# LIFE FROSTDEFEND

***LIFE20 CCA/GR/001747***

# DA1.2 Report on questionnaire results

**June 2022**

NATIONAL CENTRE FOR SCIENTIFIC RESEARCH "DEMOKRITOS"
ΓΕΩΠΟΝΙΚΟ ΠΑΝΕΠΙΣΤΗΜΙΟ ΑΘΗΝΩΝ AGRICULTURAL UNIVERSITY OF ATHENS
INRAE la science pour la vie, l'humain, la terre
AGRICULTURAL COOPERATIVES' UNION AEGHION S.A.
msensis

# Deliverable DA1.2

# Report on questionnaire resutls

| | |
|---|---|
| **Project Number** | **LIFE20 CCA/GR/001747** |
| **Project Title** | **Forecasting and protecting fruit crops from frost damage** |
| **Project Acronym** | **LIFE FROSTDEFEND** |
| **Action** | **A1. Stakeholders' consultation and mapping of needs** |
| **Deliverable** | **DA1.2 Report on questionnaire resutls** |
| **Beneficiary** | **AUA** |
| **Date** | **06/2022** |

## Table of Contents

## Summary

To promote the involvement of the stakeholders and potential end-users of the LIFE-FROSTDEFEND tool that will be developed within the framework of the FROSTDEFEND project implementation, five stakeholders' meetings were organized as part of Action A1 "Stakeholders' consultation and mapping of needs''.

The aim of the meetings was to

a) identify the key stakeholders' needs and expectations,

b) map the efficiency and effectiveness of the existing local agricultural practices for frost damage protection,

c) discuss practical recommendations that will further support the efficient implementation of the project actions and

d) inform the participants the replication activities of LIFE-FROSTDEFEND planned for their area.

At the end of the meetings, the LIFE-FROSTDEFEND team presented and distributed questionnaires to the stakeholders to capture their feedback. This document includes the main overall outcomes of the questionnaire response analysis.

*This document, is being delivered in the context of Action A1 " Stakeholders' consultation and mapping of needs".*

# 1 Meetings with stakeholders in Greece

## 1.1 Introduction

The AUA team provided stakeholders with information regarding the notable decrease in citrus growing acreage across the five most significant citrus production prefectures of Greece from 2011 to 2019.

Data taken from the Hellenic Statistics Service (ELSTAT) for lemons, oranges and mandarins:

| Year | ORCHARD ACREAGE (1000 $m^2$) top 5 prefectures (Source: Hellenic Statistical Authority) | | | | | |
|---|---|---|---|---|---|---|
| **2019** | **Lemon orchards** | | **Orange orchards** | | **Mandarin orchards** | |
| | Achaia | **15,107** | Argolida | 92,655 | Argolida | 20,522 |
| | Korinthia | **7,045** | Laconia | **69,927** | Arta | 13,722 |
| | Aitolia & Akarnania | 3,106 | Aitolia & Akarnania | 29,309 | Thesprotia | 13,680 |
| | Chania | 2,393 | Arta | 26,842 | Laconia | 12,612 |
| | Argolida | 1,821 | Chania | 26,231 | Aitolia & Akarnania | 5,439 |
| **2014** | Achaia | **16,784** | Argolida | 87,347 | Argolida | 15,842 |
| | Korinthia | **8,970** | Laconia | **86,298** | Thesprotia | 15,020 |
| | Ilia | | Arta | 28,661 | Arta | 9,939 |
| | Aitolia & Akarnania | 3,519 | Aitolia & Akarnania | 27,027 | Laconia | 6,174 |
| | Messinia | 1,998 | Chania | 26,485 | Aitolia & Akarnania | 4,565 |
| **2011** | Achaia | **26,889** | Argolida | 102,285 | Argolida | 20,994 |
| | Korinthia | **20,495** | Laconia | **80,041** | Thesprotia | 9,550 |
| | Ilia | 9,450 | Arta | 49,840 | Arta | 7,490 |
| | Aitolia & Akarnania | 3,616 | Chania | 38,644 | Chania | 5,510 |
| | Preveza | 3,239 | Ilia | 31,084 | Ilia | 4,660 |

Highlighted in yellow are areas that experienced significant reductions in the acreage of lemons and oranges. This decline has been attributed partly to severe frosts and partly to commercial reasons, such as the availability of cheap imports of lemons (primarily) and oranges. These factors often made it financially unviable for farmers to replant frost-damaged trees, particularly evident in Aigialeia, the primary area for project implementation.

All stakeholder meetings in Greece were considered as “critical and to the point” for participants, particularly due to a severe nationwide frost in late January 2022. This frost caused damage, especially in Argolis, but also affected areas like Aigialeia and Laconia.

