Supplementary materials.

Figure S1: On-line questionnaire (translated from Spanish to English).

1. In what area (s) does your organization provide training to the greenhouse horticulture sector in Almeria?

- [ ] Crop protection
- [ ] Water and nutrition
- [ ] Cultivation techniques and strategies
- [ ] Commercialization
- [ ] New technologies
- [ ] Company management
- [ ] Different: _____

2. Who does your organization offer training to?

- [ ] Producer sector
- [ ] Technical advisory and quality supervision sector
- [ ] Students
- [ ] Different: _____

3rd. How did training arise in your organization?

- [ ] Market demand
- [ ] Need to explain a new technology
- [ ] Government requirements (for example new regulations)
- [ ] Organization's own initiative
- [ ] Different: _____

3b. Has the Covid-19 crisis affected in any way the training exercised by your organization? Please comment on this issue and the solutions / modifications provided.

Your answer

4th. What pedagogical methods does your organization currently use in training activities?

- [ ] • Demonstration in farm and company
- [ ] • Participatory education (internships in the company where students can also learn and work with new knowledge, techniques or technology)
- [ ] • Co-learning (farmers and scientists collaborating to create knowledge)
- [ ] • Classroom education
- [ ] • Virtual education
- [ ] Different: _____

4b. Has the Covid-19 crisis affected in any way the training methods exercised by your organization? Please comment on this issue and the solutions / modifications provided.

Your answer

5th. How does your organization measure the effectiveness of these pedagogical methods?

- [ ] Assessing knowledge through examinations conducted by participants
- [ ] Post-training indicators are used
- [ ] Pre and post-training indicators are used
- [ ] Investigating the changes that are taking place in the sector over a longer period of time.
- [ ] Not done
- [ ] Different: _____

5b. Has the Covid-19 crisis affected in any way the evaluation of the training carried out by your organization? Please comment on this issue and the solutions / modifications provided.

Your answer

6. Does the content provided by your organization address sustainability in greenhouse horticulture? If so, what issues?

- [ ] Biological control of pests and diseases
- [ ] Decrease in fertilizer intake
- [ ] Bioeconomía

7a. Does your organization use a protocol (an official or own procedure) to design the training activities?

- [ ] Yes, there is a general protocol for all the training that my organization offers
- [ ] Yes, a specific protocol is created for each training activity.
- [ ] No
- [ ] Different: _____

7b. Has the Covid-19 crisis affected in any way the training protocols carried out by your organization? Please comment on this issue and the solutions / modifications provided.

Your answer

8. Have training activities changed or developed over the years? If so, how has it evolved?

Your answer

9a. Does your organization receive feedback / comments from the participants in the training activities?

- [ ] Yes, by evaluation of the teacher by the participants
- [ ] Yes, through the evaluation of the training program by the participants.
- [ ] No
- [ ] Different: _____

