CPVO

Community Plant Variety Office

The impact of protected new plant varieties in the European Union market

Orsola Lamberti, CPVO Legal Advisor

6 December 2022, IPR Helpdesk

European IP Helpdesk

- Service initiative of the European Commission
- Addressing **current and potential beneficiaries of EU-funded projects, researchers and EU SMEs**
- Free-of-charge first-line support on intellectual property (IP)
- Hands-on IP and innovation management support
- International pool of IP experts from various thematic fields
- Unique cooperation scheme with the Enterprise Europe Network: 44 ambassadors from 27 EU countries













The EC IP Helpdesks



EC IP (SME) Helpdesk Hub – Gateway to Information







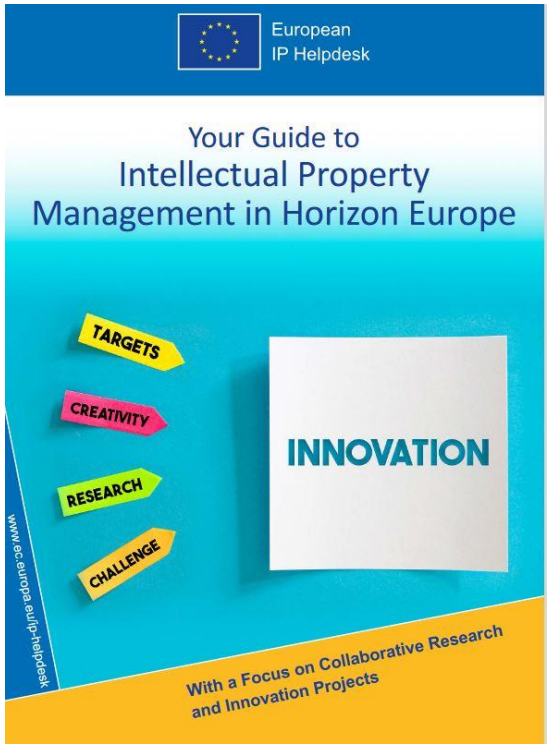






- E-learning modules & more
- Guides / Topic, country, sector-specific factsheets / Infographics
- Case studies

Your Guide to Intellectual Property management in Horizon Europe



- https://op.europa.eu/en/publication-detail/-/publication/43e0204c-6ed3-11ed-9887-01aa75ed71a1/language-en/format-PDF/source-276235204

Training cooperation with the Community Plant Variety Office and CIOPORA

CPVO
Community Plant Variety Office

CIOPORA

17 FEB 2022
TRAINING AND WORKSHOPS
EU - Webinar & CPVO coop: The essential role of Quality Auditing examination offices for EU Plant Variety Rights
Live streaming available

12 APR 2022
TRAINING AND WORKSHOPS
EU - Webinar CPVO Coop: Constraints and opportunities for edited varieties. Is the GMO legal framework impacting the creation of new plants?
Live streaming available

21 JUN 2022
TRAINING AND WORKSHOPS
EU Webinar - CPVO Coop Webinar: Introduction to Community plant variety rights: creation of new plants and their protection in the EU
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08 SEP 2022
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EU - Webinar CPVO Coop: The interface between plant variety rights and patents
Live streaming available

28 SEP 2022
TRAINING AND WORKSHOPS
EU - Webinar & CIOPORA coop: Growers' Guide to Intellectual Property Protection for Plants
Live streaming available

10 OCT 2022
TRAINING AND WORKSHOPS
EU - Webinar CPVO Coop: What's in a name: plant variety denominations and their interface with trademarks and geographical indications
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02 NOV 2022
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EU - Webinar CIOPORA coop: Enforcement practices for Plant Variety Rights in the EU
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TRAINING AND WORKSHOPS
EU - Webinar CPVO Coop: The impact of protected new plant varieties in the European Union market.
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Ambassador Scheme

- **Cooperation scheme** with the Enterprise Europe Network (EEN): 44 ambassadors – 27 countries
- **Building IP capacities** among European SMEs
- **Overcoming language barriers**
- Making the topic **more accessible**
- Exchange and feedback from ambassadors on **needs of SMEs**
- Local **awareness** and **training events**



Further learning opportunities:

1. European IP Helpdesk Ambassadors and EEN
2. EUIPO learning portal
3. EUIPO – Ideas Powered for business website
4. WIPO Academy / Diagnostics
5. The Ideas Powered for business SME Fund
6. IPA4SME
7. Horizon IP Scan
8. (IP Booster)
9. Horizon Results Booster
10. LeadershIP4SMEs
11. EPO Academy
12. 4IPCouncil







Horizon IP Scan

IP Support Service for SMEs in Collaborative EU-funded Research Projects





14 JUL 2022 — INFO DAYS — Horizon IP Scan - Info Session — Live streaming available

17 AUG 2022 — INFO DAYS — Horizon IP Scan - Info Session — Live streaming available

14 SEP 2022 — INFO DAYS — Horizon IP Scan - Info Session — Live streaming available

11 OCT 2022 — INFO DAYS — Horizon IP Scan - Info Session — Live streaming available

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www.horizon-ipscan.eu

Horizon IP Scan

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- www.ec.europa.eu/ip-helpdesk

