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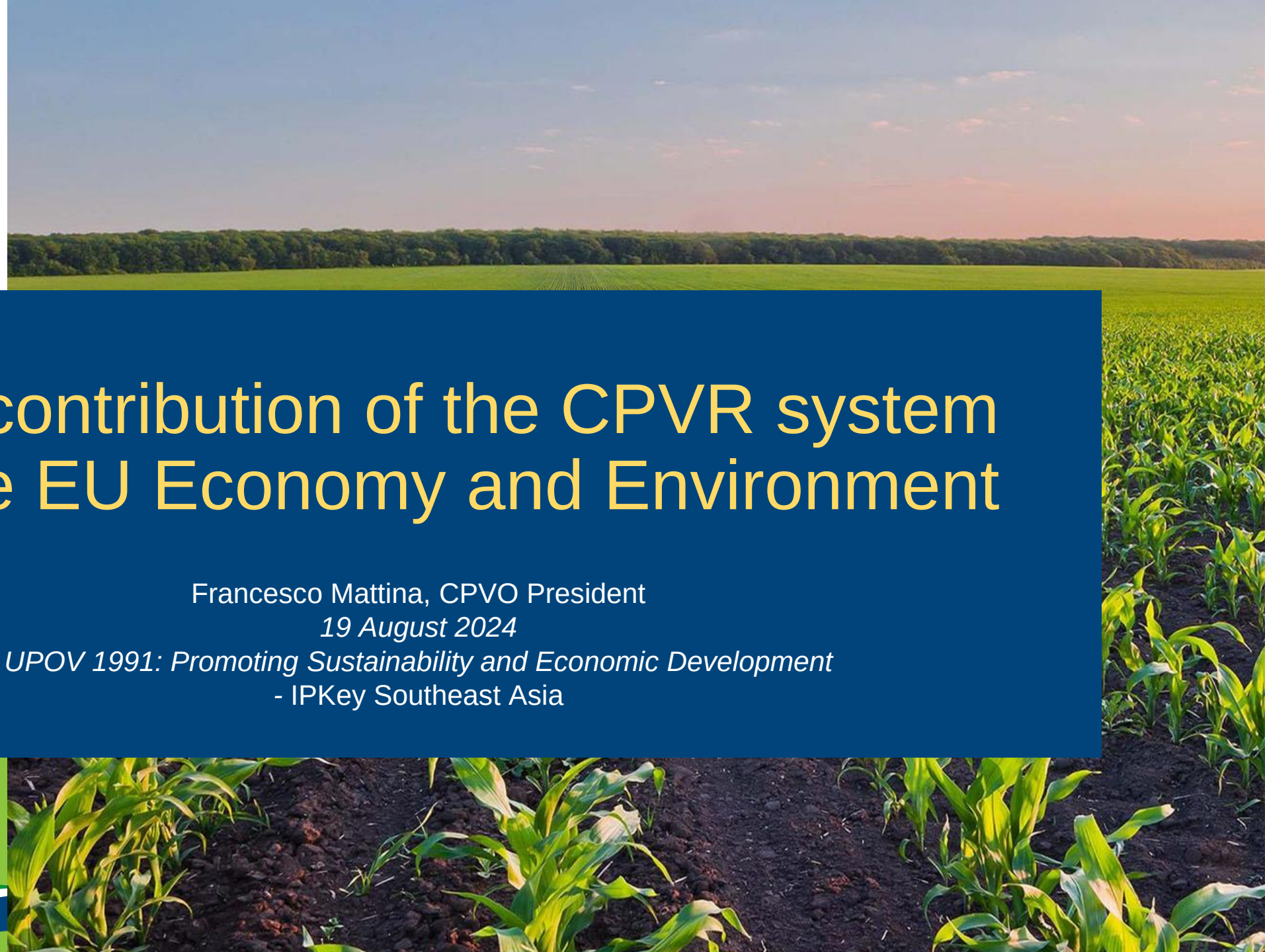

The contribution of the CPVR system to the EU Economy and Environment

Francesco Mattina, CPVO President

19 August 2024

UPOV 1991: Promoting Sustainability and Economic Development

- IPKey Southeast Asia

Outline

- General remarks of the study on impact of the CPVR system
- The impact of CPVR system on EU Economy
- The Impact of CPVR system on Environment and Society
- Final Considerations

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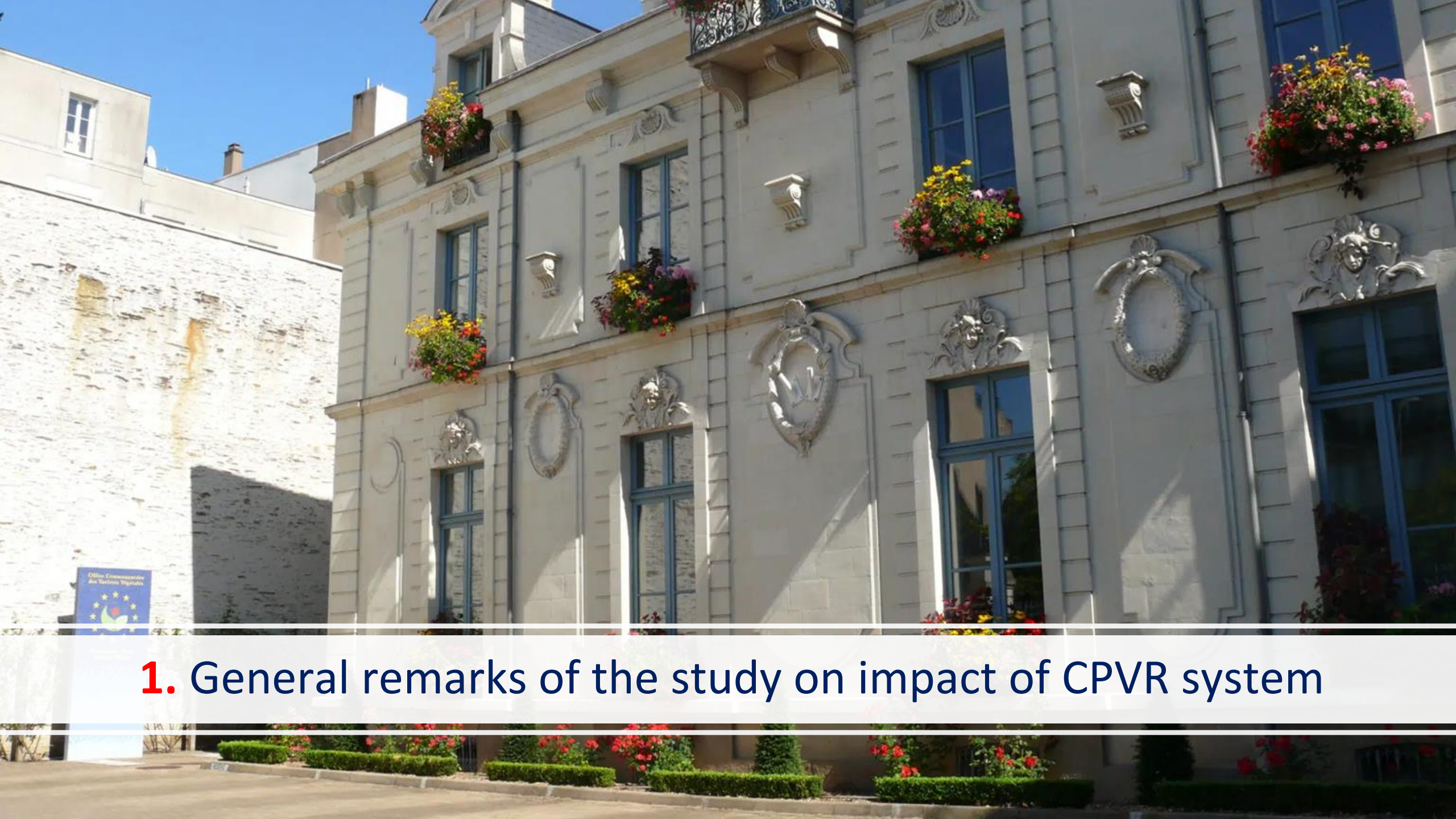