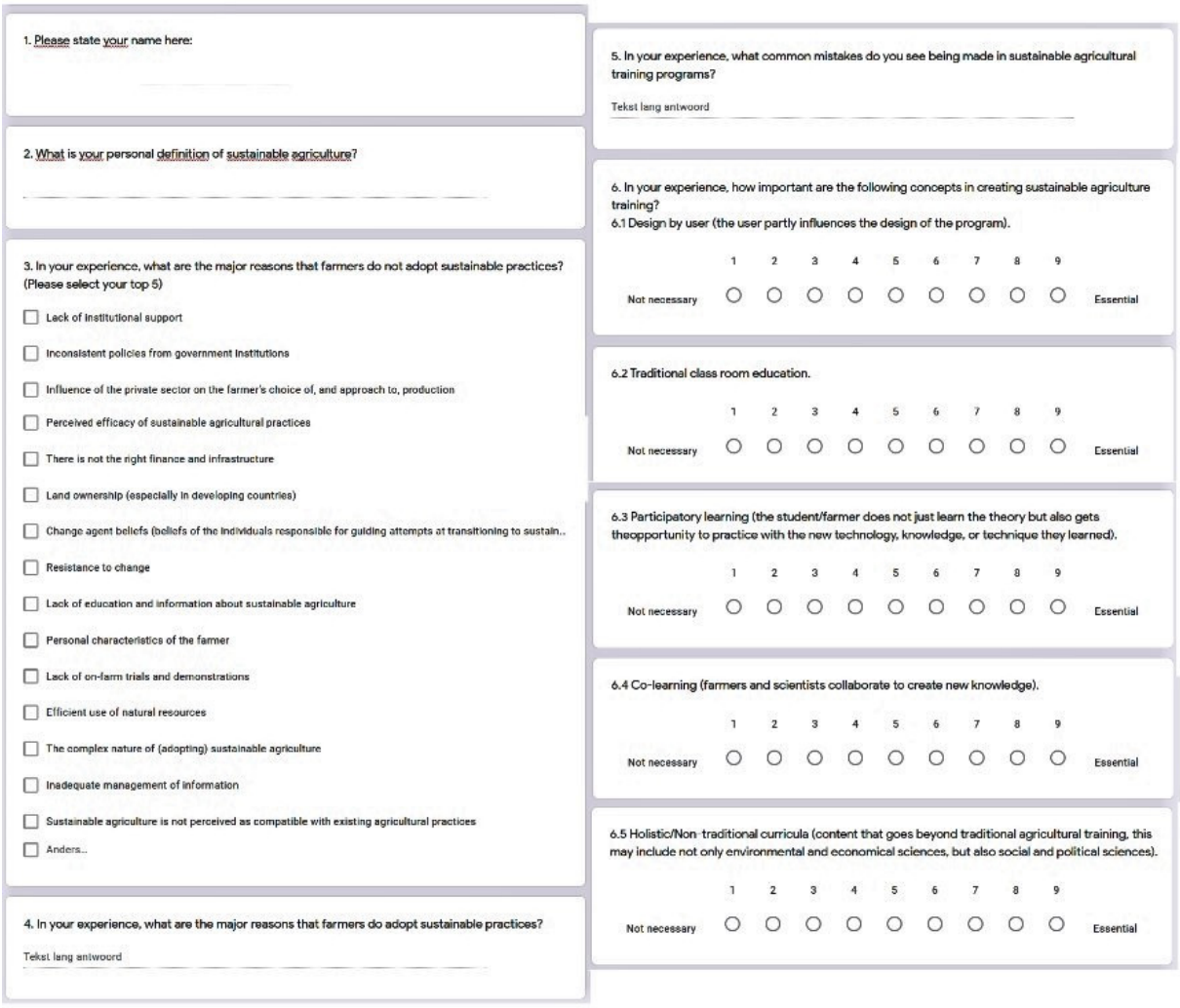
9b. If the answer is yes, what are the most important feedback points that you detect?

Your answer

10. Finally, has your organization ever done research on the best pedagogical methods to use in your training activities?

- ( ) Yes
- ( ) No

Figure S2: First round Delphi questionnaire



1. Please state your name here:

2. What is your personal definition of sustainable agriculture?

3. In your experience, what are the major reasons that farmers do not adopt sustainable practices? (Please select your top 5)

- [ ] Lack of institutional support
- [ ] Inconsistent policies from government institutions
- [ ] Influence of the private sector on the farmer's choice of, and approach to, production
- [ ] Perceived efficacy of sustainable agricultural practices
- [ ] There is not the right finance and infrastructure
- [ ] Land ownership (especially in developing countries)
- [ ] Change agent beliefs (beliefs of the individuals responsible for guiding attempts at transitioning to sustain..
- [ ] Resistance to change
- [ ] Lack of education and information about sustainable agriculture
- [ ] Personal characteristics of the farmer
- [ ] Lack of on-farm trials and demonstrations
- [ ] Efficient use of natural resources
- [ ] The complex nature of (adopting) sustainable agriculture
- [ ] Inadequate management of information
- [ ] Sustainable agriculture is not perceived as compatible with existing agricultural practices
- [ ] Anders...

4. In your experience, what are the major reasons that farmers do adopt sustainable practices?

Tekst lang antwoord

5. In your experience, what common mistakes do you see being made in sustainable agricultural training programs?

Tekst lang antwoord

6. In your experience, how important are the following concepts in creating sustainable agriculture training?

6.1 Design by user (the user partly influences the design of the program).

	1	2	3	4	5	6	7	8	9	
Not necessary	○	○	○	○	○	○	○	○	○	Essential

6.2 Traditional class room education.

	1	2	3	4	5	6	7	8	9	
Not necessary	○	○	○	○	○	○	○	○	○	Essential

6.3 Participatory learning (the student/farmer does not just learn the theory but also gets theopportunity to practice with the new technology, knowledge, or technique they learned).