- helpline@iprhelpdesk.eu
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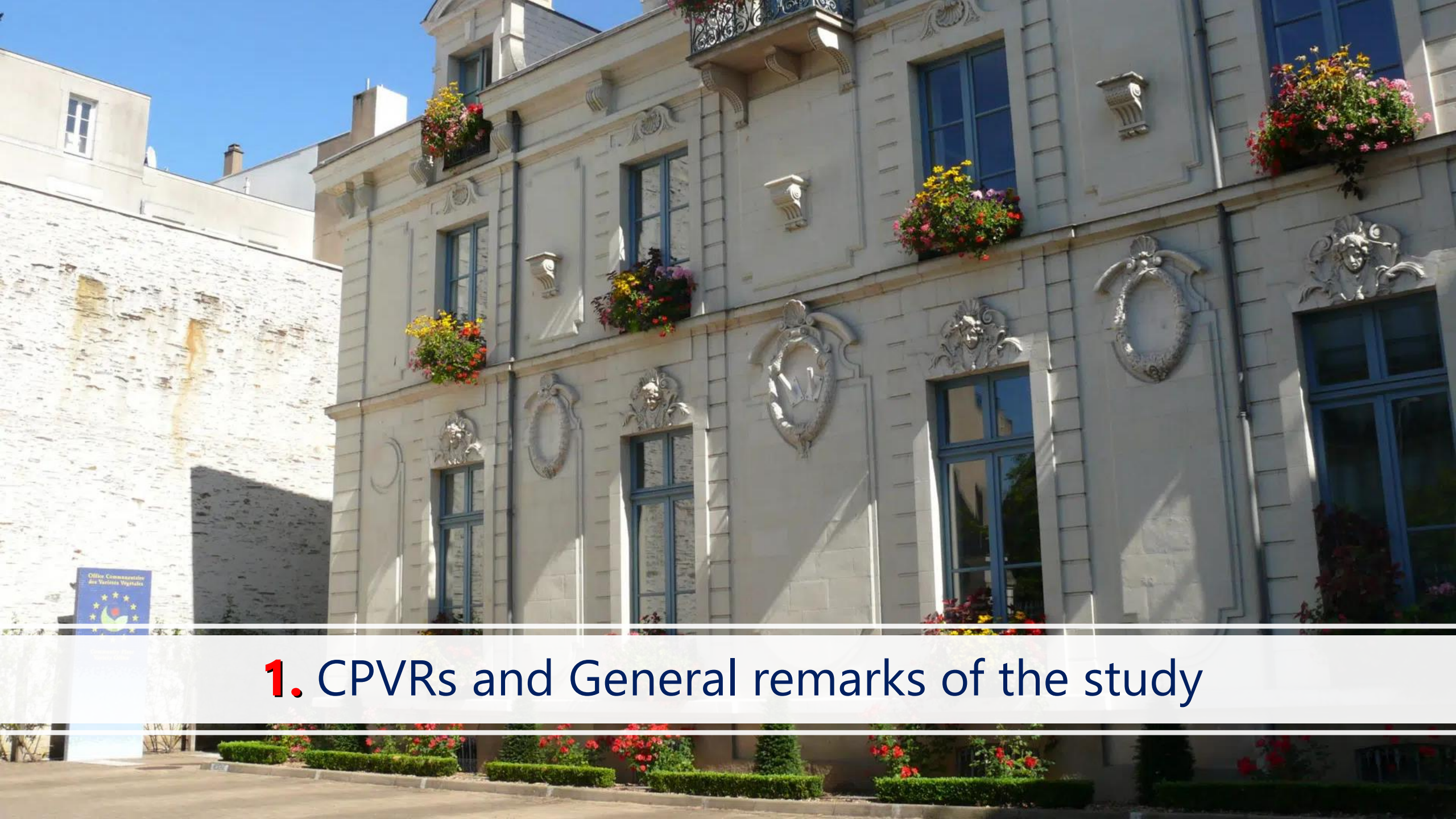
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Outline

1. CPVRs and general remarks on the study
2. The impact of CPVR system on EU Economy
3. The Impact of CPVR system on Environment and Society
4. Final Considerations

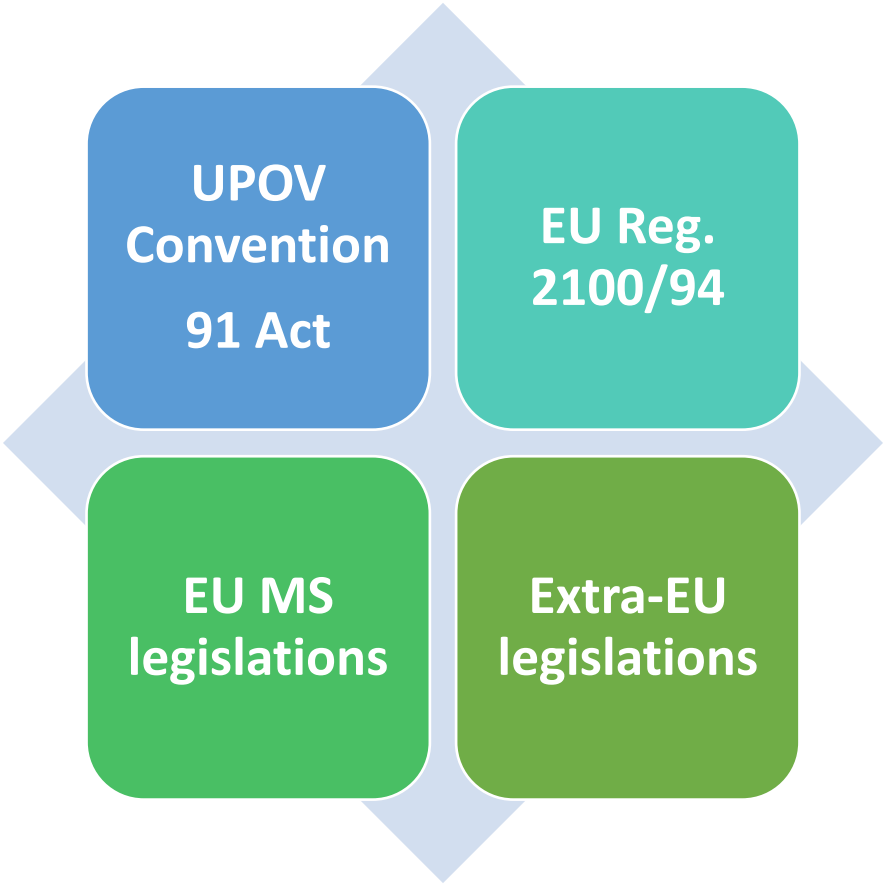


1. CPVRs and General remarks of the study

Plant Variety Rights in the EU



PVR system in the EU: legal framework



PVR system in the EU: characteristics



Sui generis system of PVP

Protection of innovative varieties (NOT traditional or amateur)