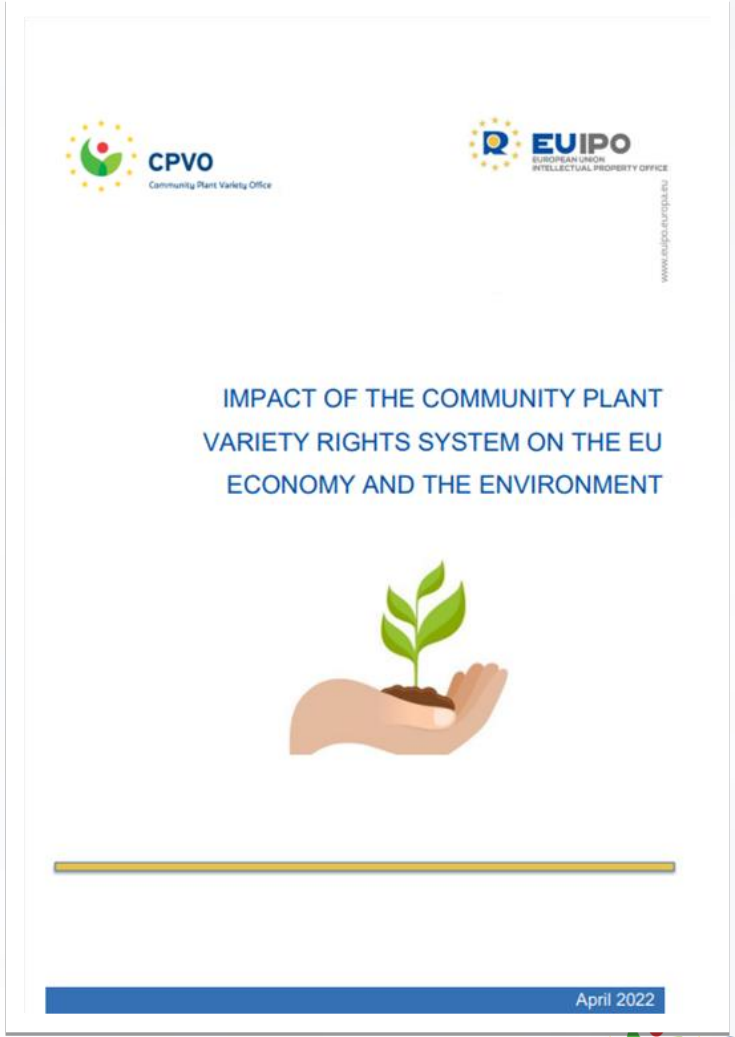
1. General remarks of the study on impact of CPVR system

General remarks on the study

Published by European **Observatory** on Infringements of Intellectual Property Rights in cooperation with the CPVO

Released on 28th April in **CPVO Policy seminar**, under the French Presidency of the Council of the European Union

The study quantifies the economic contribution in the European Union of the CPVR system



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Structure of the study

1. Introductory chapter on CPVR and EU marketing
2. Literature review
3. Methodology and data
4. Quantitative results

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Methodology used for the study

Impact on Economy

- Calculated using a **computable equilibrium model**
- Considers the impact of **increased production** on:
  - Prices
  - Farm incomes
  - Overall economic output (via multiplier effects)
  - Employment
  - Impact on EU's trade with the rest of the world

Impact on Environment

- Considers the impact of **increased productivity due to innovation**
  - less imports from rest of the world
  - less land use in rest of the world
  - less water use
  - fewer greenhouse gas emissions
  - less biodiversity loss

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Sources of Quantitative Data for the Study

CPVO Register
National PVR Registers

National listings
Common Catalogue
FRUMATIS

PLUTO (UPOV)

OECD Variety list query

FAOSTAT (production, value and trade in agricultural products)

EUIPO registry and TMView

PATSTAT and PINTO databases

ORBIS (demographic and financial data on breeders)

EUROSTAT:
- Structural Business Statistics
- Economics Accounts for Agriculture
- Labour Force Survey

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Scope of study: crops accounting for >80% of CPVRs

Agricultural

- Wheat
- Corn
- Barley
- Other cereals
- OSR
- Sunflower
- Other oilseeds
- Sugar beet
- Potato
- Pulses
- Ryegrass

Fruit

- Peach
- Strawberry
- Apple
- Wine/grape
- Apricot
- Blueberry
- Raspberry
- Plum
- Cherry

Vegetables

- Lettuce
- Tomato
- Pepper
- Melon
- Bean
- Pea
- Cucumber
- Cabbage
- Onion
- Spinach
- Endive
- Leek

Ornamentals

Treated as one combined crop due to the large number of varieties

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Indicators on impact of CPVR system

The fact that breeders do not protect varieties unlikely to be successful would confirm that the **number of applications and titles are good indicators of the benefits of a PVP system**.

[UPOV 2005 report on impact of PVP]

Breeders' perspective

Significant costs for breeders acceptable only if:

- Tangible market value

- Return in form of royalties

Growers' perspective

Choice: protected vs free varieties

- Payment of **royalties** acceptable only for **superior varieties**

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2. CPVR Impact on Economy

Pic: © Wageningen

Impact if plant breeding progress had not occurred

Impact if plant breeding progress (1995-2019) had not occurred:

- the quantity of crops that would not have been produced
- the hypothetical missing volume attributable to protected varieties

Advantages of a PVP system are made visible by disadvantages of the absence of a PVP system!