	1	2	3	4	5	6	7	8	9	
Not necessary	○	○	○	○	○	○	○	○	○	Essential

6.4 Co-learning (farmers and scientists collaborate to create new knowledge).

	1	2	3	4	5	6	7	8	9	
Not necessary	○	○	○	○	○	○	○	○	○	Essential

6.5 Holistic/Non-traditional curricula (content that goes beyond traditional agricultural training, this may include not only environmental and economical sciences, but also social and political sciences).

	1	2	3	4	5	6	7	8	9	
Not necessary	○	○	○	○	○	○	○	○	○	Essential

6.6 On-farm/business demonstrations (new techniques, technology, and knowledge is explained and showed on a farm or business where it can be seen first-hand and in action).

	1	2	3	4	5	6	7	8	9	
Not necessary	○	○	○	○	○	○	○	○	○	Essential

6.7 Peer learning (farmers learning new knowledge, skills, and technology from each other).

	1	2	3	4	5	6	7	8	9	
Not necessary	○	○	○	○	○	○	○	○	○	Essential

6.8 Virtual education (online conferences, videos, or apps).

	1	2	3	4	5	6	7	8	9	
Not necessary	○	○	○	○	○	○	○	○	○	Essential

7. Please see figure 1 (below). In your opinion, how should this diagram ideally look like? For example: should it include more of a certain method, less of a certain method, or should a whole different method be introduced?

Tekst lang antwoord

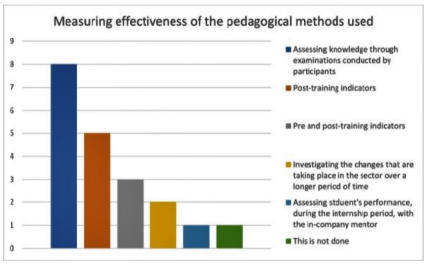
8. What resources would be necessary to facilitate this change? Please be as specific as possible.

Tekst lang antwoord

9. Please see figure 2 (below). In your experience, what is the best way to evaluate whether the short- and long-term learning outcomes have been achieved by a training program?

Tekst lang antwoord

Figure 2: how the effectiveness of training programs is measured in Almeria greenhouse horticulture training.



10. Please see figure 3 (below). In your experience, is a training protocol essential for successful training?

- ○ No
- ○ Yes, a general protocol is essential for success
- ○ Yes, a specific protocol for each training activity is essential for success
- ○ Anders...

Figure 3: The use of training protocols in Almeria greenhouse horticulture training.

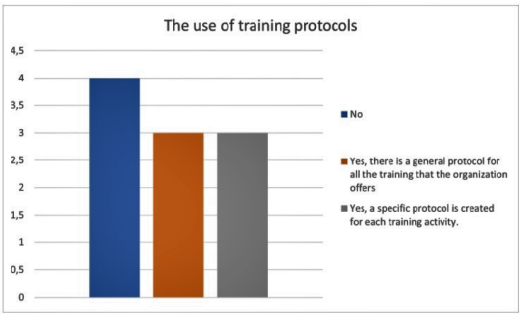


Figure S3: Second round Delphi questionnaire

1. Please state your name here:

2. The expert panel defines sustainable agriculture as agriculture that:

1. Respects people("generates quality employment")
2. Respects profit("is profitable and highly efficient")
3. Respects planet("keeps the environment in balance, no negative consequences to the environment")
4. Uses natural and non-natural resources efficiently
5. Improves the health of the land
6. Meet the current needs while not jeopardizing production for future generations.

2. Do you agree with all these definitions? If you do not agree with one, please indicate which one in 'Others'.

- [ ] Yes, I agree with the definitions
- [ ] No, I do not agree with one of these definitions
- [ ] Anders: _____

3.1 The expert panel selected the following as the top 5 reasons to why farmers do not adopt sustainable agriculture.

1. The lack of training and information on sustainable agriculture
2. The perception of high costs to implement sustainability
3. Resistance to change
4. Lack of tests and demonstrations on the farm
5. Low perceived effectiveness of sustainable agricultural practices

3.1 Do you agree with all these statements? If you do not agree with one, please indicate which one in 'Others'.

- [ ] Yes, I agree with these statements
- [ ] No, I do not agree with one of these statements
- [ ] Anders: _____

3.2 If yes, please rank these reasons (1 being the least to 5 being the biggest reason to why farmers do not adopt sustainable agriculture).

