

LIFE14 CCA/GR/000928



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Development of a Climate Change Adaptation Strategy for agriculture, in the framework of ADAPT2CLIMA project: the case of Cyprus

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Presentation contents

- ▢ Cyprus participation in the Adapt2clima project
- ▢ Methodology of Adaptation Strategy development
- ▢ Identification, evaluation and selection of adaptation measures
- ▢ Contents of Adaptation Strategy
- ▢ Stakeholders' involvement
- ▢ Remaining actions to final adoption
- ▢ Concluding remarks



Cyprus participation in the Adapt2clima

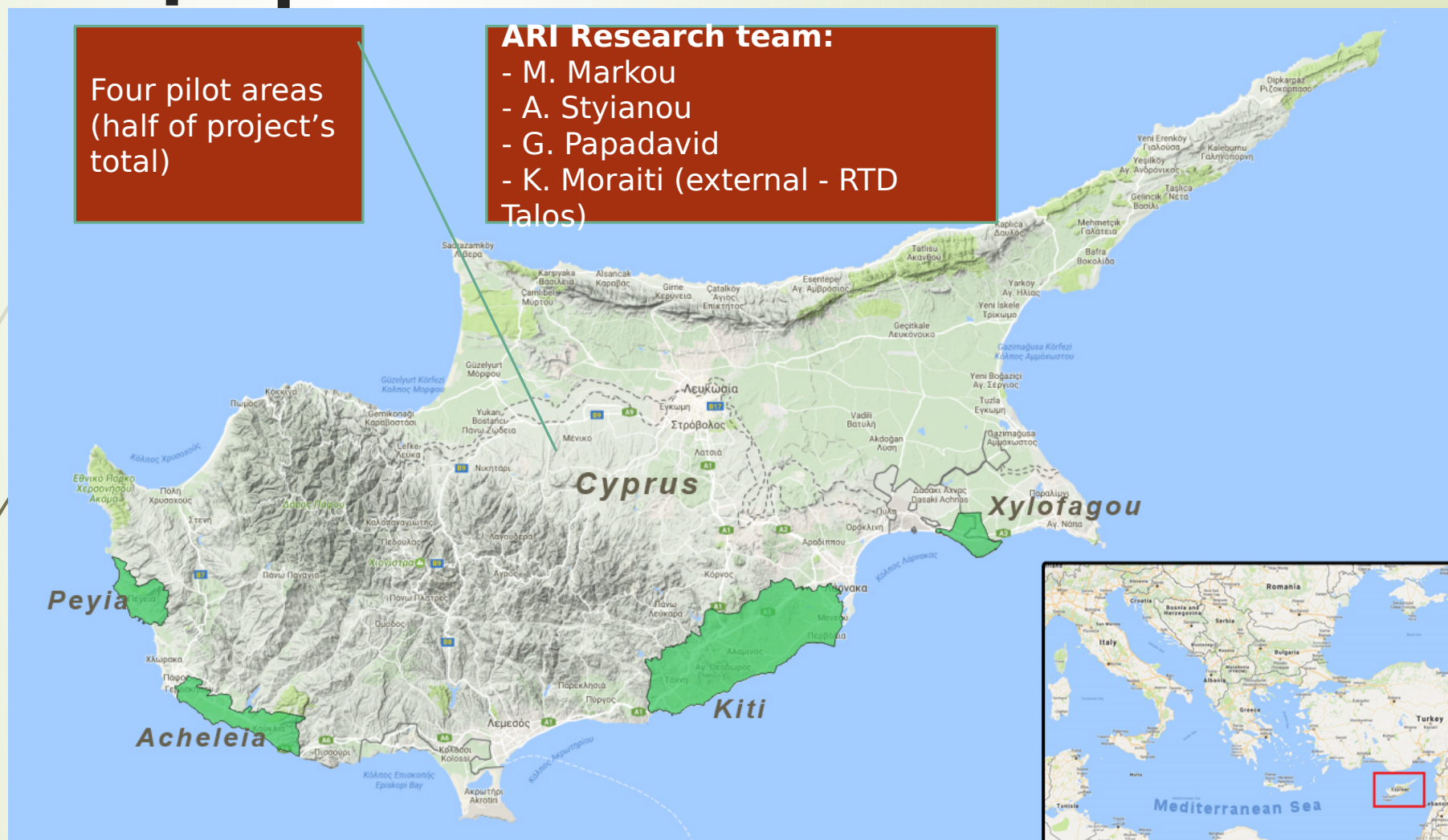
Four pilot areas
(half of project's
total)