In the absence of the CPVR system, in 2020 the production in the EU would be:

- 6.4% lower for agricultural crops;
- 2.6% lower for fruits;
- 4.7% lower for vegetables;
- 15.1% lower for ornamentals.

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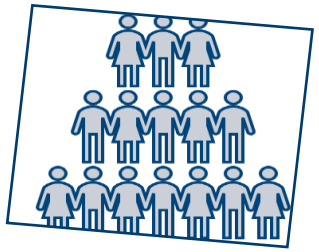
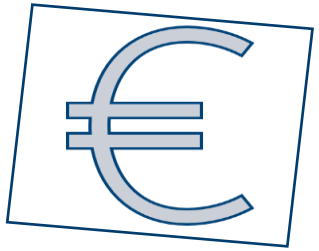
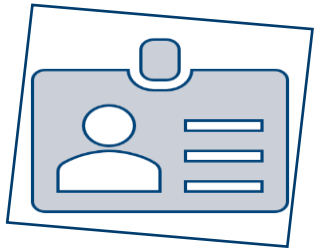
Key findings: economic contribution



The additional production brought about by EU-protected plant variety innovations is sufficient to feed (worldwide): an additional **57 million** people with arable crops, **38 million** with fruit crops, and **28 million** for vegetable crops



The additional added value (GDP contribution) generated by EU PVR-protected crops amounts to **13 billion EUR**



Additional production resulted in higher employment rates in the EU agriculture, and better remunerated

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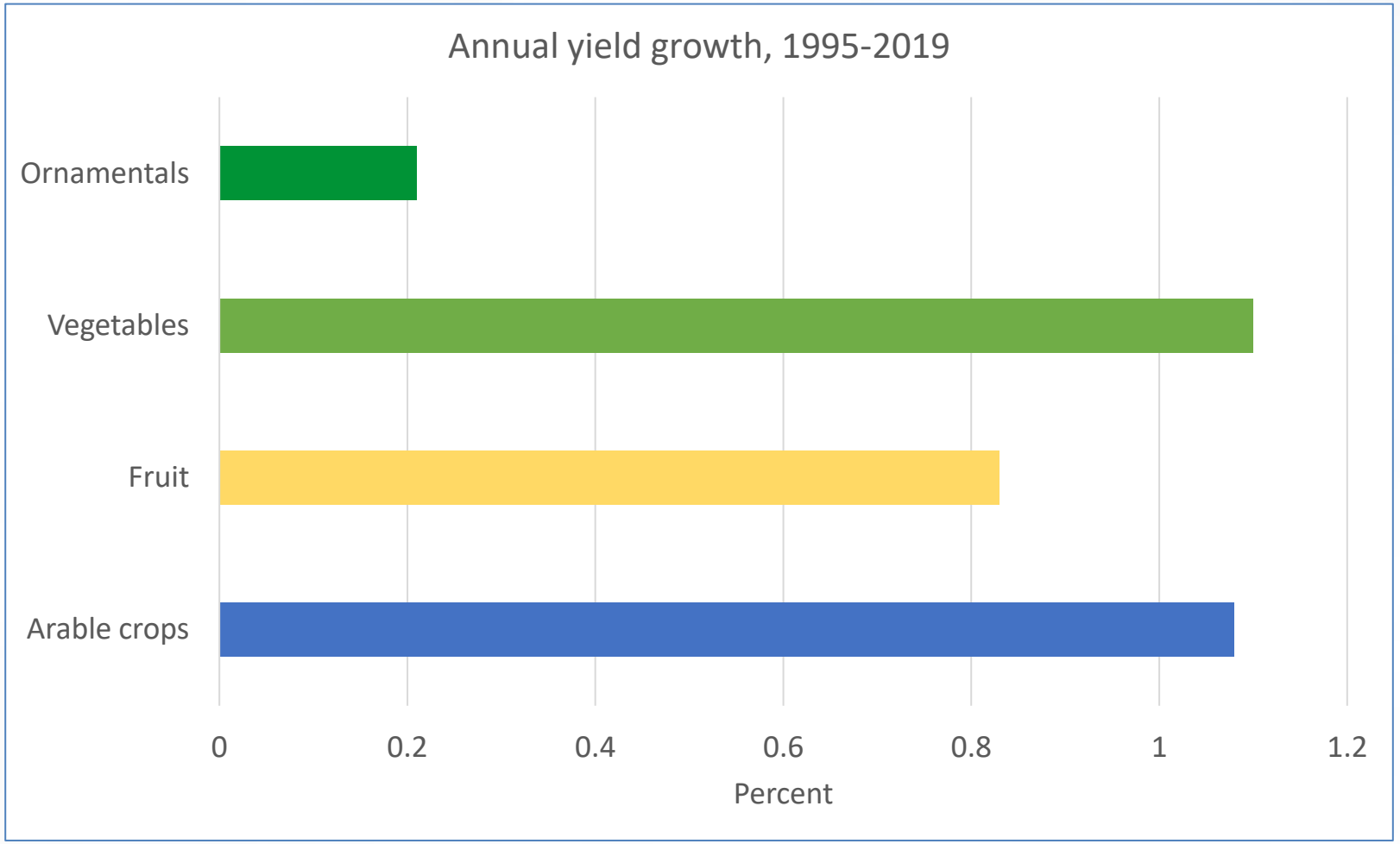
Annual yield growth for crops in the EU (1995-2019) (% per year)



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INPUT USE: DECLINING

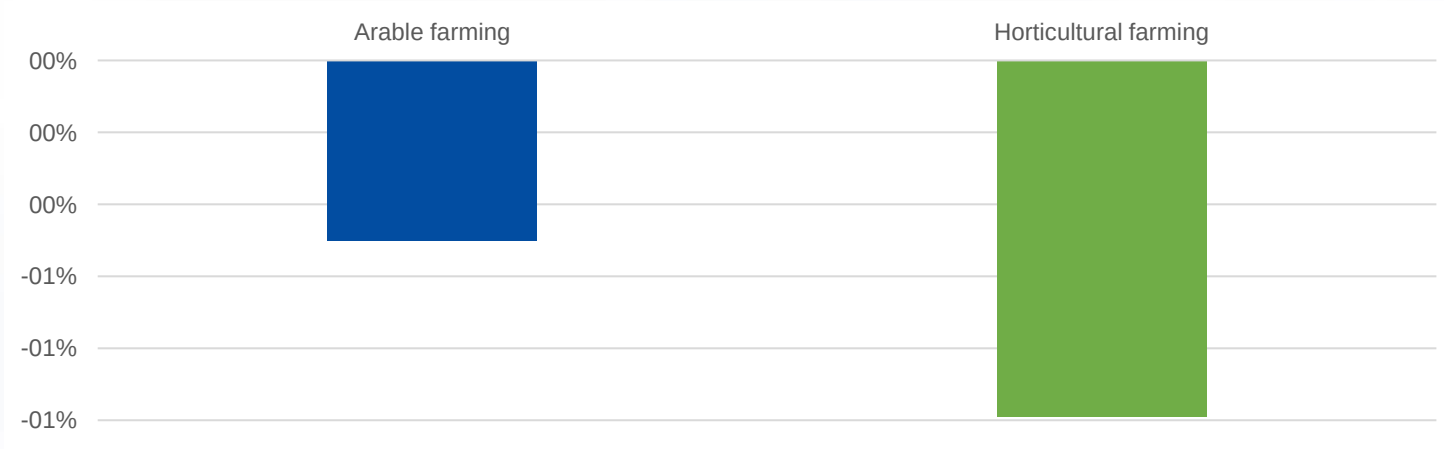
Growth rates of input use (per hectare) for EU agricultural and horticultural farming (1995-2019) (% per year)

"Agricultural Intensification" is factored out

(= increased input, e.g.: denser planting schemes, capital, labor etc.)