	1	2	3	4	5
Lack of training and information on sustainable agriculture	○	○	○	○	○
Perception of high costs to implement sustainability	○	○	○	○	○
Resistance to change	○	○	○	○	○
Lack of tests and demonstrations on the farm	○	○	○	○	○
Low perceived effectiveness of sustainable agricultural practices	○	○	○	○	○

4. The expert panel concluded the following as the main reasons why farmers do adopt sustainable agriculture:

1. For ideological/philosophical reasons
2. Environmental awareness of their farm and surroundings
3. Quality requirements from governments or companies
4. Market demand

4. Do you agree with all these reasons? If you do not agree with one, please indicate which one in 'Others'.

- [ ] Yes, I agree with all these reasons
- [ ] No
- [ ] Anders: _____

5.1 The expert panel concluded the following as the most common mistakes made in sustainable agricultural training programs:

1. The lack of practice opportunities
2. The lack of evidence that sustainable agriculture works
3. Improper way of transferring information
4. Improper idea of what sustainable agriculture is or too much emphasis on a specific element
5. Farmers not getting the needed continuous help

5.1 Do you agree with all these statements? If you do not agree with one, please indicate which one in 'Others'.

- [ ] Yes, I agree with these statements
- [ ] No, I do not agree with these statements
- [ ] Anders: _____

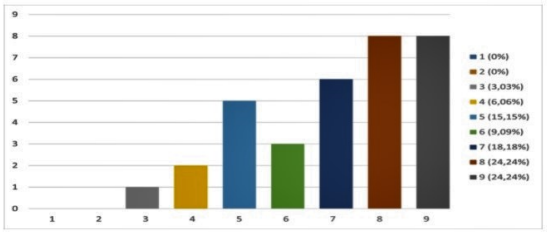
5.2 If yes, please rank these mistakes, 1 being the least common to 5 being the most common mistake made in sustainable agricultural training programs.

	1	2	3	4	5
Lack of practice opportunities	○	○	○	○	○
Lack of evidence that sustainable agriculture works	○	○	○	○	○
Improper way of transferring information	○	○	○	○	○
Too much emphasis on a specific element of sustainable agriculture	○	○	○	○	○
Farmers do not receive continuous help that is needed	○	○	○	○	○

6.1 The expert panel ranked "Design by user" as 7.0/9 in terms of importance to creating sustainable agricultural training programs (see Figure 1, below). Do you agree with this ranking? If not, please state your reason and what number you would give it.

Jouw antwoord

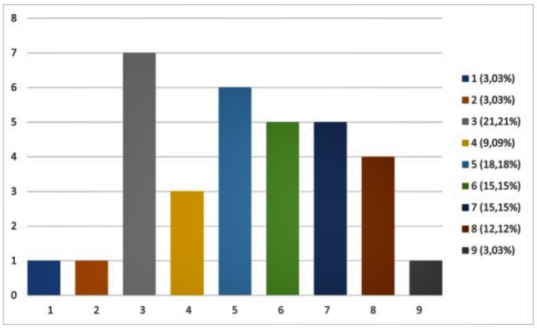
Figure 1: Design by user - 7.0/9 in terms of importance (1 being very low, 9 being very high).



6.2 The expert panel ranked "Traditional classroom training" as 5.2/9 in terms of importance to creating sustainable agricultural training programs (see Figure 2, below). Do you agree with this ranking? If not, please state your reason and what number you would give it.

Jouw antwoord

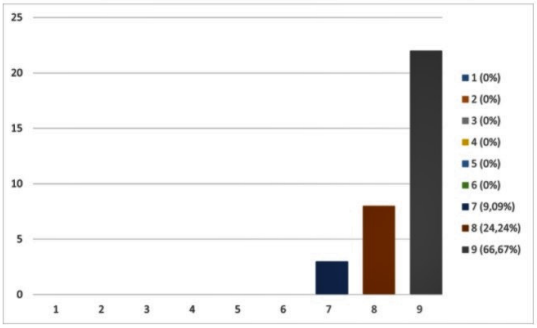
Figure 2: Traditional classroom training - 5.2/9 in terms of importance (1 being very low, 9 being very high).



6.3 The expert panel ranked "Participatory learning" as 8.6/9 in terms of importance to creating sustainable agricultural training programs (see Figure 3, below). Do you agree with this ranking? If not, please state your reason and what number you would give it.