ARI Research team:

- M. Markou
- A. Styianou
- G. Papadavid
- K. Moraiti (external - RTD Talos)

Crops

- ❖ olives
- ❖ grapes
- ❖ wheat
- ❖ barley
- ❖ potatoes
- ❖ tomatoes



Total utilized agricultural area (UAA) covered (48%)

Identification, evaluation and selection of adaptation measures

4

Deliverable C2.1:
Review and evaluation of the available options, guidelines and plans for adapting agriculture to climate change

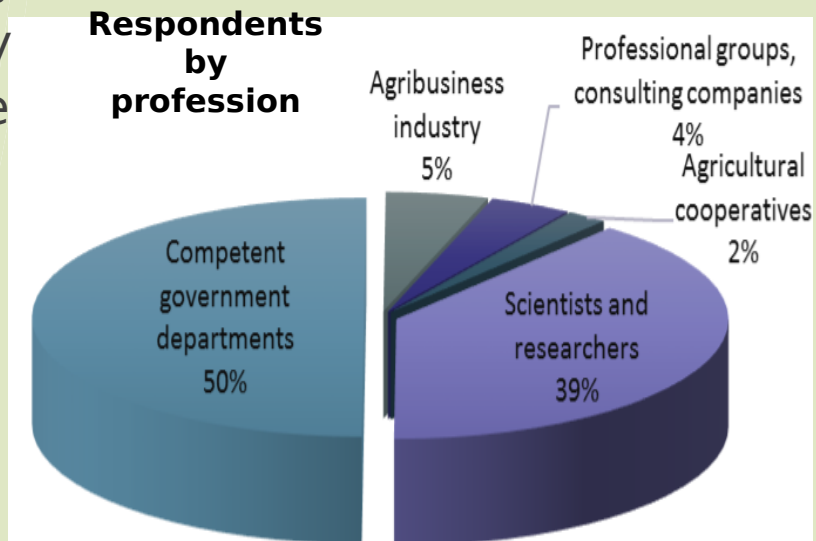
Introduction		Respondent information		Criteria				
No	Climate change impact	Measure	Efficiency of the measure	Urgency of implementing the measure	Usefulness of implementation irrespective of climate change	Technical difficulty	Contribution to climate change adaptation	
			100 - More efficient 1 - Less efficient	100 - More urgent 1 - Less urgent	100 - More useful 1 - Less useful	100 - More difficult 1 - Less difficult	100 - More significant 1 - Less significant	
4/05	Drought stress	Applying deficit irrigation strategies (e.g. regulated deficit irrigation) in olive groves						
5/05		Applying conservation tillage combined with vegetation cover in row-middle floors during winter and mulching it at the beginning of spring in olive groves						
6/05		Applying deficit irrigation strategies (e.g. regulated deficit irrigation, partial root drying or sustained deficit irrigation) in vineyards						
7/05		Applying the principles of conservation agriculture in rainfed cereals						
8/05		Applying zero tillage and early sowing in wheat/barley crops						
9/05		Strengthen on-farm water harvesting						

A. Adaptation measures

- 35 adaptation measures selected - bibliographic research
- 5 main climate change impacts: (a) drought stress, (b) heat stress, (c) decreasing plant health, (d) extreme weather events, (e) reduced crop productivity)
- Multi-Criteria Analysis (MCA) tool

B. Evaluation Criteria

1. Efficiency of the measure
2. Urgency of implementing the measure
3. Usefulness of implementation irrespective of climate change
4. Contribution to climate change adaptation
5. Technical difficulty
6. Economic viability
7. Social acceptance