FARMING	SEEDS	FERTILISERS	PPP	LABOUR	CAPITAL
Arable	-0.20	-0.07	-0.60	-0.60	-0.44
Horticultural	-0.60	-2.30	-1.40	-1.00	-0.92

Annual growth rates of the overall input use (excluding land) in agricultural and horticultural farming of the EU (1995-2019)



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YIELD: INCREASING

Innovation-induced yield growth rates for crops in the EU (1995-2019) (% per year)

Subtracting the overall input use growth rate from statistically observable yield growth leads to crop-specific annual innovation-induced growth rate

CROP	GROWTH RATE	CROP	GROWTH RATE	CROP	GROWTH RATE
Wheat	1.43	OSR	1.20	Potato	2.40
Corn	1.72	Sunflower	2.74	Pulses	0.94
Barley	1.57	Other oilseeds	0.79	Green maize	2.30
Other cereals	1.41	Sugar beet	2.63	Ryegrass	1.29
CROP	**GROWTH RATE**	**CROP**	**GROWTH RATE**	**CROP**	**GROWTH RATE**
Peach	2.20	Wine/Grape	1.59	Raspberry	1.57
Strawberry	2.22	Apricot	3.79	Plum	3.49
Apple	2.28	Blueberry	2.42	Cherry	1.48
CROP	**GROWTH RATE**	**CROP**	**GROWTH RATE**	**CROP**	**GROWTH RATE**
Lettuce	1.47	Bean	1.84	Onion	4.09
Tomato	3.16	Pea	0.91	Spinach	1.27
Pepper	3.90	Cucumber	4.71	Endive	2.31
Melon	2.14	Cabbage	1.51	Leek	1.71

Ornamental crop (as a whole): 1.20

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Breeders' geographical origin in CPVRs

- 29.000+ CPVRs in force (beginning 2022)
- Largest share: EU countries (almost 77%)

	Country	% CPVR	number CPVR
NL	Netherlands	34.8	9,919
FR	France	17.0	4,837
DE	Germany	14.0	3,985
US	United States	6.7	1,911
CH	Switzerland	5.3	1,523
DK	Denmark	3.2	906
UK	United Kingdom	3.1	872
IT	Italy	2.7	783
ES	Spain	2.4	681
BE	Belgium	2.2	615
EU27	**European Union**	**76.9**	**22,669**
	Third countries	**23.1**	5,845

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- 93.5% of registrants of CPVRs are SMEs
- 60% of CPVRs are owned by SMEs
- SMES own each around 10 CPVRs

Size of CPVR holders

Size	% CPVR	% firms	Number of firms	CPVRs per firm
Physical persons	8.0	36.8	451	3.3
Micro firms	21.7	32.8	402	10.2
Small firms	11.5	15.5	190	11.4
Medium firms	18.8	8.5	104	34.2
Large firms	**40.0**	**6.5**	**80**	**94.8**
SME + Physical	**60.0**	**93.5**	**1 147**	**9.9**

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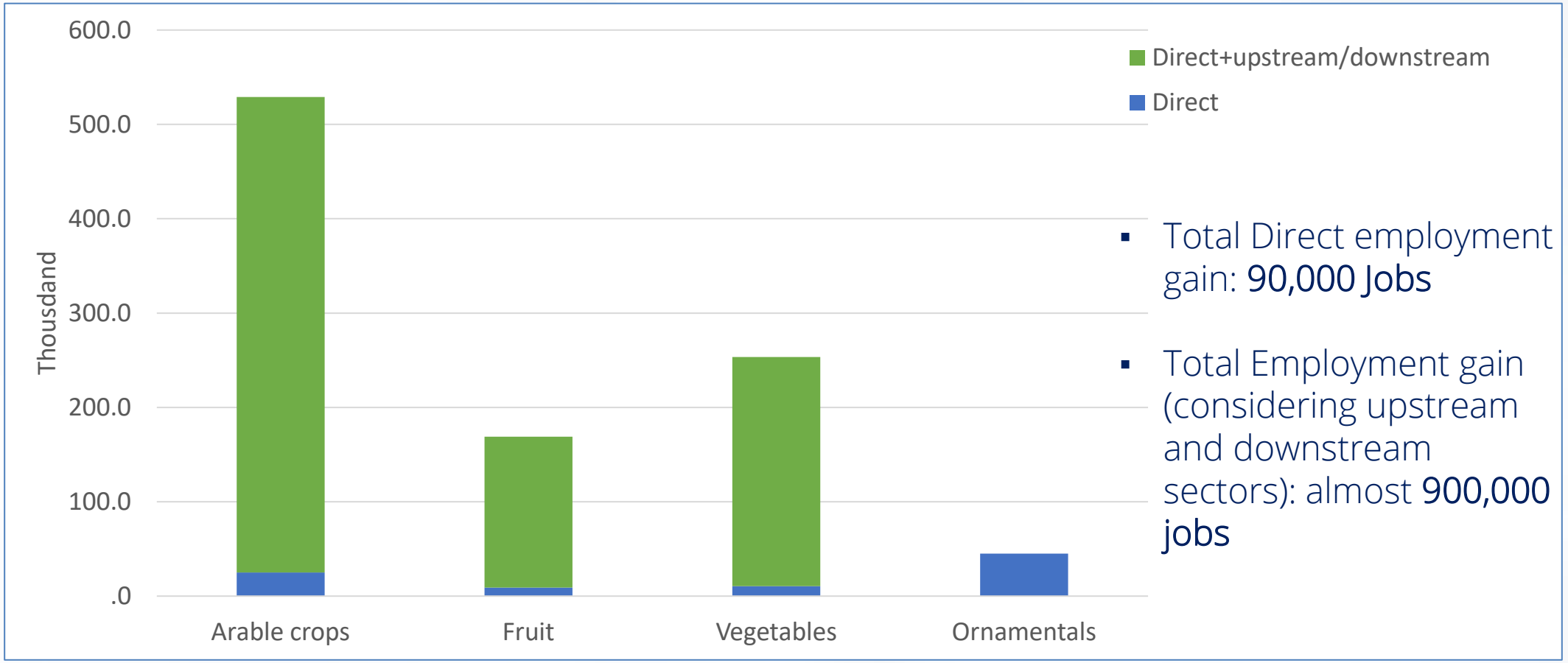
Contribution to Employment of CPVR-protected varieties



