Cómo se utiliza el conocimiento científico para mejorar la política agraria europea? La economía agraria en el Centro Común de Investigación

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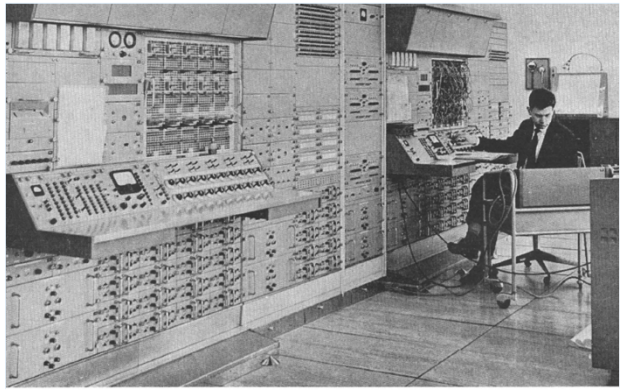
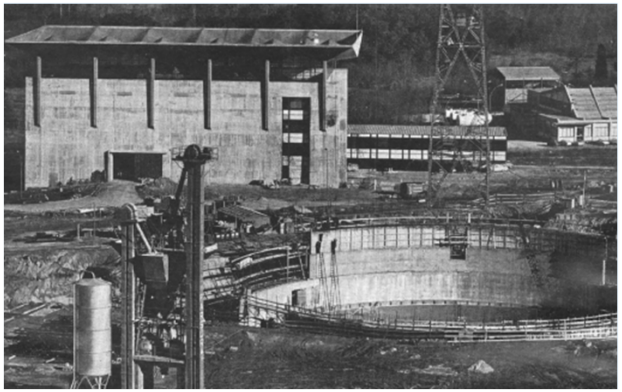
Ciclo de Seminarios de la Unidad de Economía Agroalimentaria y de los Recusos Naturales
CITA de Aragón

JRC: the birth

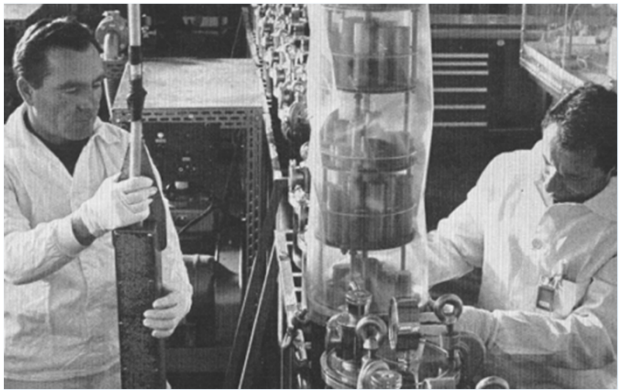
Ispra, 1962 – Euratom's Scientific Data Processing Centre: any nuclear installation requires electronic equiment.





Ispra, 1963 – The ECO reactor and the ESSOR reactor construction site.

Ispra, 1966 – Decontamination of Ispra-1 reactor.



Ispra, 1967 – Metallurgy Department: two technicians placing uranium carbide in the special airtight containers.