Based on UPOV (1991 Act)

Protection has a uniform effect throughout all Member States

Duration: 25 or 30 years

NOT a requirement for commercialisation (common catalogue)

PVR system in the EU: for what species ?

Varieties of all botanical genera and species may be protected

Applications for more than 2000 different species

Not limited to varieties to be grown in the European Union



General remarks on the study

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

Released on 28th April 2022, under the French Presidency of the Council of the European Union

Quantifies the economic contribution in the European Union of the CPVR system



CPVO - EUIPO study

The impact of the CPVR system on EU's economy & environment





Structure of the study

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

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



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

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

Agricultural	Fruit	Vegetables	Ornamentals
• Wheat • Corn • Barley • Other cereals • OSR • Sunflower • Other oilseeds • Sugar beet • Potato • Pulses • Ryegrass	• Peach • Strawberry • Apple • Wine/grape • Apricot • Blueberry • Raspberry • Plum • Cherry	• Lettuce • Tomato • Pepper • Melon • Bean • Pea • Cucumber • Cabbage • Onion • Spinach • Endive • Leek	Treated as one combined crop due to the large number of varieties









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



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:

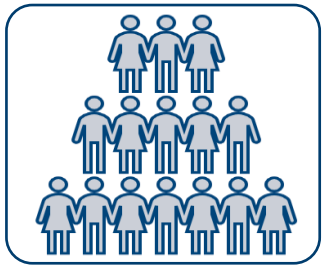
- the quantity of crops that would not have been produced
- the hypothetical missing volume attributable to protected varieties

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

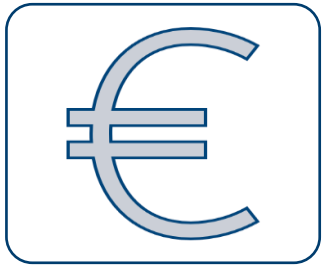
In the absence of the CPVR system, in 2020 the production in the EU would be:

