

Adopting sustainable water management practices in agriculture based on stakeholder preferences

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Electronic supplementary material

Supplementary Tables S1–S11
Supplementary Figures S1–S2

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Table S1. Participants in the in-depth interviews

Expert	Position
1	professor of the area of soil science and agricultural chemistry at university
2	professor of the area of plant production at university
3	professor of the area of ecology at university
4	professor of the applied economics area of the university
5	professor of vocational training in the agricultural field

Source: Authors' own elaboration

Table S2. Open-ended questions used in in-depth interviews

Block	Questions
Contextualization	1. What are the main drivers of the agricultural model under study? 2. How can they affect the sustainability of the agricultural model of the area?
Sustainable practices	3. What practice(s) could contribute to achieving the sustainability of the agricultural model under study? 4. What do these practices consist of? How can they contribute to improving sustainability? 5. What criteria should be taken into account when determining the best practices to implement in the agricultural model under study to achieve sustainability?
Stakeholders	6. What are the different stakeholder groups involved in the agricultural model under study? 7. What are the stakeholders related to the adoption of this practice(s)? 8. How can these stakeholders influence the adoption of this practice(s)?

Source: Authors' own elaboration

Table S3. Participants in the Delphi

Participant	Organization
1	Delegation of Agriculture of Almería
2	Organization of Irrigators in the Poniente
3	Public Agricultural Research Centre
4	Professional Agrarian Organization
5	Organization of Fruit and Vegetable Producers
6	Department of Agronomy of the University of Almería
7	Agriculture Area of the Local Administration of the Poniente
8	Organization of Agricultural Technicians
9	Organization of Irrigators in the Levant
10	Private Agricultural Research Centre
11	Fruit and Vegetable Cooperative
12	Agriculture Area of the Local Administration of the Levant
13	Organization of Companies in the Agricultural Auxiliary Industry
14	Organization of Irrigators in the Province of Almería

Source: Authors' own elaboration

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Table S4. Participants in the workshop

Group	Participant	Organization
Farmers	1	farmer from the Poniente area
	2	farmer from the Levante area
	3	farmer with crops in the Poniente and Levante area
Policymakers	4	agriculture area of the local administration of the Poniente area
	5	agriculture area of the local administration of the Levante area
	6	delegation of agriculture of Almería
Researchers	7	Department of Agronomy of the University of Almería
	8	public agricultural research centre
	9	private agricultural research centre

Source: Authors' own elaboration

Table S5. Average score for each of the practices and criteria

Criteria	Technology	Desalinated water	Reclaimed water	RWH	PC
1. Increases water availability	1.21	4.64	4.43	2.29	1.07
2. Improves water use efficiency	4.64	1.07	1.14	1.21	3.86
3. Improves water quality	1.29	4.50	4.14	3.57	4.02
4. Enables crop diversification	1.79	4.43	4.01	3.29	2.64
5. Increases crop productivity	4.14	3.07	3.21	3.43	1.79
6. Reduces input use	4.07	1.29	4.43	2.93	4.21
7. Reduces costs	2.79	1.36	2.01	4.36	3.07
8. Does not require high investment	2.07	1.50	1.29	3.00	4.57
9. Can be managed autonomously by the farmer	4.57	1.43	1.57	3.93	4.86
10. Has environmental benefits	3.93	2.86	4.14	4.01	3.64
11. Does not generate a high environmental impact	4.01	1.57	2.07	4.36	3.00
12. Improves farm safety	1.43	1.29	1.36	4.14	4.57
13. Does not require specific training of the farmer	2.14	3.29	2.57	3.21	4.21
Mean	2.93	2.48	2.80	3.36	3.50
SD	0.77	0.73	0.76	0.86	0.75
Level of consensus	high	high	high	high	high

RWH – rainwater harvesting; PC – pond covering

Source: Authors' own elaboration

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Table S6. Results of the second round of Delphi for technology

Item	Mean	Mode	SD	Consensus
1. Increases water availability	1.21	1	0.58	high
2. Improves water use efficiency	4.64	5	0.50	high
3. Improves water quality	1.29	1	0.61	high
4. Enables crop diversification	1.79	2	0.80	high
5. Increases crop productivity	4.14	4	0.77	high
6. Reduces input use	4.07	5	0.83	high
7. Reduces costs	2.79	2	1.05	reasonable
8. Does not require high investment	2.07	1	1.21	reasonable
9. Can be managed autonomously by the farmer	4.57	5	0.51	high
10. Has environmental benefits	3.93	4	1.14	reasonable
11. Does not generate a high environmental impact	4.00	4	0.68	high
12. Improves farm safety	1.43	1	0.51	high
13. Does not require specific training of the farmer	2.14	2	0.77	high
Aggregate value	2.93	–	0.77	–

Source: Authors' own elaboration

Table S7. Results of the second round of Delphi for desalinated water

Item	Mean	Mode	SD	Consensus
1. Increases water availability	4.64	5	0.50	high
2. Improves water use efficiency	1.07	1	0.27	high
3. Improves water quality	4.50	5	0.76	high
4. Enables crop diversification	4.43	5	0.65	high
5. Increases crop productivity	3.07	3	1.14	reasonable
6. Reduces input use	1.29	1	0.61	high
7. Reduces costs	1.36	1	0.63	high
8. Does not require high investment	1.50	1	0.76	high
9. Can be managed autonomously by the farmer	1.43	1	0.51	high
10. Has environmental benefits	2.86	3	1.17	reasonable
11. Does not generate a high environmental impact	1.57	1	0.65	high
12. Improves farm safety	1.29	1	0.47	high
13. Does not require specific training of the farmer	3.29	3	1.33	reasonable
Aggregate value	2.48	–	0.73	–