## 1.2 Participants

The first meeting with stakeholders (farmers who own and cultivate lemon tree orchards) from the area of Aigialeia was organized by ACUA and AUA on January 28, 2022, at the ACUA meeting room in Aegion. This was a physical meeting with 19 participants.

The second meeting with stakeholders was held in Nafplion, Argolis, on February 25, 2022. It was a physical meeting organized by ANYFION S.A., a local organic citrus company. In total, 16 farmers and local producers participated in the meeting, providing feedback about their needs.

The third meeting in Greece took place in Sparta, Laconia, on Friday, March 13, 2022. It was hosted by Sparta Valley Fruits S.A., a wholesale seller and exporter of citrus fruits, who also consults many local farmers on their crops. The meeting was attended by Mr. Neoklis Kritikos, Member of the Hellenic Parliament for Laconia, who addressed the audience and stressed the significance of events of this type for local orange producers. In total, 24 participants attended the meeting in Sparta.

## 1.3 Results

### ● *1.3.1 Meeting with stakeholders in Aigio (or Aeghion)*

Stakeholders were interested in filling the questionnaire. Fourteen questionnaires were turned in, with answers to most but not all the questions. The questionnaire must be shortened and simplified. However, the output of answers produced interesting and useful results on the current situation and the needs of the stakeholders concerning frost damage mitigation. Answers to the most significant questions are:

- 1.3 (Do you keep agronomic records): 7/14 (50%)

- 1.6 (Do you use sensors in your orchard): 4/14 (29%)
- 1.7, 2.6 (Frost mitigation measures): 14/14 (100%), of which
    - Wind fences: 2/14
    - Fans: 0/14
    - Heaters: 0/14
    - Misting: 10/14
    - Surface irrigation: 1/14
    - Copper sprays: 1/14
- 3.3 (Use of social media): 4/14 (29%)
- 3.4 (Participation in local, national and international events): 14/14 (100%)
- 4.1 (Acceptance of a frost warning service): 14/14 (100%)
- 4.3 (Acceptance of a frost warning service for a small fee): 12/14 (86%)
- 4.4, 4.5, 4.6 (Collaboration in FROSTDEFEND demonstrations): 12/14 (86%)

The key outcome and main conclusions from questionnaires of the Aegialeia stakeholders are:

- They keep agronomic records, but they do not use in-field sensors that much.
- They all take frost mitigation measures. Misting is the method of choice by the majority. No energy-consuming methods are used (fans, heaters).
- The majority do not use social media but participate in local events concerning their crop.
- They all find useful and helpful an online frost-warning service.
- A great majority accepts to pay a small fee for this service.

A great majority accepts to participate in FROSTDEFEND demonstration events in some way (allocating space in orchard, permitting the installation of sensors).

### *1.3.2 Meeting with stakeholders in Nafplion*

Stakeholders were interested in filling the questionnaire. Twenty two questionnaires were turned in, with answers to most but not all the questions. The questionnaire must be shortened and simplified. However, the output of answers produced interesting and useful results on the current situation and the needs of the stakeholders concerning frost damage mitigation. Answers to the most significant questions are:

- 1.3 (Do you keep agronomic records): 9/22 (41%)
- 1.6 (Do you use sensors in your orchard): 10/22 (45%)

- 1.7, 2.6 (Frost mitigation measures): 22/22 (100%), of which
    - Wind fences: 0/22
    - Fans: 3/22
    - Heaters: 0/22
    - Misting: 2/22
    - Surface irrigation: 2/22
    - Copper sprays: 0/22
- 3.3 (Use of social media): 1/22 (4%)
- 3.4 (Participation in local, national and international events): 4/22 (18%)
- 4.1 (Acceptance of a frost warning service): 22/22 (100%)
- 4.3 (Acceptance of a frost warning service for a small fee): 21/22 (95%)
- 4.4, 4.5, 4.6 (Collaboration in FROSTDEFEND demonstrations): 22/22 (100%)

The key outcome and main conclusions from questionnaires of the Argolis stakeholders are:

- About 50% keep agronomic records and use in-field sensors that much.
- They all take frost mitigation measures. Misting is the method of choice by the majority. Energy-consuming methods are used sparingly (fans).
- The vast majority do not use social media and do not participate in events concerning their crop.
- All find useful and helpful an online frost-warning service.
- A great majority accepts to pay a small fee for this service.
- All accept to participate in FROSTDEFEND demonstration events in some way (allocating space in orchard, permitting the installation of sensors).