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

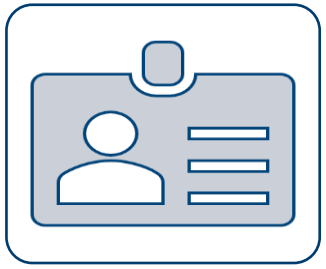
Key findings: economic contribution



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

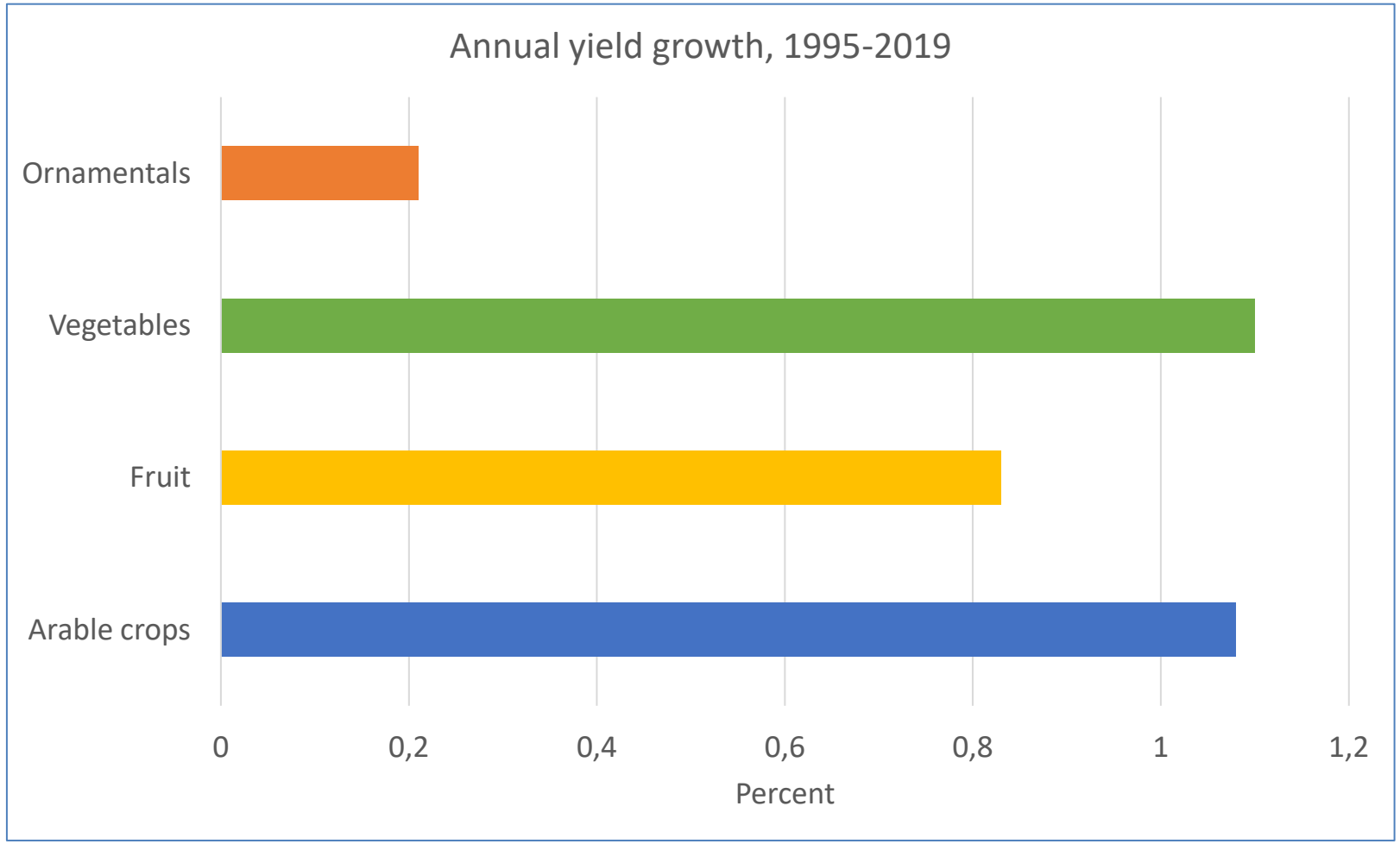


The additional added value (GDP contribution) generated by EU PVR-protected crops amounts to **13 billion EUR**



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

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



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)



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

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

Merging innovation-induced yield growth rates and plant breeding's shares in innovation-induced change

CROP	GROWTH RATE	CROP	GROWTH RATE	CROP	GROWTH RATE
Wheat	0.96	OSR	0.89	Potato	1.49
Corn	1.19	Sunflower	1.96	Pulses	0.62
Barley	1.09	Other oilseeds	0.56	Green maize	1.51
Other cereals	1.02	Sugar beet	1.60	Ryegrass	0.69
CROP	**GROWTH RATE**	**CROP**	**GROWTH RATE**	**CROP**	**GROWTH RATE**
Peach	1.29	Wine/Grape	0.93	Raspberry	0.92
Strawberry	1.31	Apricot	2.23	Plum	2.05
Apple	1.34	Blueberry	1.42	Cherry	0.87
CROP	**GROWTH RATE**	**CROP**	**GROWTH RATE**	**CROP**	**GROWTH RATE**
Lettuce	0.87	Bean	1.09	Onion	2.41
Tomato	1.86	Pea	0.54	Spinach	0.75
Pepper	2.30	Cucumber	2.78	Endive	1.36
Melon	1.26	Cabbage	0.89	Leek	1.01

Ornamental crop (as a whole): 0.71

Share of protected agricultural varieties to account for the effects of the PVP system

CROP	REGISTERED VARIETIES	EU-LEVEL PVR VARIETIES	SHARE
Wheat	4 137	1 401	33.9 %
Corn/Green maize	10 942	2 537	23.2 %
Barley	2 109	650	30.8 %
Other cereals	2 502	593	23.7 %
OSR	2 431	884	36.4 %
Sunflower	3 037	686	22.6 %
Other oilseeds	1 875	370	29.7 %
Sugar beet	2 901	115	4.0 %
Potato	2 146	1 057	49.3 %
Pulses	1 075	167	15.5 %
Ryegrass	1 318	260	19.7 %



Therefore, 25.3 % of all registered varieties of the arable crops that are the focus of this study are varieties with an EU-level PVR.

Share of protected fruit varieties to account for the effects of the PVP system

CROP	REGISTERED VARIETIES	EU-LEVEL PVR VARIETIES	SHARE
Peach	3 333	640	19.2 %
Strawberry	1 868	418	22.4 %
Apple	6 748	345	5.1 %
Wine/Grape	2 444	243	9.9 %
Apricot	1 069	199	18.6 %
Blueberry	412	129	31.3 %
Raspberry	709	138	19.5 %
Plum	295	83	28.1 %
Cherry	1 731	99	5.7 %



12.3 % of all registered fruit varieties are varieties with an EU-level PVR.

Share of protected vegetable varieties to account for the effects of the PVP system

CROP	REGISTERED VARIETIES	EU-LEVEL PVR VARIETES	SHARE
Lettuce	3 314	1329	40.1 %
Tomato	5 740	922	16.1 %
Pepper	2 967	383	12.9 %
Melon	1 540	284	18.4 %
Bean	1 807	245	13.6 %
Pea	1 523	369	24.2 %
Cucumber	1 664	220	13.2 %
Cabbage	3 050	332	10.9 %
Onion	1 359	194	14.3 %
Spinach	584	105	18.0 %
Endive	461	88	19.1 %
Leek	299	84	28.1 %



18.7 % of all registered varieties of the vegetables that are the focus of this study are varieties with an EU-level PVR.

Share of protected ornamental varieties to account for the effects of the PVP system