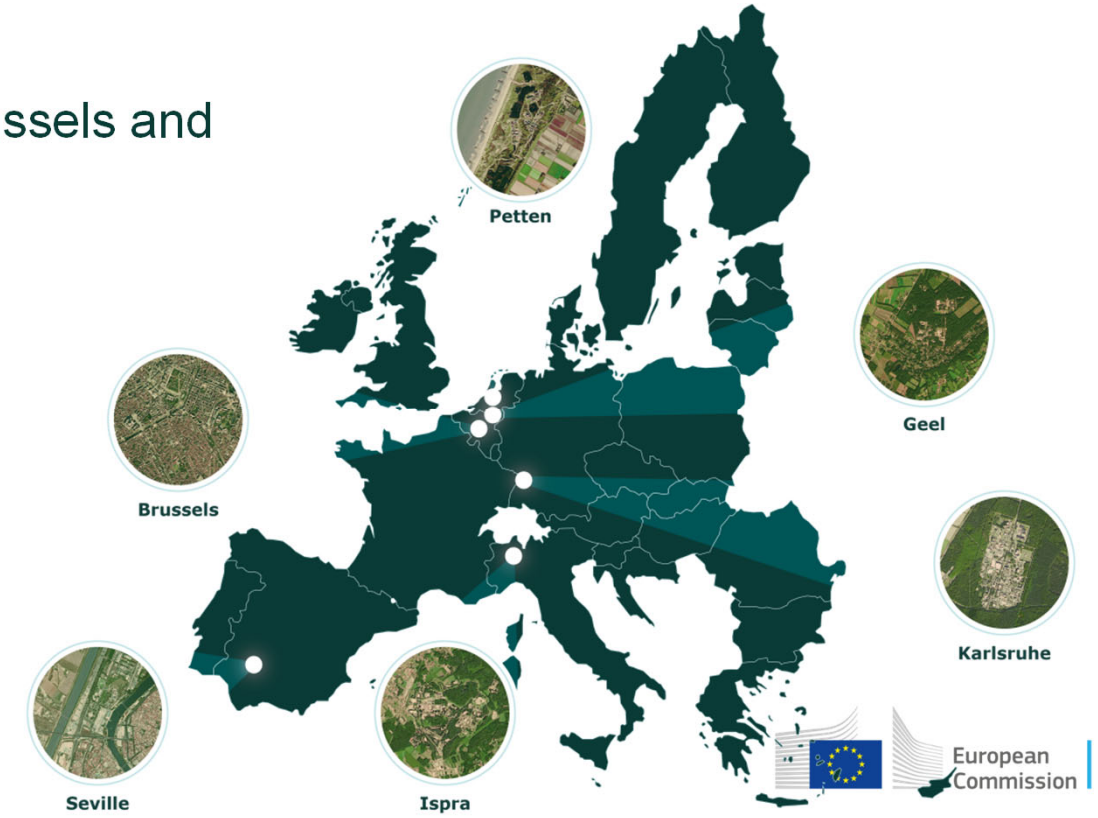
European Commission

Joint Research Centre (JRC)

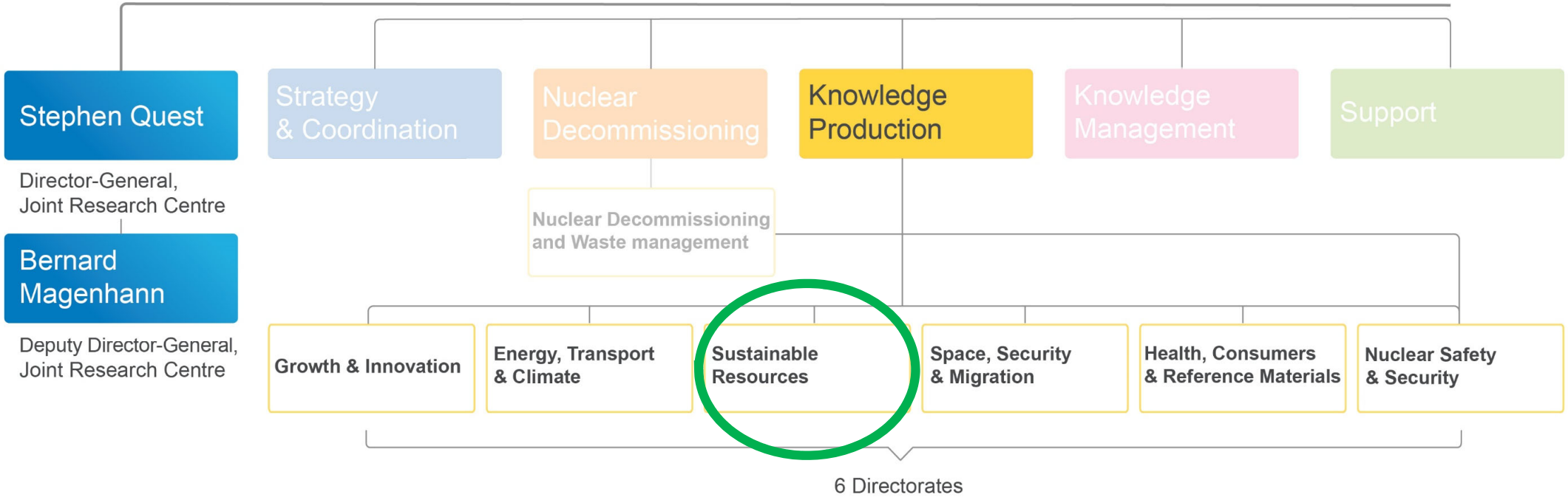
"As the science and knowledge service of the Commission our mission is to support EU policies with independent evidence throughout the whole policy cycle"