No.	Recommended Adaptation measures	Efficiency (E)	Contribution (C)	Index
1	Use of efficient irrigation systems and schedules	4,36	3,85	4,11
2	Improvement of agricultural advisory and external services for building resilience to climate change	3,90	3,60	3,75
3	Strengthen on-farm water harvesting	3,75	3,60	3,68
4	Strengthen local institutional support for promotion of adaptation measures	3,86	3,45	3,66
5	Breeding drought/heat resistant/tolerant varieties	3,80	3,45	3,63
6	Development/improvement of early warning systems	3,90	3,30	3,60
7	Applying supplementary irrigation at critical periods of the cropping season in rainfed crops	4,10	2,96	3,53
8	Use of heat-resistant grape varieties	3,71	3,30	3,51
9	Applying deficit irrigation strategies (e.g. regulated deficit irrigation) in olive groves	3,63	3,28	3,46
10	Intercropping with legumes	3,65	3,20	3,43
11	Use of local cereal landraces and/or local vegetable and tree varieties	3,60	3,08	3,34
12	Applying principles of Integrated Pest Management (IPM)	3,65	2,95	3,30
13	Development of a data base with long-term monitoring data of population dynamics of main pest and disease of study crops at project areas	3,49	3,08	3,29
14	Breeding early maturing potato varieties for shorter rainy seasons	3,31	3,14	3,23
15	Strengthen increased diversity of cultivars or crops (diversification)	3,34	3,09	3,22
16	Relocating vineyards to higher elevations or higher latitude that are presently cooler	3,45	2,90	3,18
17	Development of pest risk analysis model for the project areas	3,27	2,95	3,11

Calculation of adaptation

Vulnerability
with
adaptation
(for each measure)

$$V_{TWA} = V_{TWOA} - A$$

$$A = (E + C) / 2$$

NOTE: Scores of criteria E and C are based on respondents' answers through questionnaire survey

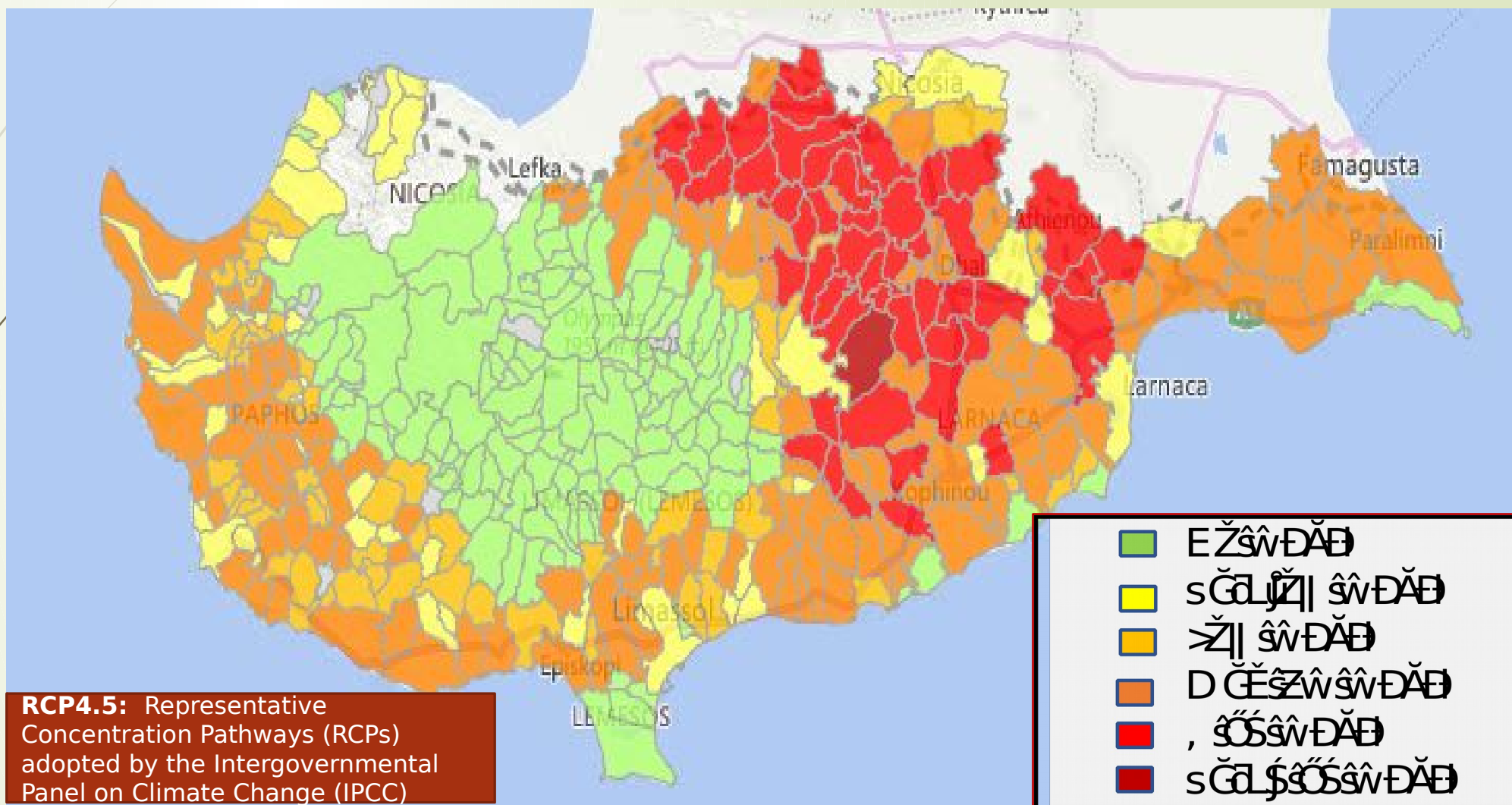
Examples of recommended adaptation measures per crop and climate change impact they address