### *1.3.3 Meeting with stakeholders in Sparta*

Stakeholders were interested in filling the questionnaire. Fifteen questionnaires were turned in, with answers to most but not all the questions. The questionnaire must be shortened and simplified. However, the output of answers produced interesting and useful results on the current situation and the needs of the stakeholders concerning frost damage mitigation. Answers to the most significant questions are:

- 1.3 (Do you keep agronomic records): 0/15 (0%)
- 1.6 (Do you use sensors in your orchard): 0/15 (0%)
- 1.7, 2.6 (Frost mitigation measures): 3/15 (20%), of which
    - Wind fences: 0/15

  - Fans: O/15
  - Heaters: 0/15
  - Misting: 3/15
  - Surface irrigation: 2/15
  - Copper sprays: 1/15
- 3.3 (Use of social media): 3/15 (20%)
- 3.4 (Participation in local, national and international events): 5/15 (33%)
- 4.1 (Acceptance of a frost warning service): 12/15 (80%)
- 4.3 (Acceptance of a frost warning service for a small fee): 11/15 (73%)
- 4.4, 4.5, 4.6 (Collaboration in FROSTDEFEND demonstrations): 12/15 (80%)

The key outcome and main conclusions from questionnaires of the Laconia stakeholders are:

- None of the participants keeps agronomic records and uses in-field sensors.
- Few take frost mitigation measures. Misting is the method of choice by the majority. Energy-consuming methods are not used (fans).
- The vast majority do not use social media and do not participate in events concerning their crop.
- The majority find useful and helpful an online frost-warning service.
- A smaller majority accepts to pay a small fee for this service.
- The majority accept to participate in FROSTDEFEND demonstration events in some way (allocating space in orchard, permitting the installation of sensors).

### • *1.3.4 Overview of the results from the meetings held in Greece*

The results from the analysis of the analysis of the questionnaire responses are summarized in Table 1.

Table 1: Overview of the questionnaire results from Achaia, Argolis and Laconia regions

| | Achaia | Argolis | Laconia |
|---|---|---|---|
| **CITRUS CROPS** | Lemons 100% | Oranges 80%<br>Mandarins 20% | Oranges 100% |
| | | | |
| **Questionnaires turned in** | 14 | 22 | 15 |
| | | | |
| **RELEVANT CROP PRACTICES** | | | |
| keep agronomic records | 50% | 41% | 0% |
| use sensors | 29% | 45% | 0% |
| suffered frost damage | 64% | 77% | 53% |
| frost mitigation measures | 100% | 100% | 20% |
| misting | 10/14 | 2/22 | 3/15 |
| fans | 0/14 | 3/22 | 0/15 |
| wind fences | 2/14 | 0/22 | 0/15 |
| copper sprays | 1/14 | 0/22 | 1/15 |
| surface irrigation | 1/14 | 2/22 | 2/15 |
| | | | |
| **NETWORKING** | | | |
| Use of social media | 29% | 4% | 20% |
| Participation in information events | 100% | 18% | 33% |
| Happy with collaboration with local agronomists | 100% | 100% | 100% |
| | | | |
| **ADOPTION OF FROSTDEFEND** | | | |
| Acceptance of a frost warning service | 100% | 100% | 80% |
| Acceptance of a fee-based service | 86% | 95% | 73% |
| Collaboration in demonstrations | 86% | 100% | 80% |

Overall, it was found that 52% of the participants use a frost protection method to minimize the damage from frost. 29% of the participants use water mist to prevent fruit crop damage from freezes. 10 % of the participants use surface irrigation and only 5% rely on wind mixers (fans). The results are presented in Figure 1.