- Total Direct employment gain: **90,000 Jobs**
- Total Employment gain (considering upstream and downstream sectors): almost **900,000 jobs**

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- 951 CPVR holders have plant breeding as primary activity
- CPVR holders employ more than 70.000 workers and have an annual turnover of EUR 35 billion

Employment and Turnover rates of CPVR holders

sector	firms	employees	turnover (million €)
Agriculture (seed growing)	603	35,045	17,780
R&D (agricultural & biotechnology)	128	7,970	2,364
Royalties (PVR)	47	119	722
Wholesale (seeds)	173	27,590	14,552
Total	**951**	**70,725**	**35,418**

- Positive impact on wages:
  - Agricultural crop sector: +12.6%
  - Horticultural sector: +11%
- Positive impact on EU's trade balance
  - Without CPVR-protected innovation, the EU would become a net importer of some crops for which it is an exporter today

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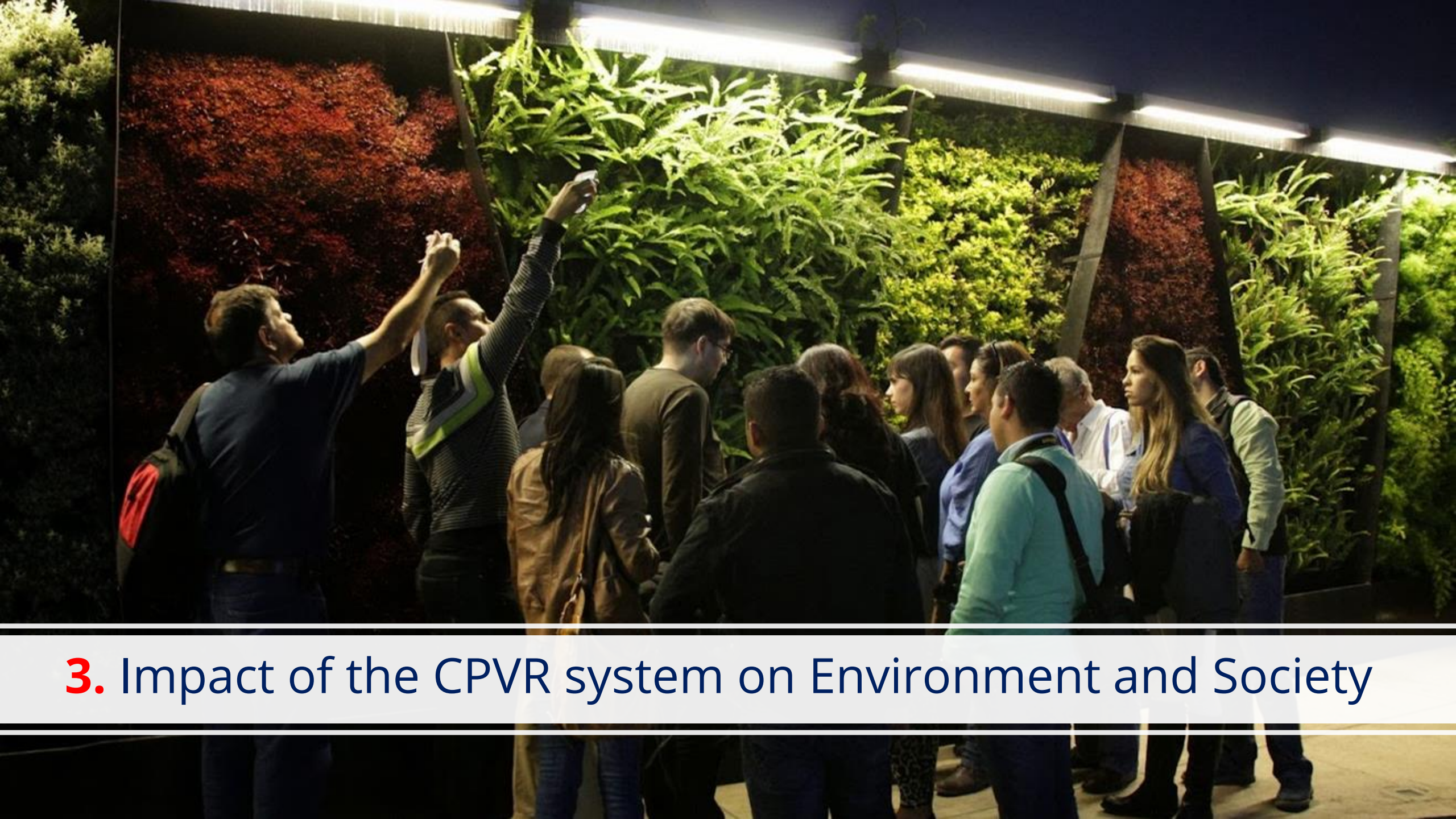
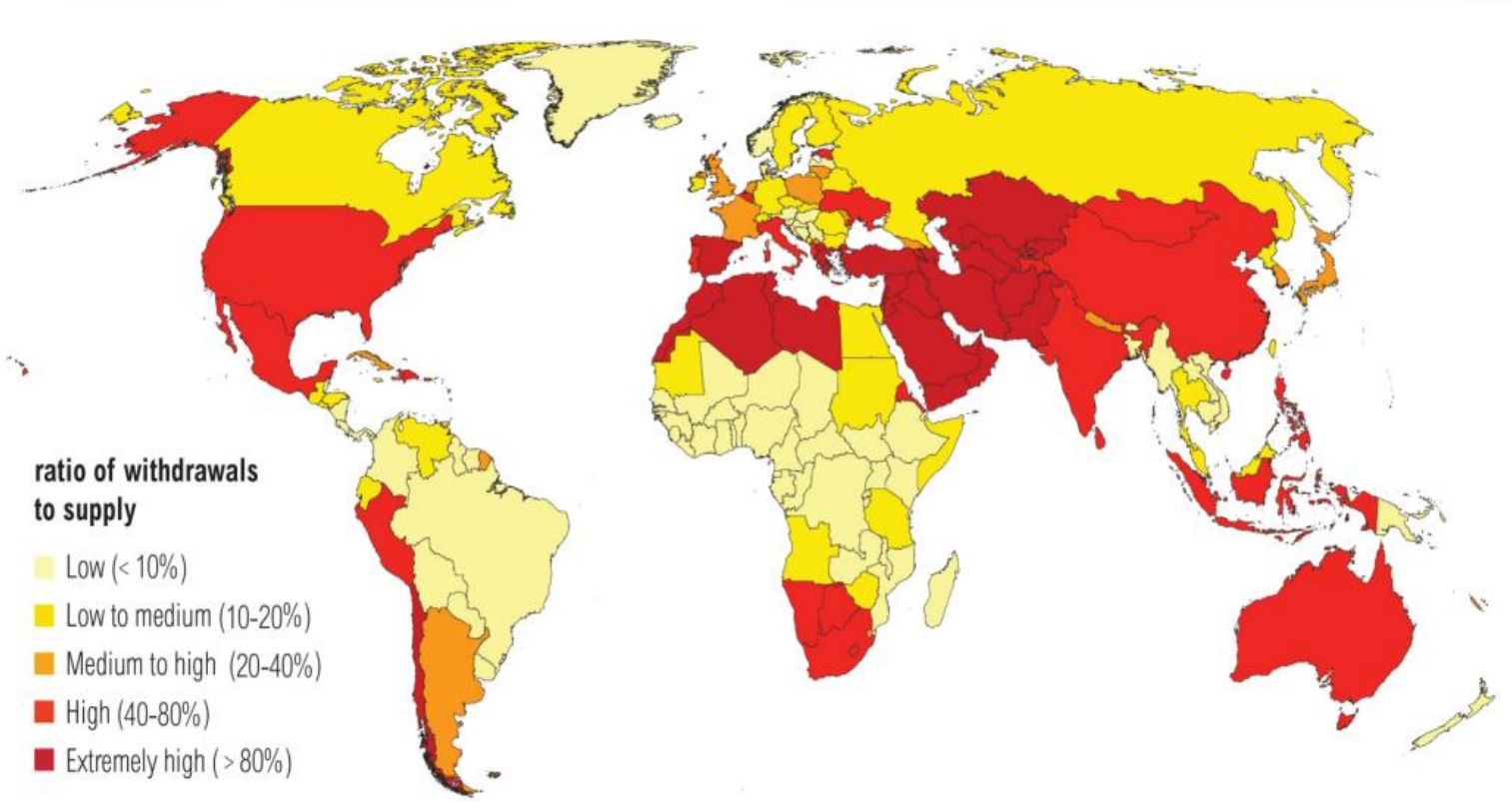