Adaptation measures	Wheat/barley	Potatoes	Tomatoes	Olives	Grapes	Climate change impact	Index A
1. Use of efficient irrigation systems and schedules	X	X	X	X	X	Drought stress	4.11
2. Improvement of agricultural advisory and external services for building resilience to climate change	X	X	X	X	X	Total impact	3.75
3. Development/improvement of early warning systems	X	X	X	X	X	Extreme weather events	3.60
4. Development of a data base with long-term monitoring population dynamics of main pest and disease for study crops	X	X	X	X	X	Decreasing plant health	3.29
5. Use of heat-resistant grape varieties					X	Heat stress	3.51
6. Intercropping with legumes	X	X				Reduced crop productivity	3.43

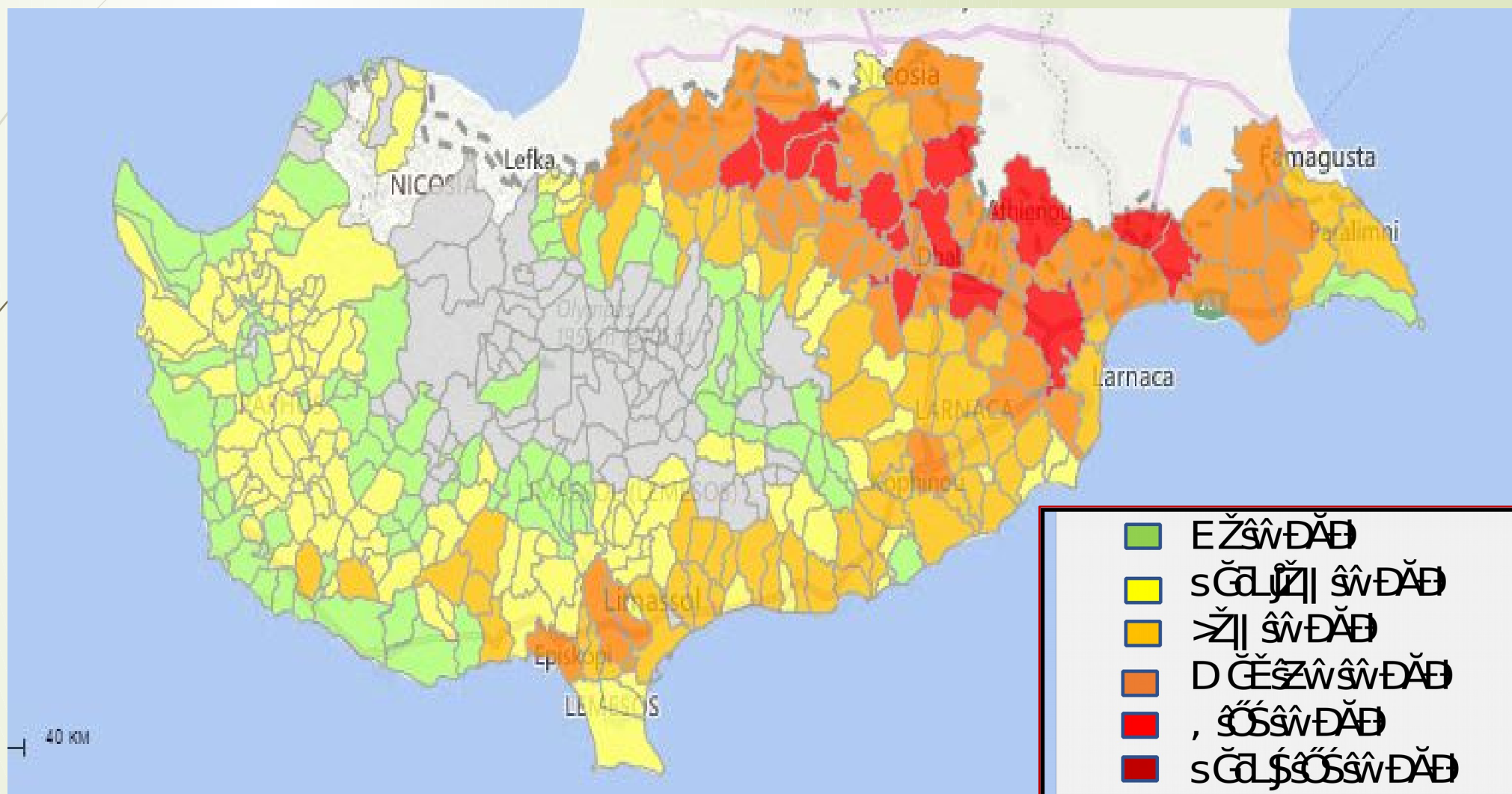
Other information used in Adaptation Strategy