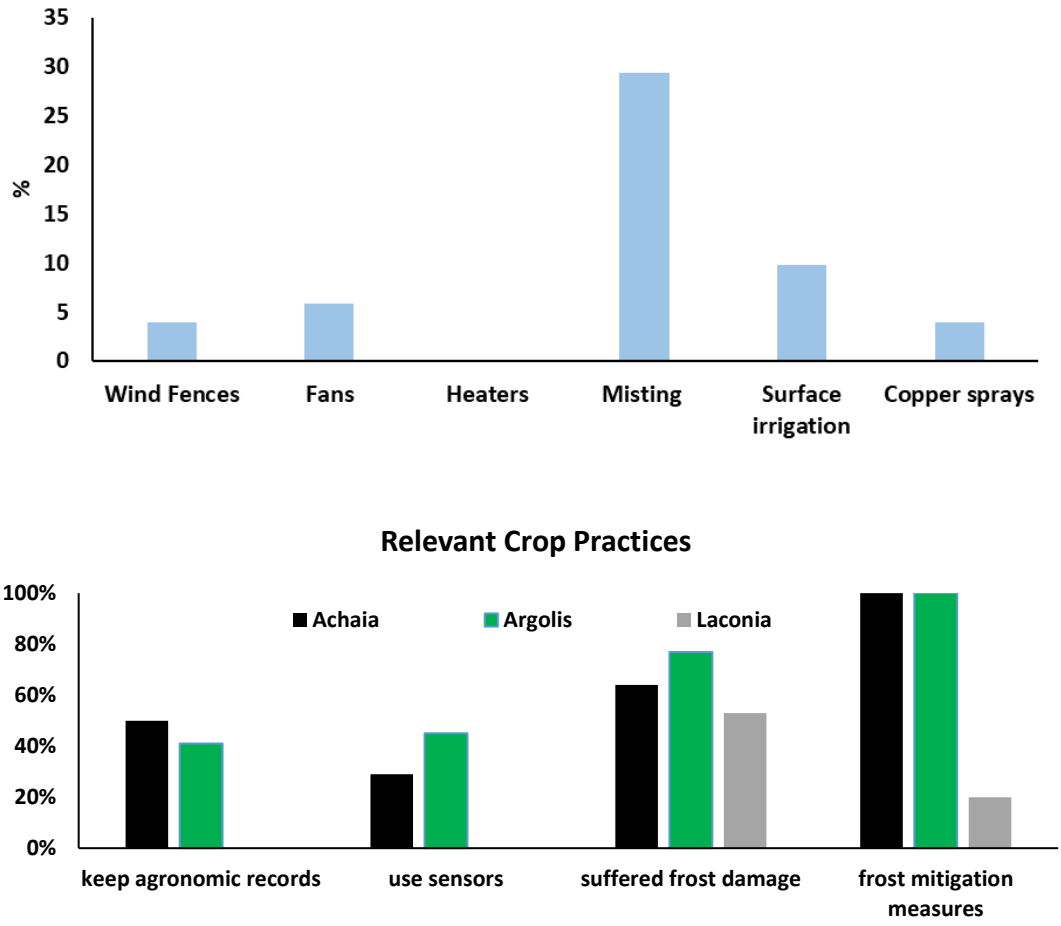


**Figure 1:** Frost mitigation measures and relevant crop practices usually applied in Greece (Laconia, Achaia and Argolis regions)

# 2 Meetings with stakeholders in France

## 2.1 Introduction

The questionnaire was held online, developed using LimeSurvey and was accessible at : https://sondages.inrae.fr/index.php/566658

From March 2022 until mid-May 2022, 66 independent connections were recorded with 14 full answers.

## 2.2 Participants

Grape and fruit producers from the Auvergne Rhone Alpes and Provence Alpes Cote d'Azur regions and grape producers from prestigious domains and from smaller farms in the Champagne region participated in the virtual meetings organized by INRAE. A total of 25 participants attended the meetings.

## 2.3 Results

### Producers:

The growers mainly originated From Rhone Alpes region (10) and Champagne (3). The type of structure they belonged to were EARL (4), SA (2), SARL (2), GAEC (1), SCEA (1), Association (1), individual (1) and 1 CCVC. Among them 2 were working with an union (cooperative agricole).

The growers had on average 80ha (median 95.5). They were fruit trees (10, for an average surface of 24ha, median 25, from 4.5 to 52ha) and grape growers (6, for an average area of 108ha, median 56 from 1.1 to 288 ha).

### Exploitation:

Fruit growers had on average 25% of their orchards protected from frost. Higher protection rates were observed on apricot (30%), pear (28%) and peach (20%) with large variability between producers. In grape production, only 1% of the cultivated area is protected. The main protection methods are sprinklers (Apricot Peach and Pear), Wind mixers (Apricot, Peach, Pear and Grape), Heaters (Apricot, Peach, Pear, Plum and Grape). Apricot and grape were considered as the most sensitive crops.

| | Yield<br>1 (Bad) - 5 (Excellent) | Variability<br>1 (Low) – 4 (Large) | Profitability |
|---|---|---|---|
| **Apricot** | 2.8 | 3.6 | +/- |
| **Apple** | 4 | 1.75 | ++ |
| **Cherry** | 3.3 | 3 | +/- |
| **Nectarine** | 2.5 | 3.7 | + |
| **Peach** | 3.2 | 3.8 | + |
| **Pear** | 3.2 | 3.2 | ++ |
| **Plum** | 3 | 2 | + |
| **Grape** | 3.5 | 2.2 | +/- |

Two third of them note the phenological stages in both fruit and grape culture. A large majority (90%) have climate stations in their orchards/fields (mainly Sencrop and Weenat). Other ones base their strategy on the alerts from the Chambre d' Agriculture or the CIVC.

**Frost damages:**

Average frost damage is evaluated at 36% (from 10 to 75%), with a potential yield loss at 39%.

April is the most critical month (70%) although March (20%) and May (25%) are also critical. Radiative (May in Champagne) and black frost events (April in Champagne) are similarly impacting the exploitations.