3. Impact of the CPVR system on Environment and Society

Water stress by country in 2040



NOTE: Projections are based on a business-as-usual scenario using SSP2 and RCP8.5.

For more: ow.ly/RiWop

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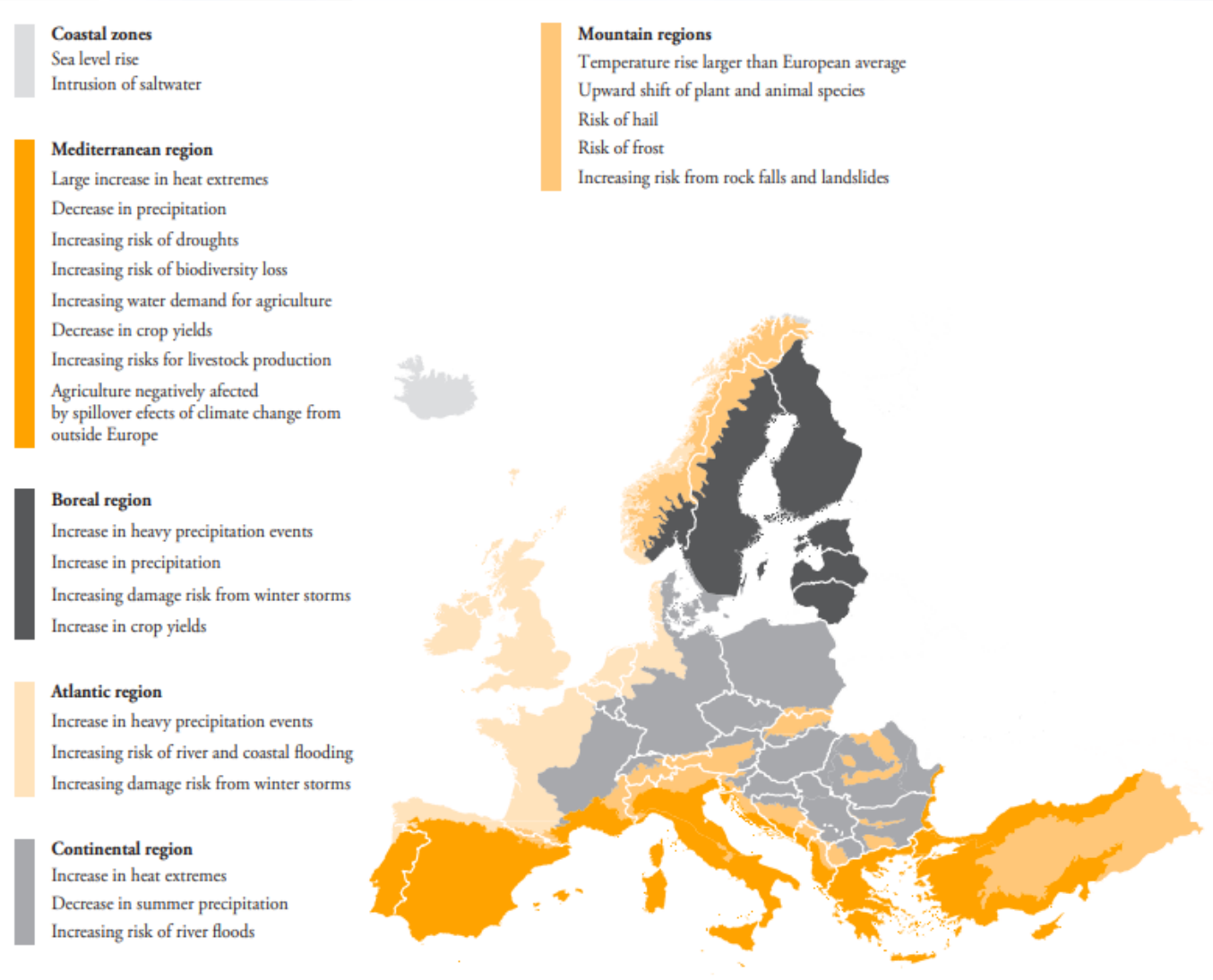
Need for **Climate change adaptation** in EU agriculture