- Future projections on climatic indices with particular relevance to agriculture for the three islands and for each agricultural pilot area (Deliverable C3)
- Estimation of future climate change impacts on the water resources of Cyprus, Crete and Sicily (Deliverable C4.1)
- Use of crop models for assessing the vulnerability of agriculture to climate change (Deliverable C4.2)
- Output of the Adapt2clima tool (maps w/o adaptation)

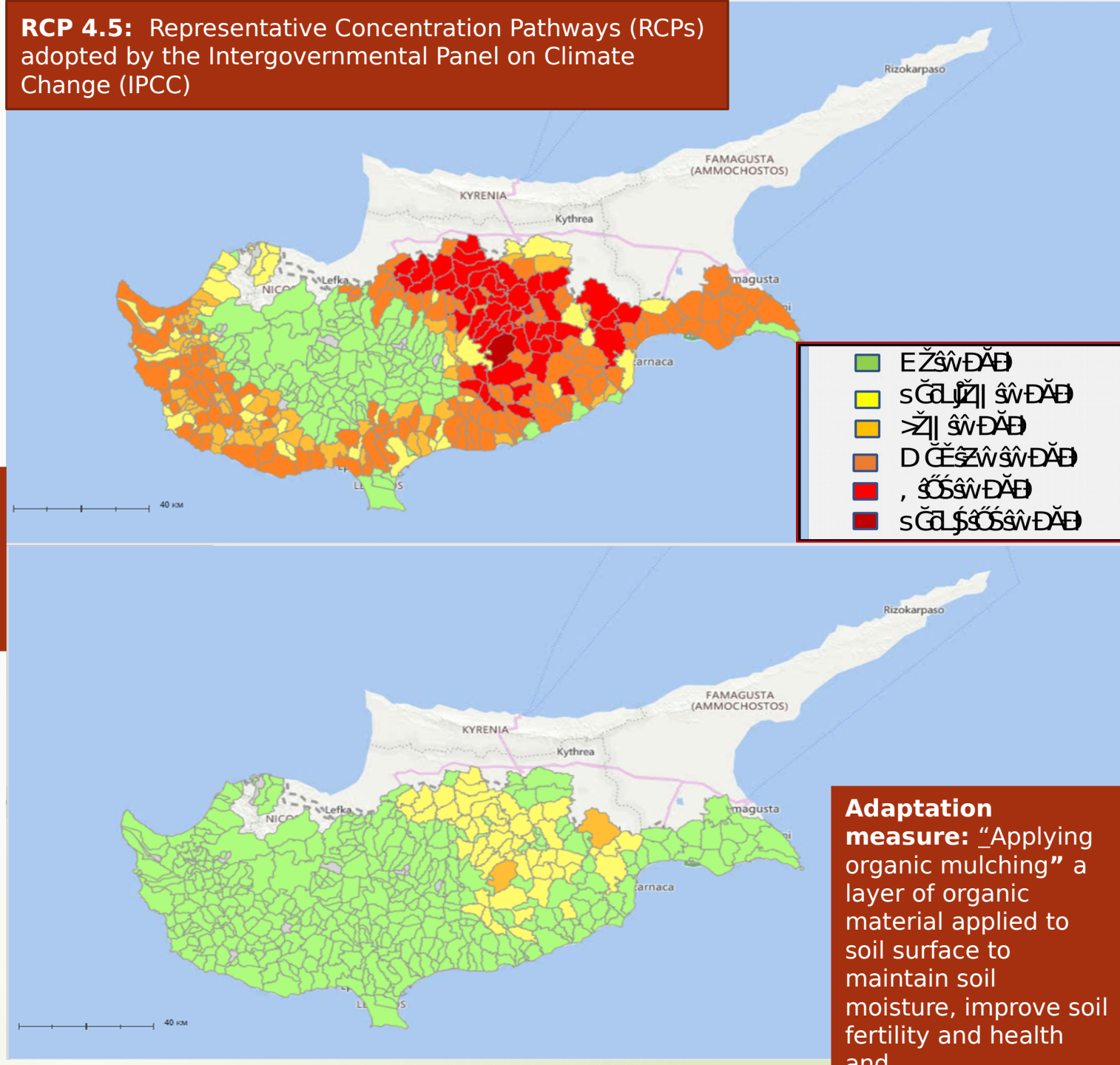
Total impacts with no adaptation - Olives - RCP 4.5