CROP	REGISTERED VARIETIES	EU-LEVEL PVR VARIETES	SHARE
Ornamentals	15 588	15 094	96.8 %



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

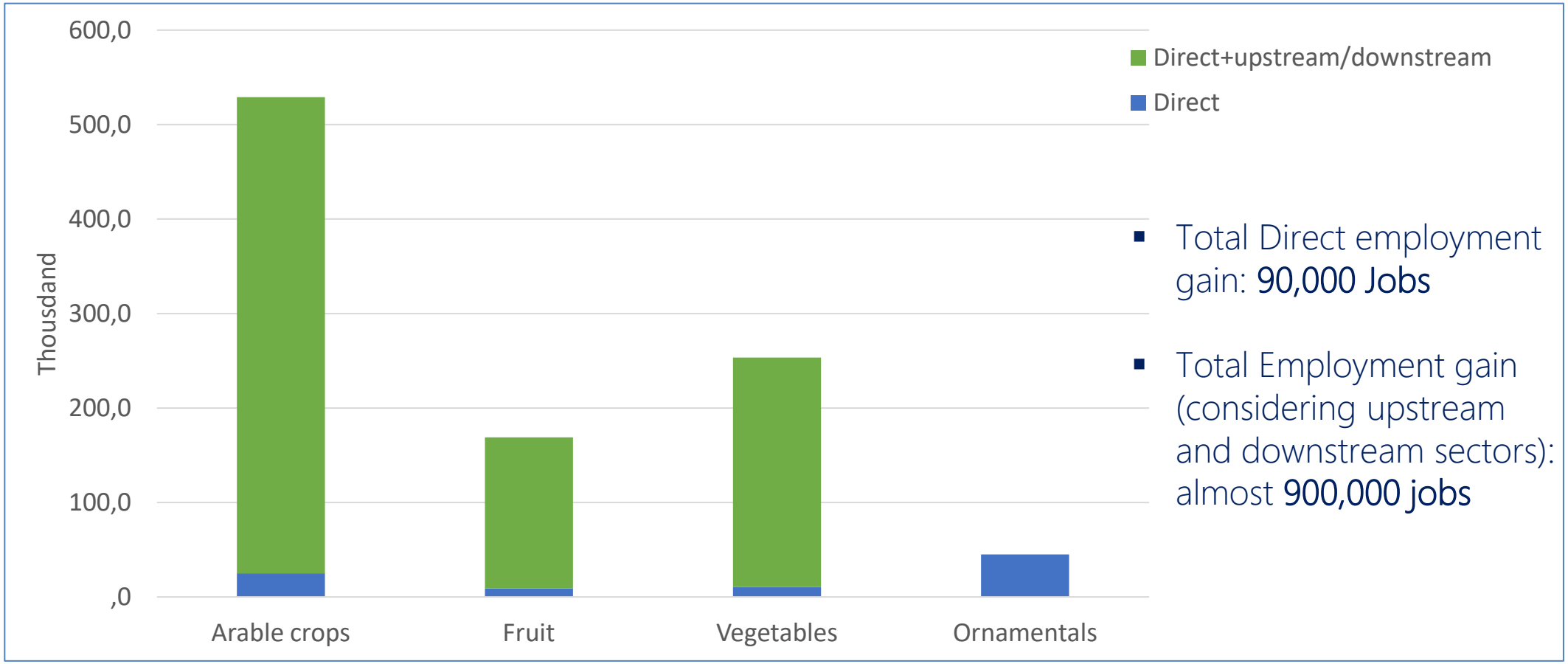
Size of CPVR holders

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



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**

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**

Employment and Turnover rates of CPVR holders

- 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



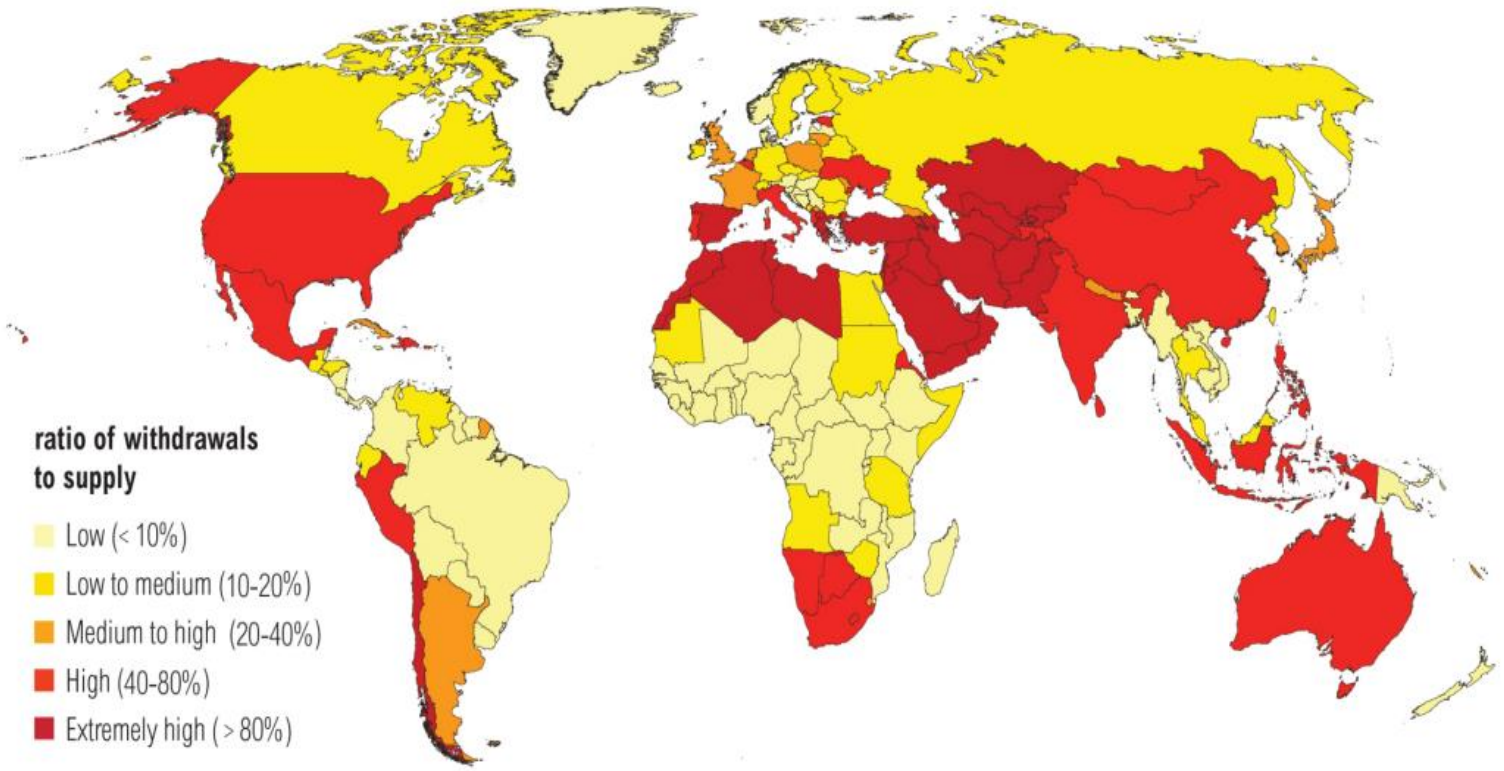
sector	firms	employees	turnover (million €)
Agriculture (seed growing)	603	35,045	17,780
R&D (agricultural & biotechnology)	128	7,970	2,364
Royalties (PVR)	47	119	722
Wholesale (seeds)	173	27,590	14,552
Total	**951**	**70,725**	**35,418**