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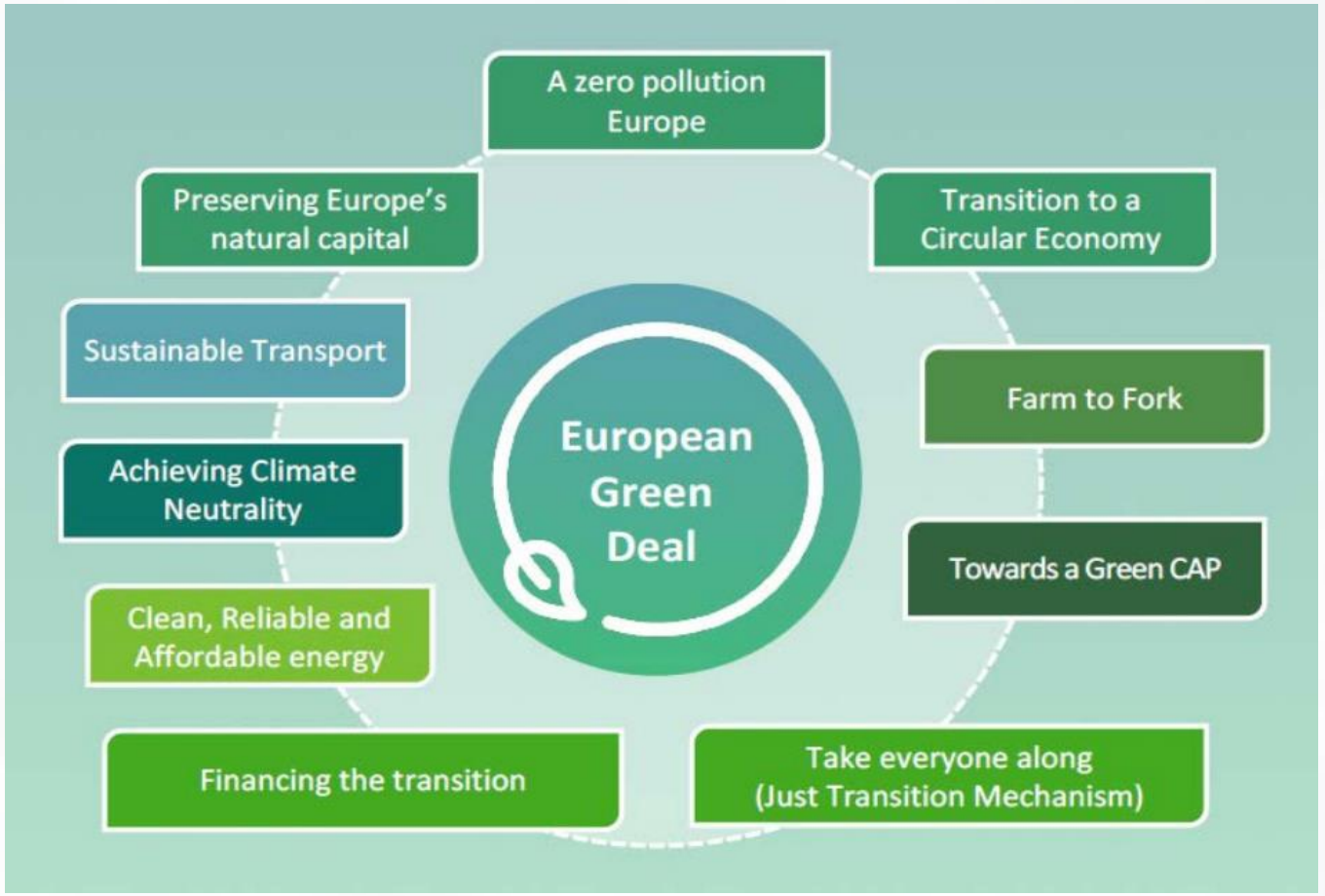
Commission's EU Green Deal
EU to become climate-neutral by 2050



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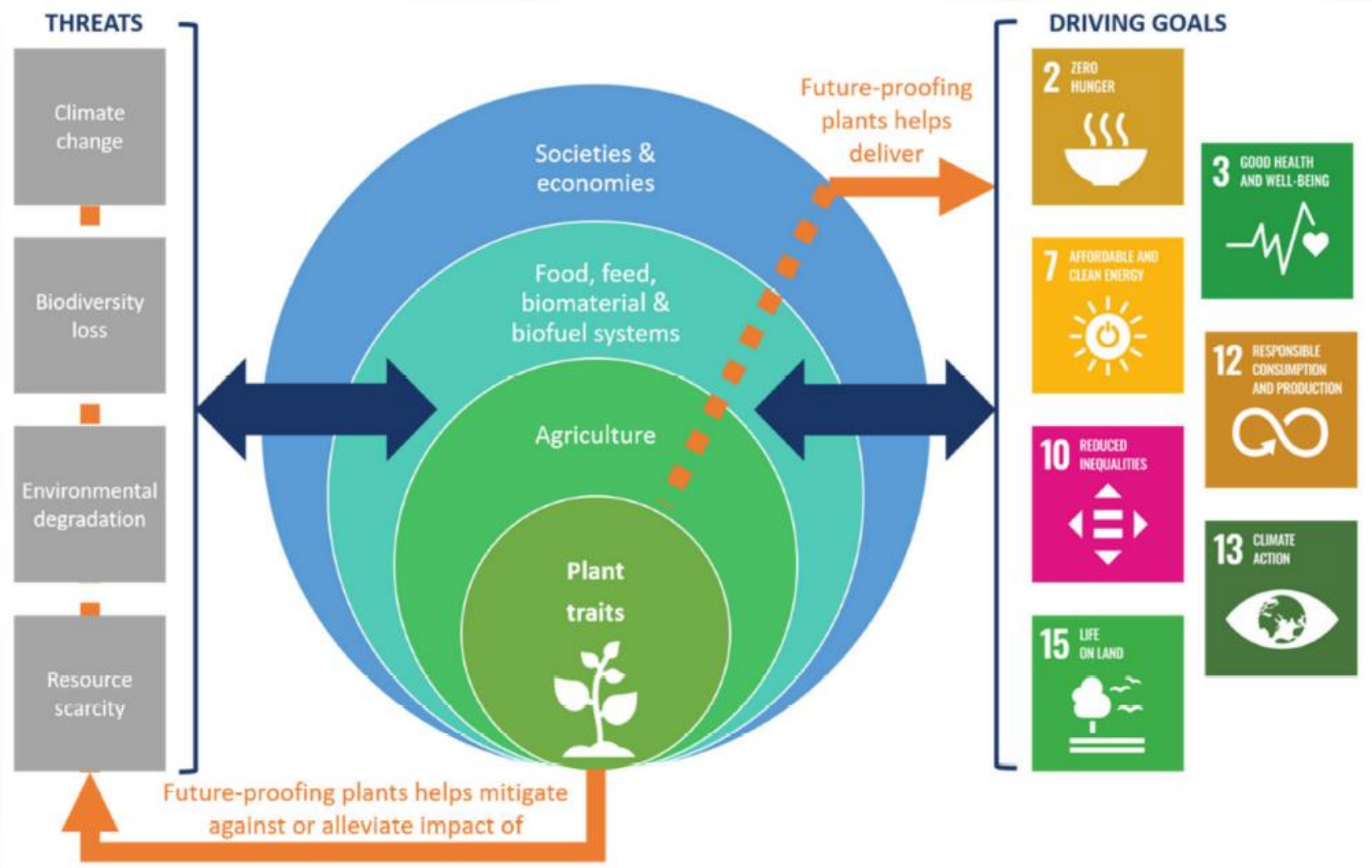
Plant variety innovation is part of the solution!