Total impacts with no adaptation - Barley - RCP 8.5

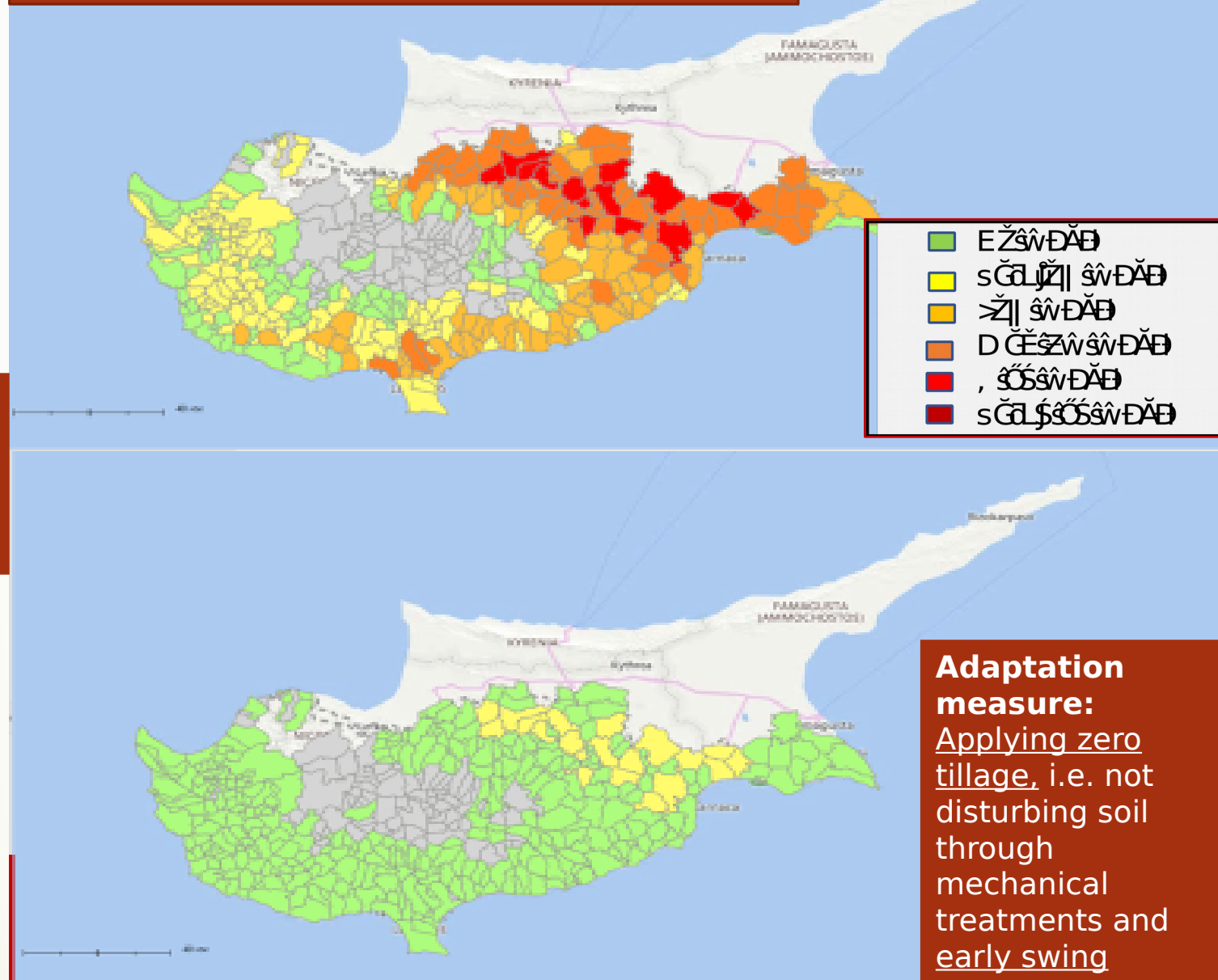


Example 1: Total impact without and with adaptation - olive trees



Example 2: Total impact without and with adaptation - barley

RCP 8.5: Increasing emissions scenario



Contents of Adaptation Strategy for Agriculture

- Chapter 1: Introduction, including methodology for the total impact assessment.
- Chapter 2: Assessment of exposure and vulnerability - data taken into account for calculation of exposure and vulnerability indicators.
- Chapter 3: Climate change projections - methodology used for climate change projections and significant results for temperature and precipitation indices for Cyprus.
- Chapter 4: Future water resources availability assessment and significant results on future water availability in Cyprus pilot areas (Kiti, Xylofagou, Pegeia and Acheleia).
- Chapter 5: Impacts per crop (wheat, barley, tomatoes, potatoes, olives and grapes) and each scenario.

Contents of Adaptation Strategy for Agriculture

- Chapter 6: Total impact assessment for each crop and scenario
- **Chapter 7: Adaptation plan with measures per crop and climatic scenario, implementation timeline and potential funding sources.**
- **Chapter 8: Strategy for efficient water use in Agriculture, including suggestions for integrating the outcomes of Adapt2clima to the River Basin Management Plans and the National Strategy on Adaptation to Climate Change.**
- **Chapter 9: Monitoring Plan. Follow up implementation strategy to assess if established objectives have been achieved (adaptation measure, progress indicator, target, expected output).**

Stakeholder involvement

- ▮ Steering Committee meeting - 03/04/2019
Adapt2clima tool presented to stakeholders to get their feedback and calibrate the tool.
- ▮ Adapt2clima tool is available to users to test its functionality.