Jouw antwoord

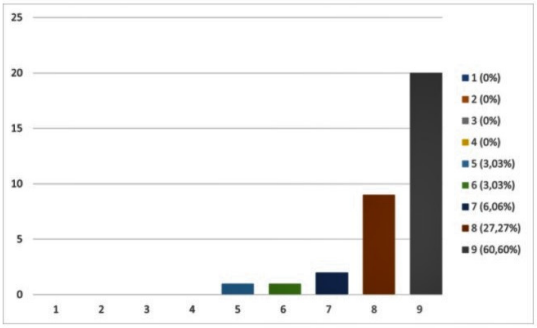
Figure 3: Paricpatory learning - 8.6/9 in terms of importance (1 being very low, 9 being very high).



6.4 The expert panel ranked "Co-learning" as 8.4/9 in terms of importance to creating sustainable agricultural training programs (see Figure 4, below). Do you agree with this ranking? If not, please state your reason and what number you would give it.

Jouw antwoord

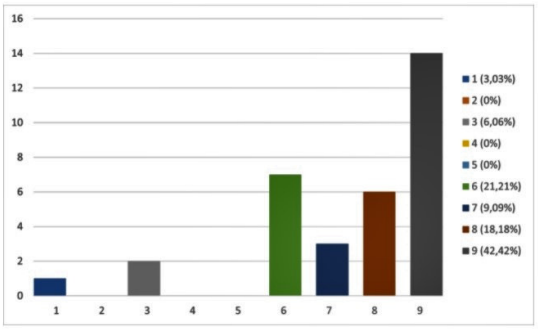
Figure 4: Co-learning - 8.4/9 in terms of importance (1 being very low, 9 being very high).



6.5 The expert panel ranked "Holistic/non-traditional curricula" as 7.4/9 in terms of importance to creating sustainable agricultural training programs (see Figure 5, below). Do you agree with this ranking? If not, please state your reason and what number you would give it.

Jouw antwoord

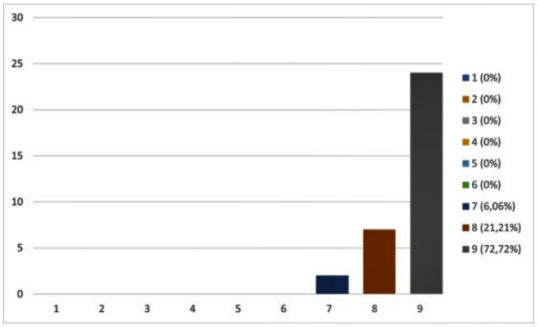
Figure 5: Holistic/non traditional curricula - 7.4/9 in terms of importance (1 being very low, 9 being very high).



6.6 The expert panel ranked "On-farm/business demonstrations" as 8.7/9 in terms of importance to creating sustainable agricultural training programs (see Figure 6, below). Do you agree with this ranking? If not, please state your reason and what number you would give it.

Jouw antwoord

Figure 6: On-farm/business demonstrations - 8.7/9 in terms of importance (1 being very low, 9 being very high).



6.7 The expert panel ranked "Peer learning" as 7.9/9 in terms of importance to creating sustainable agricultural training programs (see Figure 7, below). Do you agree with this ranking? If not, please state your reason and what number you would give it.

Jouw antwoord

Figure 7: Peer learning - 7.9/9 in terms of importance (1 being very low, 9 being very high).

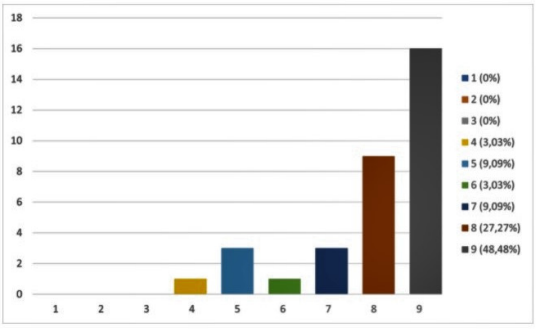


Figure S4: Example of the affinity method utilized in the analysis of the online questionnaire and Delphi (example given is question 4 of the Delphi)