- 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



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

WORLD RESOURCES INSTITUTE

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

Coastal zones
Sea level rise
Intrusion of saltwater

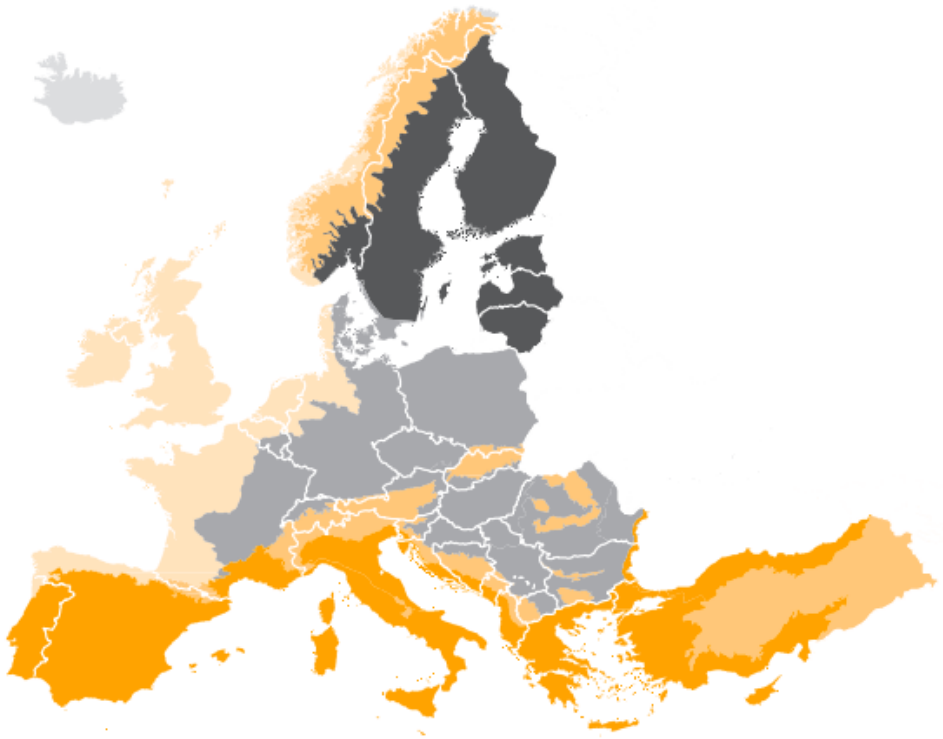
Mediterranean region
Large increase in heat extremes
Decrease in precipitation
Increasing risk of droughts
Increasing risk of biodiversity loss
Increasing water demand for agriculture
Decrease in crop yields
Increasing risks for livestock production
Agriculture negatively afected by spillover efects of climate change from outside Europe

Boreal region
Increase in heavy precipitation events
Increase in precipitation
Increasing damage risk from winter storms
Increase in crop yields

Atlantic region
Increase in heavy precipitation events
Increasing risk of river and coastal flooding
Increasing damage risk from winter storms

Continental region
Increase in heat extremes
Decrease in summer precipitation
Increasing risk of river floods

Mountain regions
Temperature rise larger than European average
Upward shift of plant and animal species
Risk of hail
Risk of frost
Increasing risk from rock falls and landslides



