cork quality. This variable is directly related to cork price. The increase of cork thickness implies the increase of annual cork growth and/or the increase of the cork debarking rotation period. Ultimately, this will have an impact on the equivalent annual annuity of the farm. Cork sampling is crucial for evaluating cork thickness, and for accessing the need of delaying the cork debarking period, in order to increase cork thickness and ultimately the cork price.

## ✓ Results

For discount rates of 0.5% and 2% the impact of different cork debarking rotation (CDR) on equivalent annual annuity (EAA) from 9 to 14 years is low. In stands characterized by high to average site index values or high to medium cork quality characteristics, CDR of 9 and 11 years are associated with similar values of EAA. The variation of the CDR in stands characterized by low site index values and/or low cork quality characteristics did not have a relevant effect on the variation of EAA. For the simulations carried out with a discount rate of 5% the EAA decreases with the increase of CDR, indicating that the minimum legal value of 9 years for CDR should be applied.

## 💡 Recommendations

Climate is known for affecting cork annual growth and ultimately cork thickness. During the last years an increase of the frequency of severe drought events was observed in Portugal. As a result, for the same debarking rotation period, cork production shows a decreasing trend of average cork thickness. Detailed knowledge of cork and stand characteristics obtained by the collection of cork samples in a forest inventory, the consideration of climate conditions, namely precipitation regimes, during the period of cork growth, and the collection of updated information on cork prices structure and values, are essential drivers for the farmer's decision on the accomplishment or delaying of the debarking operation.

## Impacts and weaknesses

Although cork annual growth is known to be much related to climate, namely precipitation regimes, it is also highly variable between farms, in different areas of one single farm, and even between trees geographically close. The importance of site conditions such as soil depth and texture, management practices and tree genetic variability implies that management operations, such as the cork debarking, should be decided for homogeneous management areas. This entails an increase investment in monitoring activities such as forest inventory and cork sampling. Cork price fluctuations and uncertainty are also a relevant driver for farmer's, that may affect the decision on cork debarking or postponing.

## → Future developments

Increase knowledge, that allows the quantification of the impact of soil and topographic characteristics and management operations (e.g. fertilization) on cork growth, is needed. This knowledge may be included in the management and decision support tools such as forest growth models and simulators, that should be accessible for managers.

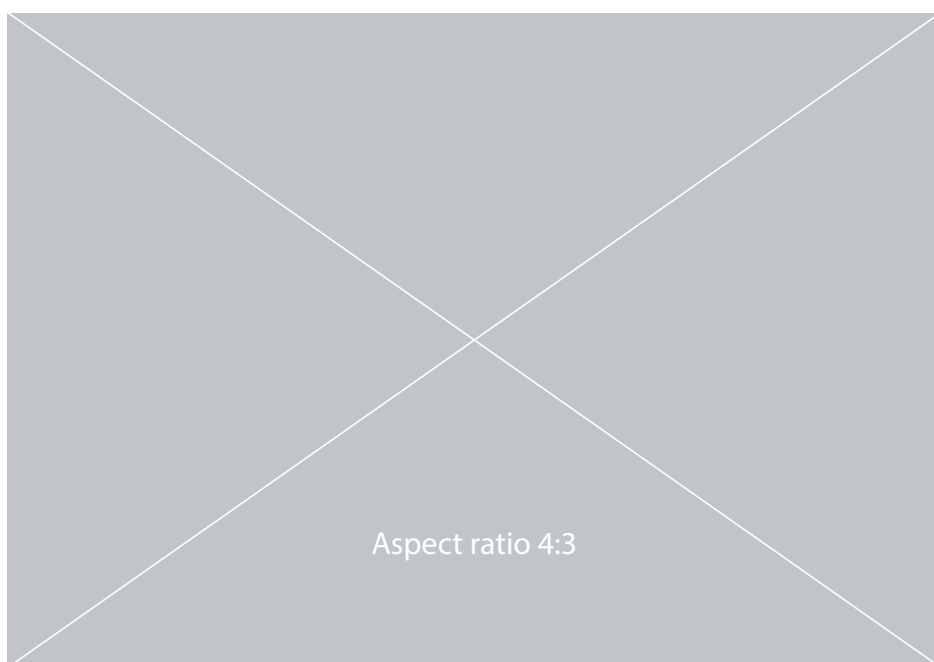


Image caption, photo source, rights

### Further information

Paulo, J. A., Tomé, M. 2017 Using the SUBER model for assessing the impact of cork debarking rotation on equivalent annual annuity in Portuguese stands. -09931Forest systems. 26(1), e008, 11 pages.  
<https://doi.org/10.5424/fs/2017261>

Paulo, J. A., Tomé, M. 2017 Using the SUBER model for assessing the impact of cork debarking rotation on equivalent annual annuity in Portuguese stands. -09931Forest systems. 26(1), e008, 11 pages.  
<https://doi.org/10.5424/fs/2017261>

Paulo, J. A., Tomé, M. 2017 Using the SUBER model for assessing the impact of cork debarking rotation on equivalent annual annuity in Portuguese stands. -09931Forest systems. 26(1), e008, 11 pages.  
<https://doi.org/10.5424/fs/2017261>

### Contact

**Organisation** ISA  
**Country** Portugal  
**Region** XXX  
**Lead** Joana Amaral Paulo  
joanaap@isa.ulisboa.pt

<https://fenix.isa.ulisboa.pt/qubEdu/homepage/isa114126/>

### Author

**Name** Margarida Tomé  
**Organisation** ISA  
**e-mail** magatome@isa.ulisboa.pt

### About INCREDIBLE Project

INCREDIBLE aims to show how Non-Wood Forest Products (NWFP) can play an important role in supporting sustainable forest management and rural development, by creating networks to share and exchange knowledge and expertise. 'Innovation Networks of Cork, Resins and Edibles in the Mediterranean basin' (INCREDIBLE) promotes cross-sectoral collaboration and innovation to highlight the value and potential of NWFPs in the region. This project has received funding from the European Union's H2020 research and innovation programme under grant agreement No. 774632.