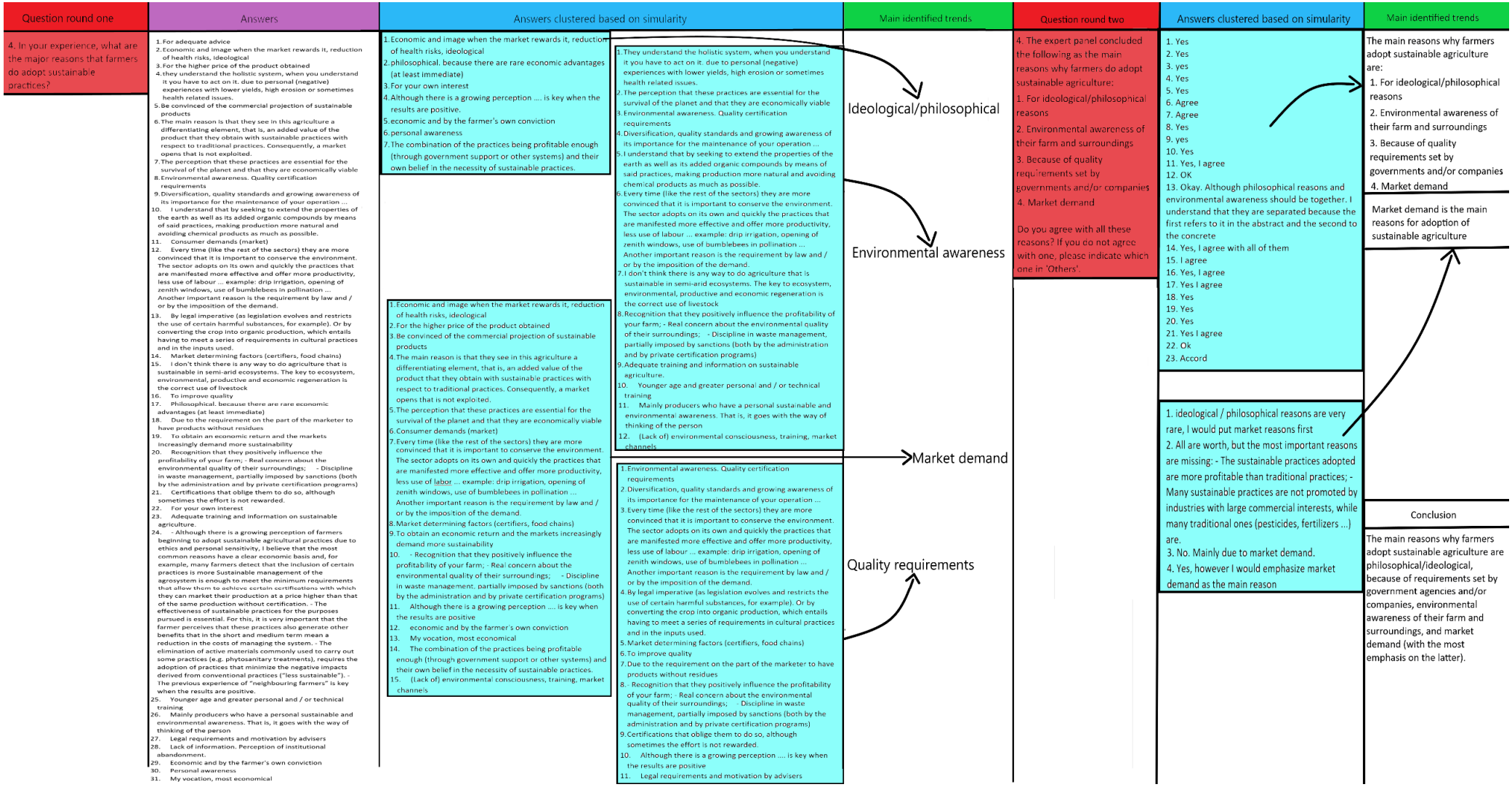


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Figure S5: Participants of the Delphi method, codified by a consecutive number

Participants of the Delphi method					
Main provider of training in Almeria 1	Horticulturalist in Almeria 1	Trainer of sustainable agriculture 1	Scientist 1	Pedagogical expert 1	Technical advisor 1
Main provider of training in Almeria 2	Horticulturalist in Almeria 2	Trainer of sustainable agriculture 2	Scientist 2	Pedagogical expert 2	Technical advisor 2
Main provider of training in Almeria 3	Horticulturalist in Almeria 3	Trainer of sustainable agriculture 3	Scientist 3	Pedagogical expert 3	
Main provider of training in Almeria 4	Horticulturalist in Almeria 4	Trainer of sustainable agriculture 4	Scientist 4	Pedagogical expert 4	
Main provider of training in Almeria 5			Scientist 5	Pedagogical expert 5	
Main provider of training in Almeria 6					
Main provider of training in Almeria 7					