© Designing the Crops for the Future; The CropBooster Program, Harbinson et al, MDPI (2021)

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Contribution of the EU PVR system to **SDGs**

SDG 1
POVERTY REDUCTION

- Increased farm incomes
- More affordable food

SDG 2
ZERO HUNGER

- Increased food production

SDG 8
JOBS & GROWTH

- More jobs in agriculture & horticulture + in upstream & downstream industries

SDG 12
SUSTAINABLE PRODUCTION AND CONSUMPTION

- Growth in yields with less resource input

SDG 13
CLIMATE ACTION

- Reduced resource use and GHG emissions

SDG 15
LIFE ON LAND

- Release of new adapted varieties
- Preservation of land thanks to yield growth

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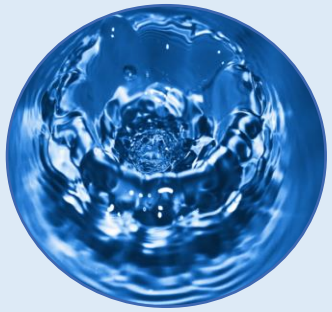
Key findings: **environmental objectives**

Annual Greenhouse Gas (GHG) emissions from agriculture and horticulture: reduced by **62 million tons** per year

= total **Portugal**'s GHG footprint



Water use in agriculture and horticulture: reduced by more than **14 billion m3**

= 1/3 of **Lake Constance's** volume

Land use and biodiversity: prevention of conversion of **6.5 million hectares of grassland** and natural habitats in the world

= size of **Ireland's** territory

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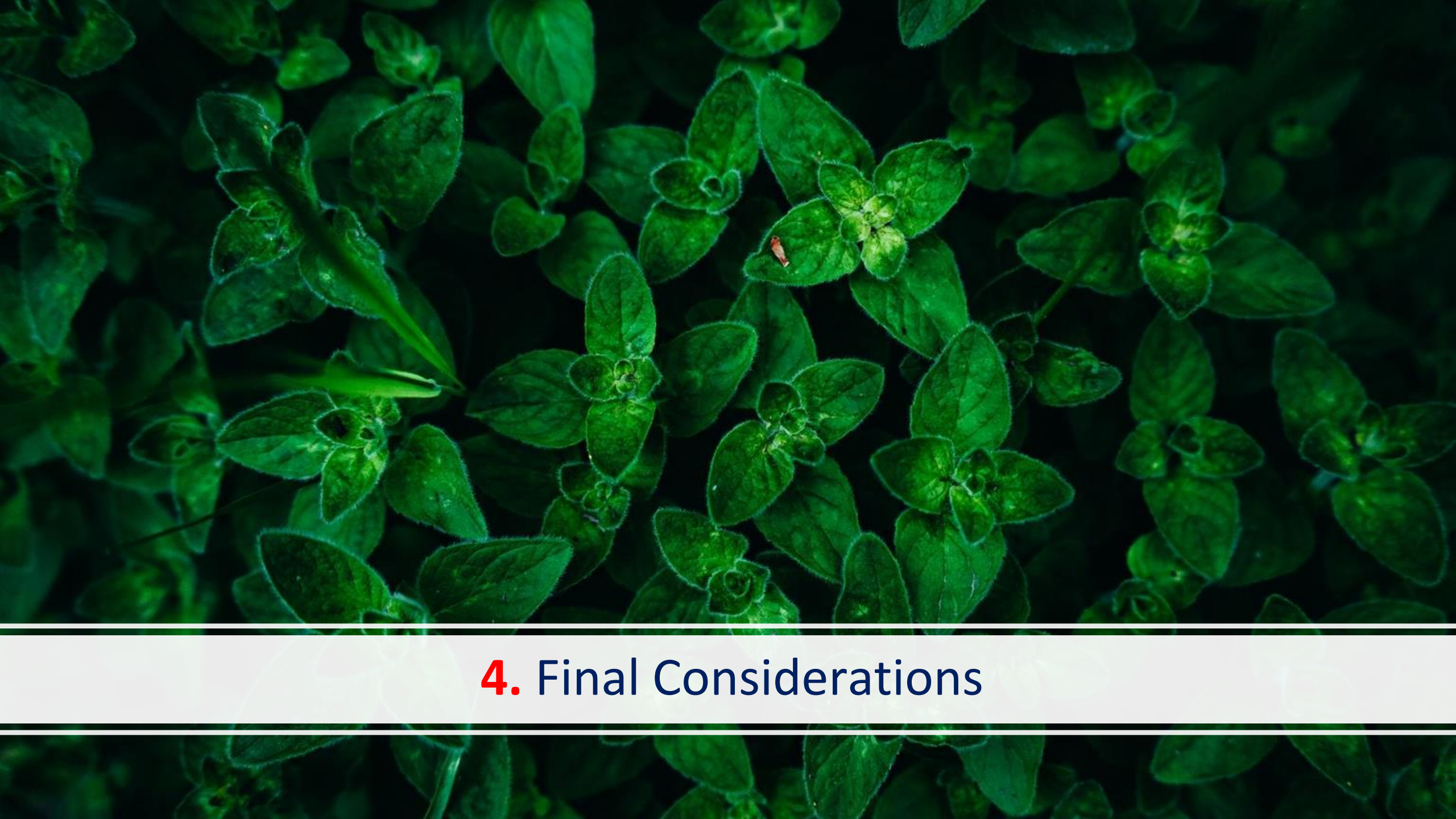

4. Final Considerations

Key findings: farmers, breeders, SMEs

Farmers/growers across the EU benefit from the innovations protected by the CPVR system

R&D by Breeders leads to innovations, employment and economic growth

SMEs and physical persons account hold 60% of CPVRs currently in force

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Final considerations

Plant variety innovation must support **low-input agriculture** and **better environmental protection**

Varieties should not only produce **higher yields** but also **be adapted to biotic and abiotic stresses**

In the context of **Climate Change: draught-resistance** and **less-water-input traits**

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Final considerations

Legislation must drive innovation to accelerate transition to sustainable inclusive food systems from primary production to consumption

EU legislative reforms foreseen:

- **CPVR system**
- **Plant Reproductive Material marketing**
- **Gene-Editing Regulatory framework**

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