# Postponing cork extraction under severe and prolonged drought events



Cork sampling is vital to inform decisions on when to carry out cork debarking. Photo: Joana A. Paulo

## NWFP

Cork

## Keywords

Precipitation

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## 🎯 Objective

Increase the cork market price of the extracted cork and the equivalent annual annuity of the farm

## 📍 Context

Cork thickness is one of the parameters considered for industrial classification of cork quality. This variable is directly related to cork price. The increase of cork thickness implies the increase of annual cork growth and/or the increase of the cork debarking rotation period. Ultimately, this will have an impact on the equivalent annual annuity of the farm. Cork sampling is crucial for evaluating cork thickness, and for accessing the need of delaying the cork debarking period, in order to increase cork thickness and ultimately the cork price.

## ✓ Results

For discount rates of 0.5% and 2% the impact of different cork debarking rotation (CDR) on equivalent annual annuity (EAA) from 9 to 14 years is low. In stands characterized by high to average site index values or high to medium cork quality characteristics, CDR of 9 and 11 years are associated with similar values of EAA. The variation of the CDR in stands characterized by low site index values and/or low cork quality characteristics did not have a relevant effect on the variation of EAA. For the simulations carried out with a discount rate of 5% the EAA decreases with the increase of CDR, indicating that the minimum legal value of 9 years for CDR should be applied.

## 💡 Recommendations

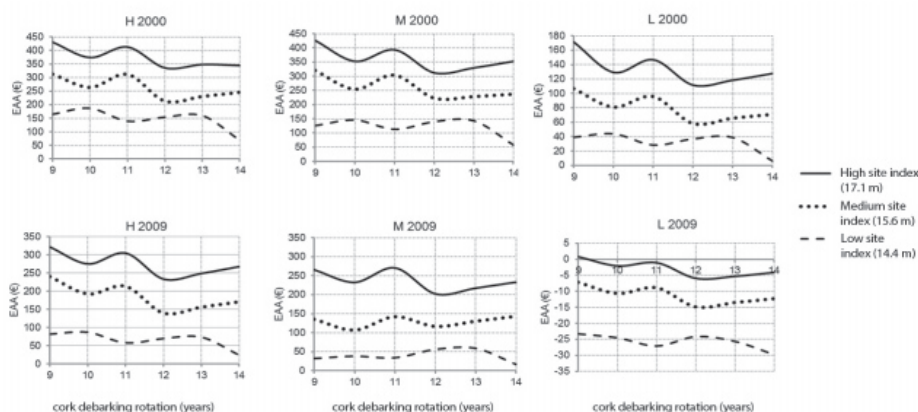
Climate is known for affecting cork annual growth and ultimately cork thickness. During the last years an increase of the frequency of severe drought events was observed in Portugal. As a result, for the same debarking rotation period, cork production shows a decreasing trend of average cork thickness. Detailed knowledge of cork and stand characteristics obtained by the collection of cork samples in a forest inventory, the consideration of climate conditions, namely precipitation regimes, during the period of cork growth, and the collection of updated information on cork prices structure and values, are essential drivers for the farmer's decision on the accomplishment or delaying of the debarking operation.

## ⚠ Impacts and weaknesses

Although cork annual growth is known to be much related to climate, namely precipitation regimes, it is also highly variable between farms, in different areas of one single farm, and even between trees geographically close. The importance of site conditions such as soil depth and texture, management practices and tree genetic variability implies that management operations, such as the cork debarking, should be decided for homogeneous management areas. This entails an increase investment in monitoring activities such as forest inventory and cork sampling. Cork price fluctuations and uncertainty are also a relevant driver for farmer's, that may affect the decision on cork debarking or postponing.

## ➔ Future developments

Increase knowledge, that allows the quantification of the impact of soil and topographic characteristics and management operations (e.g. fertilization) on cork growth, is needed. This knowledge may be included in the management and decision support tools such as forest growth models and simulators, that should be accessible for managers.



Equivalent annual annuity (EAA) for discount rate of 0.5% as a function of cork debarking rotation for stands with different site index (14.4 m, 15.6 m or 17.1 m).

From: Paulo, J. A., Tomé, M. 2017 Using the SUBER model for assessing the impact of cork debarking rotation on equivalent annual annuity in Portuguese stands. *Forest systems* 26(1) e0008.

## Further information

Paulo, J. A., Tomé, M. 2017 Using the SUBER model for assessing the impact of cork debarking rotation on equivalent annual annuity in Portuguese stands. *-09931Forest systems*. 26(1), e008, 11 pages.  
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### Contact

**Organisation** ISA  
**Country** Portugal  
**Lead** Joana Amaral Paulo  
 joanaap@isa.ulisboa.pt

<https://fenix.isa.ulisboa.pt/qubEdu/homepage/isa114126/>

### Author

**Name** Margarida Tomé  
**Organisation** ISA  
**e-mail** magatome@isa.ulisboa.pt

## About INCREDIBLE Project

INCREDIBLE aims to show how Non-Wood Forest Products (NWFP) can play an important role in supporting sustainable forest management and rural development, by creating networks to share and exchange knowledge and expertise. 'Innovation Networks of Cork, Resins and Edibles in the Mediterranean basin' (INCREDIBLE) promotes cross-sectoral collaboration and innovation to highlight the value and potential of NWFPs in the region. This project has received funding from the European Union's H2020 research and innovation programme under grant agreement No. 774632.