3000 staff Almost 75% are scientists and researchers. Headquarters in Brussels and research facilities located in **5 Member States:**

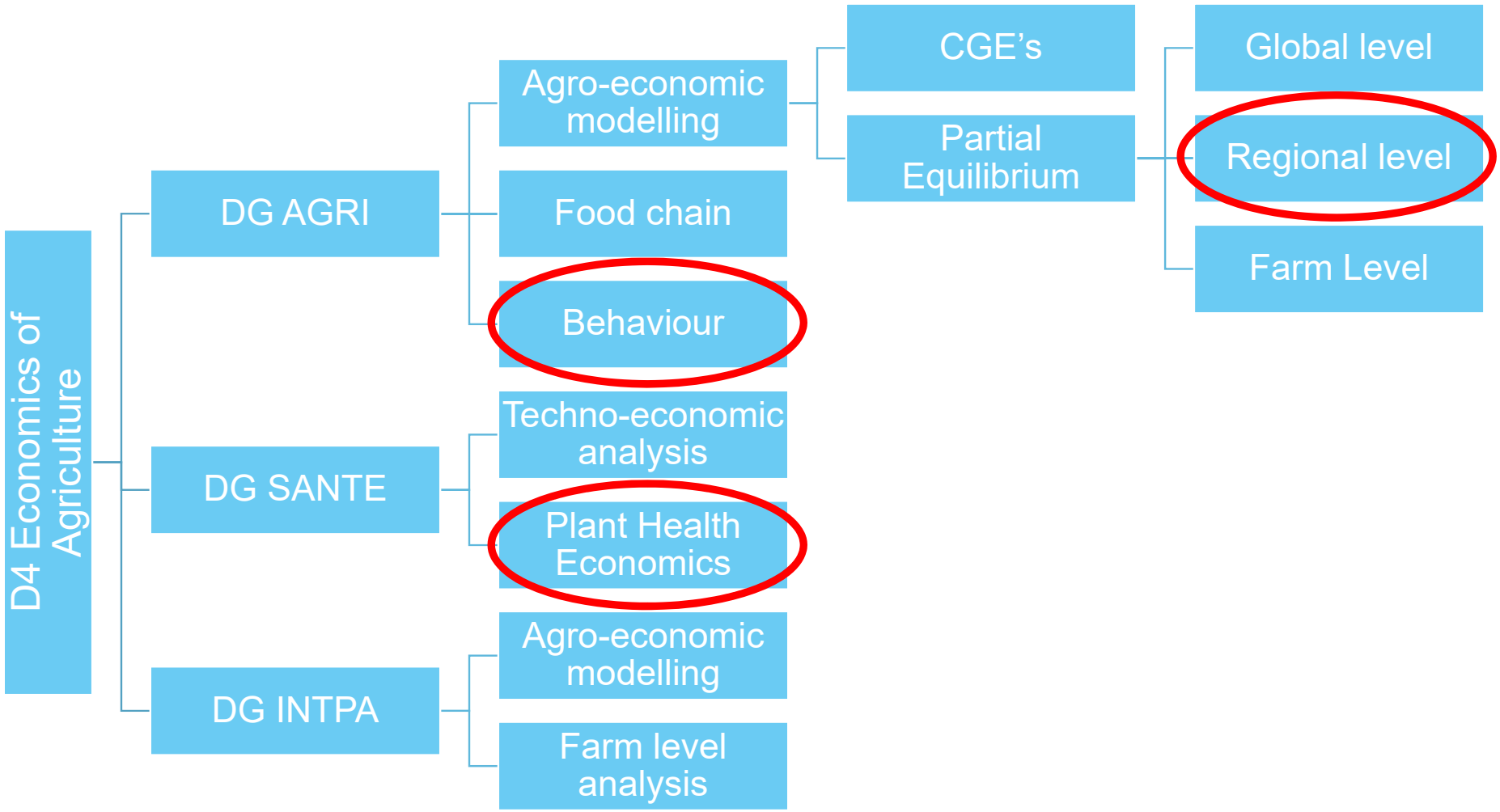
- Belgium (Geel)
- Germany (Karlsruhe)
- **Italy (Ispra)**
- The Netherlands (Petten)
- **Spain (Seville)**