- ▮ Three training sessions / workshops on using Adapt2clima tool will be organized (September 2019).
- ▮ National Adaptation Strategy (NAS) of Cyprus available for public consultation. Stakeholders will be invited to submit their comments/ feedback (September 2019).

Remaining actions to final adoption

- Draft National Adaptation Strategy will be launched for public consultation at least for four (4) weeks - scheduled 09/2019.
- The response of the competent Authority (Department of Environment, Ministry of Agriculture, Rural Development and Environment) on questions raised during public consultation will be published 2 weeks after the end of the public consultation (expected mid October 2019)
- The Department of Environment will review the final draft of Adaptation Strategy and advice respectively the Minister of Agriculture, Rural Development and Environment.
- A Ministerial Decision adopting NAS by the end of 2019.

Concluding remarks

- ▮ Climate change affects the entire socio-economic aspects of life.
- ▮ Agriculture considered the most severely affected sector by climate change, due to its exposure to weather conditions.
- ▮ Certain adaptation measures could be implemented to increase resilience of agriculture to climate change.
- ▮ Only a few MS (France, Spain, Finland and Malta) are at stage 4 of adaptation, meaning that a portfolio of adaptation measures has been identified and some measures launched (results of the European Environment Agency self-assessment survey).
- ▮ Adapt2clima project assists participated regions to elaborate and implement National Adaptation Strategies for climate change
- ▮ Involvement of stakeholders in the development of Adaptation Strategy is important - they play a key role in the implementation of adaptation measures.



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Thank you for your attention!

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