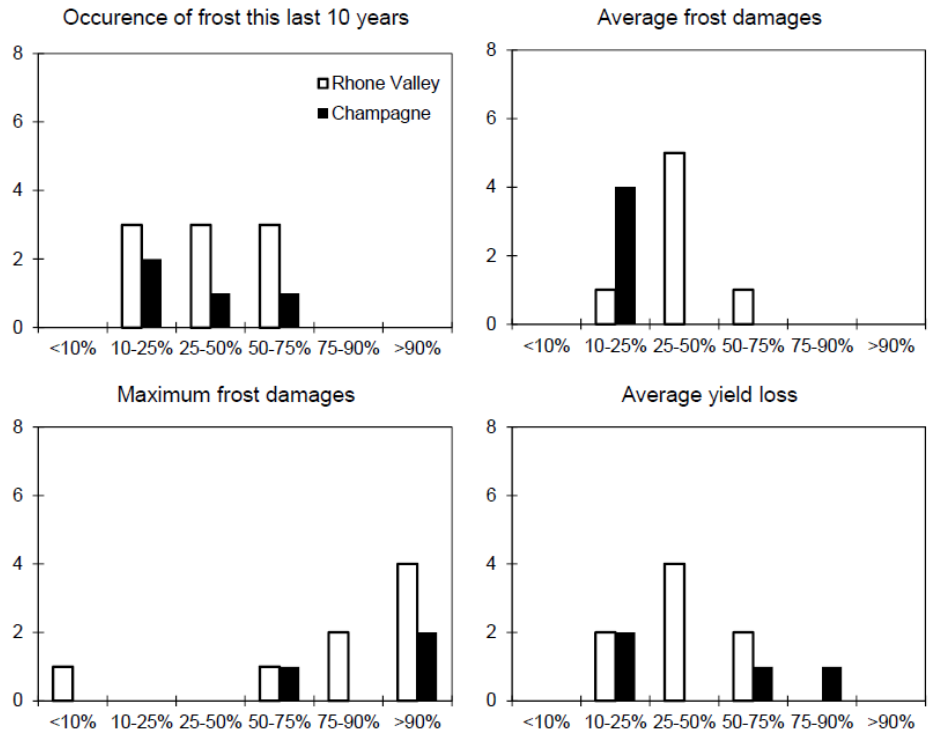


**Figure 2:** Occurrence if frost in the last 10 years, average frost damages, maximum frost damages and average yield loss in France i.e. Grape and fruit producers from the Auvergne Rhone Alpes and Provence Alpes Cote d'Azur regions and grape producers from prestigious domains and from smaller farms on Champagne region

Champagne producers considered their production to be partly adapted to face late frost events, whereas in Rhone Valley only 19% considered it adapted to late frost and 31% not adapted at all. The main concern is about budburst and blooming occurring earlier. A few solutions were mentioned: improving warning tools, improving mitigation techniques and insurance. However, insurance fees are becoming extremely expensive in recent years, reaching the point of non-profitability.

**Frost situation:**

63% have good contact with stakeholders and advisors, and 80% are satisfied with the solutions provided. Two third of them follow the actuality using social media and usually participate at different meetings.

**Frost warnings:**

10 producers agree to help the development of the warning tool in their fields. 9 (36%) would agree to install one for demonstration and 4 would be ok to participate in different media. 8 are ok for further contact and frost risk diagnostic in their orchards.

# 3 Summary and Discussion

The three stakeholder meetings in Peloponnese, Greece yielded significant insights into cropping practices, frost-related challenges, frost mitigation methods, networking practices, and the willingness to adopt the LIFE-FROSTDEFEND tool. Farmers in Aegialia have borne the brunt of frosts over the past 15-20 years, with lemons being one of the primary tree crops in the area. ACUA, previously a major wholesaler and exporter of lemons, has seen a decline in activity due to reduced production. Losses of trees, coupled with commercial factors, led to the abandonment of installed fans for frost mitigation, primarily due to high operational and maintenance costs. Instead, they have resorted to less expensive methods such as misting or surface irrigation. Some even resort to burning mixed waste in orchards to locally increase temperatures and mitigate frost damage, although this practice poses environmental risks. This underscores the importance of the project's goal to introduce a new warning tool, enabling timely copper sprays ahead of frost events—a practice akin to their existing method for protection against plant pathogens.

The majority of growers in Aegialia collaborate with ACUA, making it a significant channel for disseminating LIFE-FROSTDEFEND activities. Their strong networking and initial willingness to engage with the LIFE-FROSTDEFEND consortium in planned dissemination activities are promising indicators.