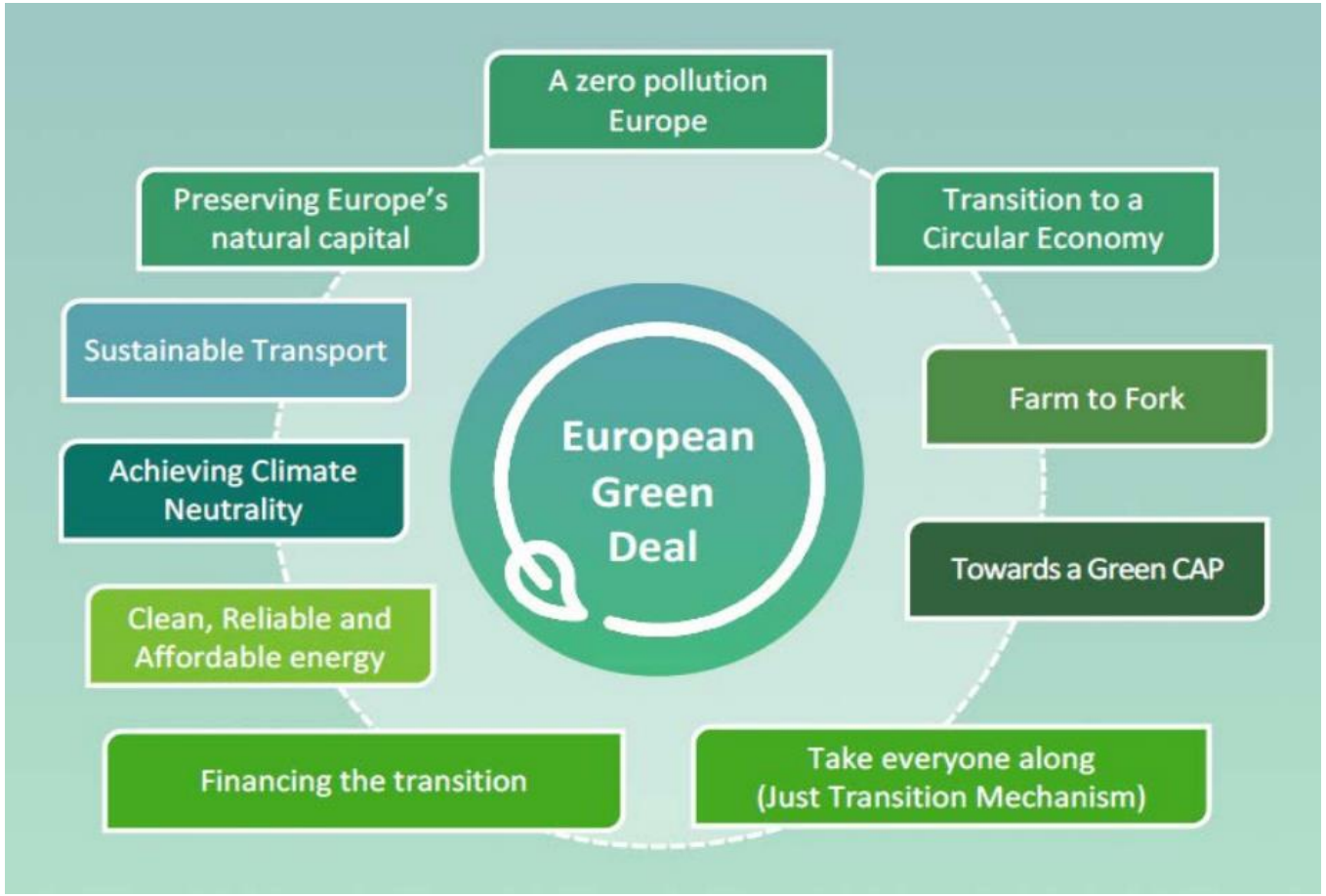
© European Union Environmental Agency (2019)

Commission's **EU Green Deal**

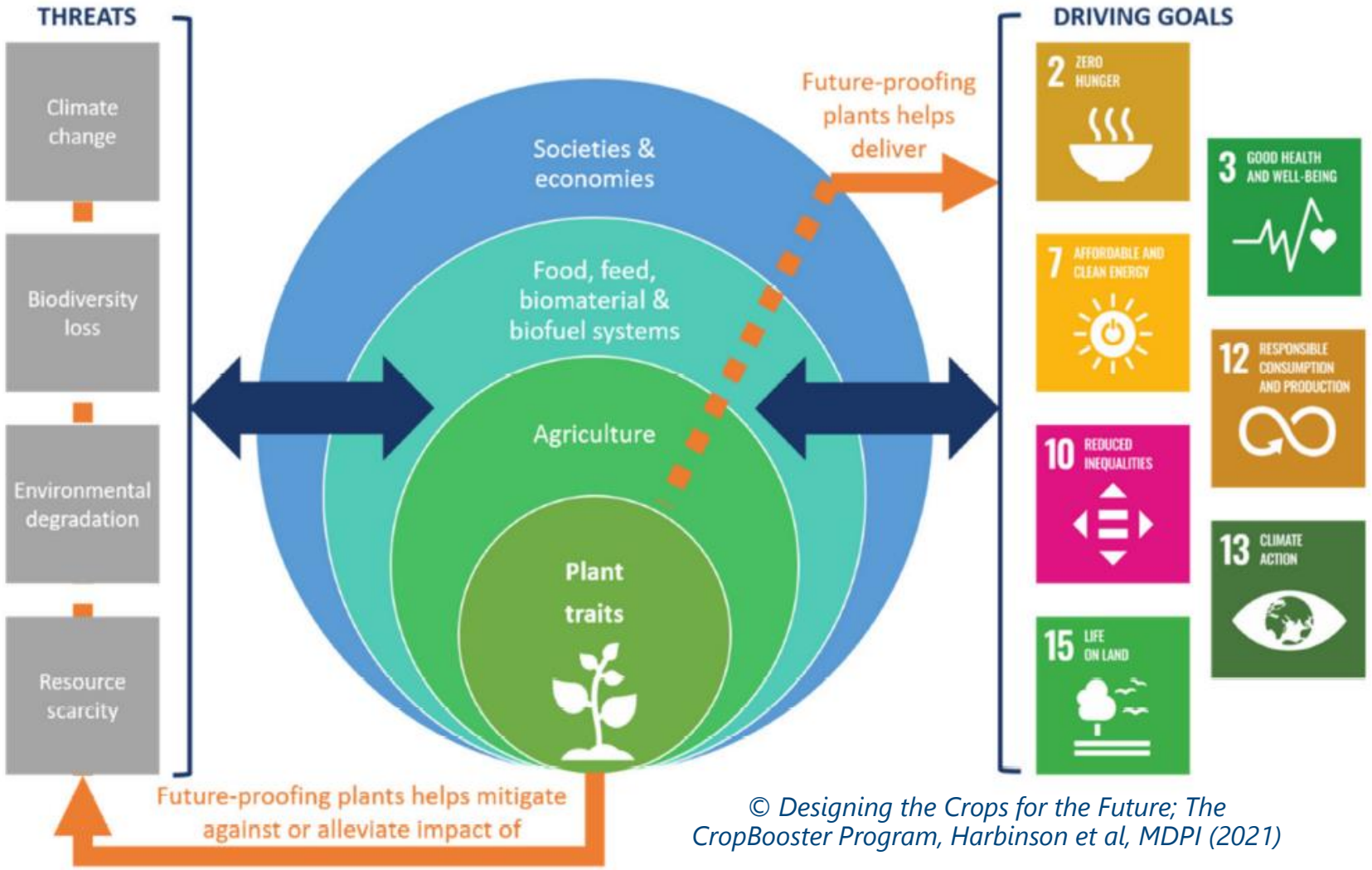
*EU to become **climate-neutral** by 2050*