Source: Authors' own elaboration

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Table S8. Results of the second round of Delphi for reclaimed water

Item	Mean	Mode	SD	Consensus
1. Increases water availability	4.43	5	0.65	high
2. Improves water use efficiency	1.14	1	0.36	high
3. Improves water quality	4.14	5	0.77	high
4. Enables crop diversification	4.00	4	0.96	high
5. Increases crop productivity	3.21	3	1.25	reasonable
6. Reduces input use	4.43	5	0.65	high
7. Reduces costs	2.00	1	0.88	high
8. Does not require high investment	1.29	1	0.61	high
9. Can be managed autonomously by the farmer	1.57	2	0.51	high
10. Has environmental benefits	4.14	4	0.66	high
11. Does not generate a high environmental impact	2.07	2	0.73	high
12. Improves farm safety	1.36	1	0.50	high
13. Does not require specific training of the farmer	2.57	2	1.09	reasonable
Aggregate value	2.80	–	0.74	–

Source: Authors' own elaboration

Table S9. Results of the second round of Delphi for rainwater harvesting (RWH)

Item	Mean	Mode	SD	Consensus
1. Increases water availability	2.29	3	0.83	high
2. Improves water use efficiency	1.21	1	0.43	high
3. Improves water quality	3.57	3	0.94	high
4. Enables crop diversification	3.29	4	1.33	reasonable
5. Increases crop productivity	3.43	3	0.94	high
6. Reduces input use	2.93	3	0.92	high
7. Reduces costs	4.36	4	0.63	high
8. Does not require high investment	3.00	3	1.04	reasonable
9. Can be managed autonomously by the farmer	3.93	5	1.00	high
10. Has environmental benefits	4.00	4	0.68	high
11. Does not generate a high environmental impact	4.36	5	0.84	high
12. Improves farm safety	4.14	4	0.86	high
13. Does not require specific training of the farmer	3.21	4	0.80	high
Aggregate value	3.36	–	0.86	–

Source: Authors' own elaboration

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Table S10. Results of the second round of Delphi for pond covering

Item	Mean	Mode	SD	Consensus
1. Increases water availability	1.07	1	0.27	high
2. Improves water use efficiency	3.86	4	0.77	high
3. Improves water quality	4.00	3	0.96	high
4. Enables crop diversification	2.64	3	0.63	high
5. Increases crop productivity	1.79	2	0.70	high
6. Reduces input use	4.21	5	0.80	high
7. Reduces costs	3.07	3	0.92	high
8. Does not require high investment	4.57	5	0.65	high
9. Can be managed autonomously by the farmer	4.86	5	0.53	high
10. Has environmental benefits	3.64	4	1.08	reasonable
11. Does not generate a high environmental impact	3.00	4	1.11	reasonable
12. Improves farm safety	4.57	5	0.65	high
13. Does not require specific training of the farmer	4.21	4	0.70	high
Aggregate value	3.50	–	0.75	–

Source: Authors' own elaboration

Table S11. Assessment of the importance of the different stakeholders

Stakeholders	Mean	Mode	SD	Consensus
1. Farmers	4.86	5	0.36	high
2. Policy-makers	4.14	4	0.66	high
3. Researchers	4.07	4	0.83	high
4. Technicians	3.00	4	1.04	reasonable
5. Farmers' organisations	2.93	2	1.27	reasonable
6. Credit institutions	2.86	2	1.17	reasonable
7. Auxiliary industry	2.86	3	1.03	reasonable
8. Academia	2.79	3	1.12	reasonable
9. Local residents	2.71	3	1.14	reasonable
10. Non-governmental organisations	2.64	3	1.22	reasonable
11. Supply chain	2.57	2	1.02	reasonable
12. Employees	2.36	2	0.93	high
13. Other sectors	2.29	2	1.14	reasonable

Source: Authors' own elaboration

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Please rate your level of agreement with the following statements using the following scale: 1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, 5 = strongly agree.

***Rainwater harvesting increases water availability.**

Choose one of the following answers

☐ Strongly disagree (1)

☐ Disagree (2)

☐ Neither agree nor disagree (3)

☐ Agree (4)

☐ Strongly agree (5)

Please enter your comment here:

Please rate the importance of the following stakeholders in installing sustainable water practices on the following scale: 1 = not important, 2 = less important, 3 = important, 4 = very important, 5 = extremely important.

***Farmers.**

Choose one of the following answers

☐ Not important (1)

☐ Less important (2)

☐ Important (3)

☐ Very important (4)

☐ Extremely important (5)

Please enter your comment here:

Figure S1. Example of the Delphi Round 1 questionnaire

Source: Authors' own elaboration

Please rate your level of agreement with the following statements using the following scale: 1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, 5 = strongly agree.

***Rainwater harvesting increases water availability.**

Your previous answer	Results obtained in the previous round	
	Mean	Mode
3	2.14	3

Choose one of the following answers

☐ Strongly disagree (1)

☐ Disagree (2)

☐ Neither agree nor disagree (3)

☐ Agree (4)

☐ Strongly agree (5)

Please enter your comment here:

Please rate the importance of the following stakeholders in installing sustainable water practices on the following scale: 1 = not important, 2 = less important, 3 = important, 4 = very important, 5 = extremely important.

***Farmers.**

Your previous answer	Results obtained in the previous round	
	Mean	Mode
4	4.71	5

Choose one of the following answers

☐ Not important (1)

☐ Less important (2)

☐ Important (3)

☐ Very important (4)

☐ Extremely important (5)

Please enter your comment here:

Figure S2. Example of the Delphi Round 2 questionnaire

Source: Authors' own elaboration