The same conclusions also apply to orange growers in Argolis, as indicated by the discussion at the conclusion of our meeting. In Argolis, numerous electric fans are utilized in orchards, with their operational costs being notably significant and having increased dramatically in recent times. Therefore, the LIFE-FROSTDEFEND tool can provide a cost-effective and environmentally friendlier strategy for mitigating frost damage to an already receptive target group.

The orange growers of Laconia, as indicated by discussions following the meeting and the analysis of questionnaires, harbor some skepticism towards the LIFE-FROSTDEFEND tool. They express a preference for a free service rather than a subscription for a small fee. Despite some reported use of misting, they generally do not employ frost damage mitigation measures, and the frost in January 2022 caused significant damage to their trees. Our contact in the area, Sparta Valley Fruits S.A., maintains strong connections with local orange growers and will

serve as a crucial channel for our replication activities in Laconia during the final two years of the project.

Tree crop and vine growers in France from the Champagne, Auvergne Rhone Alpes, and Provence Alpes Cote d'Azur regions have adapted their crops to frost by selecting resilient varieties and rootstock. However, late frosts in the spring remain a concern, particularly when crops are highly susceptible to damage during the bloom or early leaf stage. These growers have demonstrated interest in LIFE FROSTDEFEND and its replication and dissemination activities, as evidenced by the analysis of the questionnaires.

Another interesting observation is that in France, two-thirds of tree crop and vine growers use social media for information. Conversely, in Greece, only 16% of stakeholders utilize social media for networking; instead, the majority are members of farmers' groups, from which they seek assistance on managing their crops effectively.

One final consensus among all growers who completed the questionnaire is the need for its simplification. The consortium will develop a simpler questionnaire for future dissemination activities.

stionnaire (EN)

# LIFE20 CCA/GR/001747 “FROSTDEFEND

**Current situation and evaluation of needs**

**Questionnaire to stakeholders and farmers**

**Contact details**

**Name:**

_____

**Surname:**

_____

**e-mail:**

_____

**Address:**

_____

**Telephone:**

_____

**City:**

_____

**Country:**

_____

## SECTION 1: CROP DETAILS

1.1 What kind of tree crop are you growing?

| Species | Cultivars | Age | Planting density |
|---|---|---|---|
| Lemon | | | |
| Orange | | | |
| Tangerine | | | |
| Other (specify): | | | |

1.2 Please, provide details about the geographic and topographic characteristics of your orchards

1.3 Do you keep a logbook of plant growth stages (anthesis, first/new leaf development, fruit appearance, fruit harvest) over years?

- No
- Yes

1.4 Please, provide an estimate of the harvest per year and per orchard in kg/acre:

1.5 Please, provide details about the soil type(s) and soil-related parameters (e.g. pH, soil chemical composition) of your orchards, if available.

1.6 Do you have any temperature recording devices or/and meteorological records available for your orchards?

- No
- Yes

If yes, please provide details

1.7 Wind information, wind breakers, fences?

- No
- Yes

1.8 Type of surrounding crops?

**SECTION 2: AGRICULTURAL PRACTICES**

2.1 Do you keep a logbook of plant protection actions?

- No
- Yes

2.2 Do you control weeds and keep a logbook of actions?

- No
- Yes

If yes, please specify

- Herbicide
- Tillage
- Other, ……

2.3 When do you apply fertilizer?

_____

_____

_____

2.4 Please, specify other problems you face and the anticipated control actions

_____

_____

_____

2.5 Number of frost incidents and frost damage? Do you keep a Logbook of frost incidents and crop losses?

_____

2.6 Do you use any frost protection method?

- No
- Yes

If yes, please specify the kind of frost protection method you use?

- Wind mills
- Sprinklers and misting systems
- Heaters
- Surface irrigation
- Other, ……

Please, provide an estimate of the annual energy and water consumption required for effective frost protection

Please, provide an estimate of the amount (percentage of your income) you should spend per year for effective frost protection

**SECTION 3: NETWORKING**

3.1 Are you a member of a farmer's group of any kind?

- No
- Yes, ……..

3.2 Marketing of your crop?

- No
- Yes, ……

3.3 Following social media about your crop?

- No
- Yes

If yes, please specify:

- Facebook
- Twitter
- Instagram
- Other, …….