Biodiversity Strategy &

Farm to Fork Strategy



Plant variety innovation is part of the **solution**!



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

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

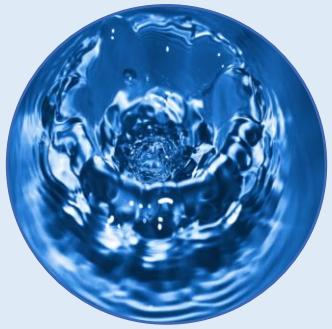
- Release of new adapted varieties
- Preservation of land thanks to yield growth

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



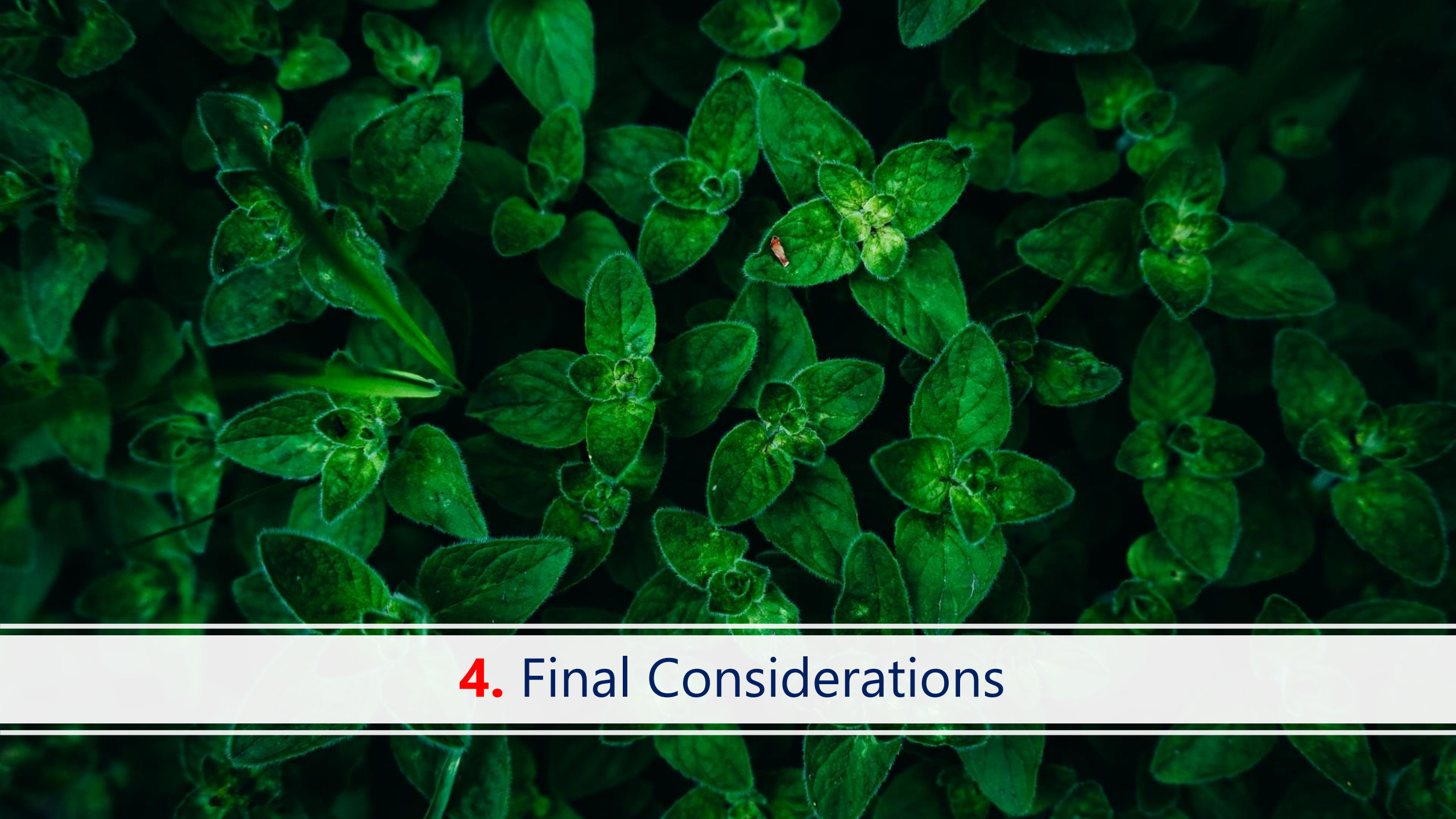
Water use in agriculture and horticulture: reduced by more than **14 billion m3**

= 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



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

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**

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

CPVO

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