3.4 Do you participate in dissemination and marketing events such as exhibitions, workshops, etc?

- No
- Yes

If yes, please specify,

- Local
- National
- International

3.5 How do you collaborate with local farm advisors? Please, rate on a scale from 1 to 4.

- 1 (Poor)
- 2 (Good)
- 3 (Very Good)

- 4 (Excellent)

Free comments

3.6 How satisfied are you from your advisory and information network? Is it efficient enough in providing effective and up-to-date solutions? Please, rate on a scale from 1 to 4

- 1 (Dissatisfied)
- 2 (Partly satisfied)
- 3 (Satisfied)
- 4 (Very satisfied)

Free comments

**SECTION 4: FROSTDEFEND ADOPTION**

4.1 Would you be interested in using a frost forecasting service?

- No
- Yes

If yes, please rate the necessity of a frost forecasting service from 1 to 3

- 1 = Somewhat Necessary
- 2 = Necessary
- 3 = Very Necessary

4.2 Do you pay for an online service related to your crop?

- No
- Yes, ……

4.3 Would you be willing to pay a small fee for a frost forecasting service?

- No
- Yes

4.4 Would you be willing to accept monitoring instruments in your orchard for a reduced fee for a frost forecasting service?

- No
- Yes

4.5 Would you accept to receive notifications and personally participate (physically or virtually) in demonstration and dissemination events, within the framework of the LIFE-FROSTDEFEND project implementation?

- No
- Yes

4.6 Would you be willing to allocate space in your orchard for demonstration activities, within the LIFE-FROSTDEFEND project implementation?

- No
- Yes

**SECTION 5: MISCELLANEOUS, FREE COMMENTS FROM FARMER**

## 4.2 Questionnaire (EL)

# LIFE20 CCA/GR/001747 “FROSTDEFEND

**Καταγραφή τρέχουσας κατάστασης και αναγκών**

**Ερωτηματολόγιο προς Ενδιαφερόμενους Φορείς-Παραγωγούς**

**Στοιχεία Επικοινωνίας**

**Όνομα:**

_____

**Επώνυμο:**

_____

**e-mail:**

_____

**Διεύθυνση:**

_____

**Τηλέφωνο:**

_____

**Πόλη:**

_____

**Χώρα:**

_____

## Τμήμα 1: Λεπτομέρειες καλλιέργειας

1.9 Τι είδους δέντρα καλλιεργείτε;

| Είδος | Ποικιλία | Ηλικία | Πυκνότητα φύτεσης |
|---|---|---|---|
| Λεμονιά | | | |
| Πορτοκαλιά | | | |
| Μανταρινιά | | | |
| Άλλο (ποιο;): | | | |

1.10 Παρακαλώ δώστε την γεωγραφική θέση και τα τοπογραφικά χαρακτηριστικά του οπωρώνα σας:

1.11 Κρατάτε αρχείο των σταδίων ανάπτυξης των δέντρων (άνθηση, ανάπτυξη νέων φύλλων, καρπόδεση, συγκομιδή) όλα τα χρόνια;

- Οχι
- Ναι

1.12 Παρακαλώ δώστε μια εκτίμηση της ετήσιας συγκομιδής σε κιλά/στρέμμα για κάθε οπωρώνα:

1.13 Παρακαλώ δώστε λεπτομέρειες για τον τύπο και άλλες παραμέτρους του εδάφους (pH, χημική σύσταση) του οπωρώνα σας, εάν γνωρίζετε:

1.14 Έχετε όργανα καταγραφής θερμοκρασίας και μετεωρολογικών δεδομένων στον οπωρώνα σας; Αν ναι, έχετε κρατήσει τα δεδομένα;

- Οχι
- Ναι

Αν ναι, δώστε λεπτομέρειες για τα όργανα:

1.15 Έχετε ανεμοφράκτες ή άλλου είδους φράκτες;

- Οχι
- Ναι

1.16 Τί είδους καλλιέργειες περιβάλλουν τον οπωρώνα σας;

**ΤΜΗΜΑ 2: ΚΑΛΛΙΕΡΓΗΤΙΚΕΣ ΠΡΑΚΤΙΚΕΣ**

2.7 Κρατάτε ημερολόγιο φυτοπροστατευτικών επεμβάσεων;

- Οχι
- Ναι

2.8 Κάνετε ζιζανιοκτονία;

- Οχι
- Ναι

Αν ναι, τί είδους;

- Χημική
- Καλλιέργεια
- Άλλο, ……

2.9 Πότε ρίχνετε λίπασμα;

2.10 Αντιμετωπίζετε άλλου είδους προβλήματα στην καλλιέργεια, και τί ενέργειες κάνετε γι αυτά;

2.11 Πόσες φορές αντιμετωπίσατε παγετό και είχατε ζημιές; Κρατάτε αρχείο παγετών και απωλειών από παγετοπληξία;

2.12 Χρησιμοποιείτε κάποια μέθοδο προστασίας από παγετό;

- Οχι
- Ναι

Αν ναι, ποια μέθοδο;

- Ανεμομείκτες
- Υδρονέφωση/Τεχνητή ομίχλη
- Θερμάστρες
- Επιφανειακή άρδευση/κατάκλυση
- Άλλη, ……

Παρακαλώ δώστε μία εκτίμηση της ετήσιας κατανάλωσης ρεύματος ή/και νερού για προστασία της καλλιέργειάς σας από παγετό.

Παρακαλώ δώστε μία εκτίμηση του ετήσιου ποσού (ποσοστό του εισοδήματός σας) που διαθέσατε για προστασία της καλλιέργειάς σας από παγετό.

**ΤΜΗΜΑ 3: ΤΡΟΠΟΙ ΔΙΚΤΥΩΣΗΣ**

3.7 Είστε μέλος κάποιας ομάδας παραγωγών οποιουδήποτε είδους; Αν ναι, ποιας ομάδας;

- Οχι
- Ναι, ……..

3.8 Διαθέτετε την παραγωγή σας στο εμπόριο;

- Οχι
- Ναι (πώς;) ……

3.9 Χρησιμοποιείτε τα social media σχετικά με την καλλιέργειά σας;

- Οχι
- Ναι

Αν ναι, ποια;

- Facebook
- Twitter
- Instagram
- Άλλο ……

3.10 Συμμετέχετε σε ενημερωτικές εκδηλώσεις σχετικά με την καλλιέργειά σας (εκθέσεις, ημερίδες, κλπ);

- Οχι
- Ναι

Αν ναι, τί είδους;

- Τοπικές
- Πανελλαδικές
- Διεθνείς

3.11 Πώς είναι η συνεργασία σας με τους γεωπόνους της περιοχής σας; Βαθμολογήστε από 1 έως 4:

- 1 (Μέτρια)
- 2 (Καλή)
- 3 (Πολύ καλή)
- 4 (Εξαιρετική)

Εδώ μπορείτε να προσθέσετε σχόλια σχετικά με το παραπάνω ερώτημα:

3.12 Πόσο ικανοποιημένος/η είστε από το δίκτυο πληροφοριών και συμβουλών που έχετε; Σας παρέχει αποτελεσματικές λύσεις; Βαθμολογήστε από 1 έως 4:

- 1 (Δυσαρεστημένος/η)
- 2 (Λίγο ικανοποιημένος/η)
- 3 (Ικανοποιημένος/η)
- 4 (Πολύ ικανοποιημένος/η)

Εδώ μπορείτε να προσθέσετε σχόλια σχετικά με το παραπάνω ερώτημα:

**ΤΜΗΜΑ 4: ΑΠΟΔΟΧΗ ΤΟΥ FROSTDEFEND**

4.5 Θα σας ενδιέφερε να χρησιμοποιήσετε μια υπηρεσία πρόγνωσης του κινδύνου παγετού;

- Οχι
- Ναι

Αν ναι, βαθμολογήστε την ανάγκη χρήσης τέτοιας υπηρεσίας από το 1 έως το 3:

- 1 = Λίγο απαραίτητη
- 2 = Απαραίτητη
- 3 = Πολύ απαραίτητη

4.6 Πληρώνετε οποιαδήποτε διαδικτυακή υπηρεσία πληροφόρησης σχετική με την καλλιέργειά σας;

- Οχι
- Ναι (ποια), ……

4.7 Θα πληρώνατε μια μικρή συνδρομή σε μια υπηρεσία πρόγνωσης του κινδύνου ζημιάς από παγετό στην καλλιέργειά σας;

- Οχι
- Ναι

4.8 Θα δεχόσασταν την εγκατάσταση οργάνων παρακολούθησης συνθηκών στον οπωρώνα σας εάν σας παρεχόταν έκπτωση στη συνδρομή για μια υπηρεσία πρόγνωσης ζημιάς από παγετό;

- Οχι
- Ναι

4.5 Δέχεστε να παίρνετε ενημέρωση και να συμμετέχετε προσωπικά (με φυσική παρουσία ή διαδικτυακά) σε εκδηλώσεις επίδειξης ή ενημέρωσης στα πλαίσια των δραστηριοτήτων του προγράμματος FROSTDEFEND;

- Οχι
- Ναι

4.6 Δέχεστε να παραχωρήσετε ένα μικρό μέρος του οπωρώνα σας για εκδηλώσεις επίδειξης στα πλαίσια των δραστηριοτήτων του προγράμματος FROSTDEFEND;

- Οχι
- Ναι

**ΤΜΗΜΑ 5: ΕΛΕΥΘΕΡΑ ΣΧΟΛΙΑ**

## 4.3 Questionnaire (FR)

https://sondages.inrae.fr/index.php/566658

***The project has received funding from the LIFE Programme of the European Union under GA number LIFE20 CCA/GR/001747. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or CINEA. Neither the European Union nor the granting authority can be held responsible for them.***