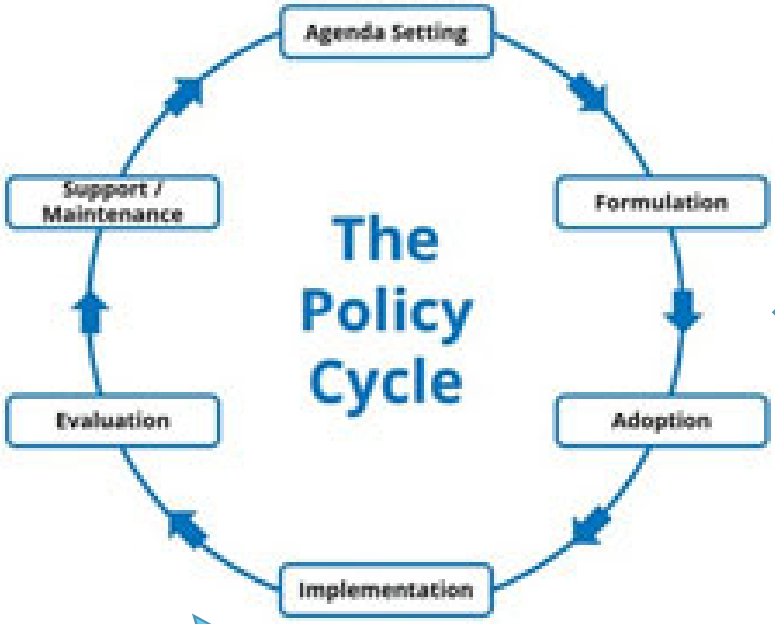
The JRC within the Commission

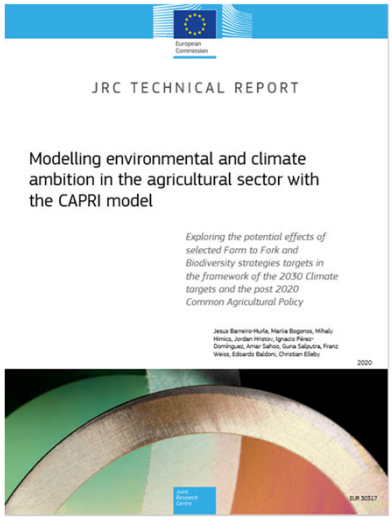


European Commission



European Commission



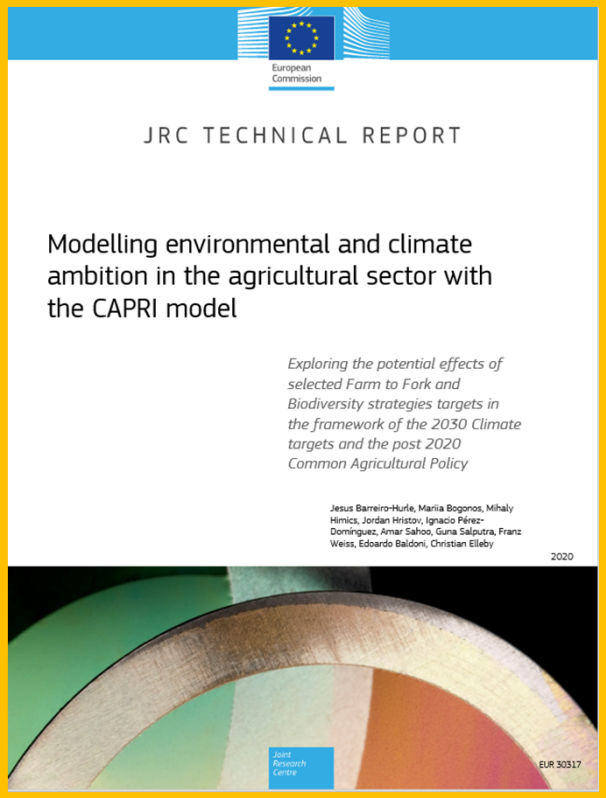


European Commission

Evaluación ex-ante utilizando modelos agro-económicos: los objetivos de las estrategias de la granja a la mesa y de biodiversisad

DG AGRI

EX-ANTE



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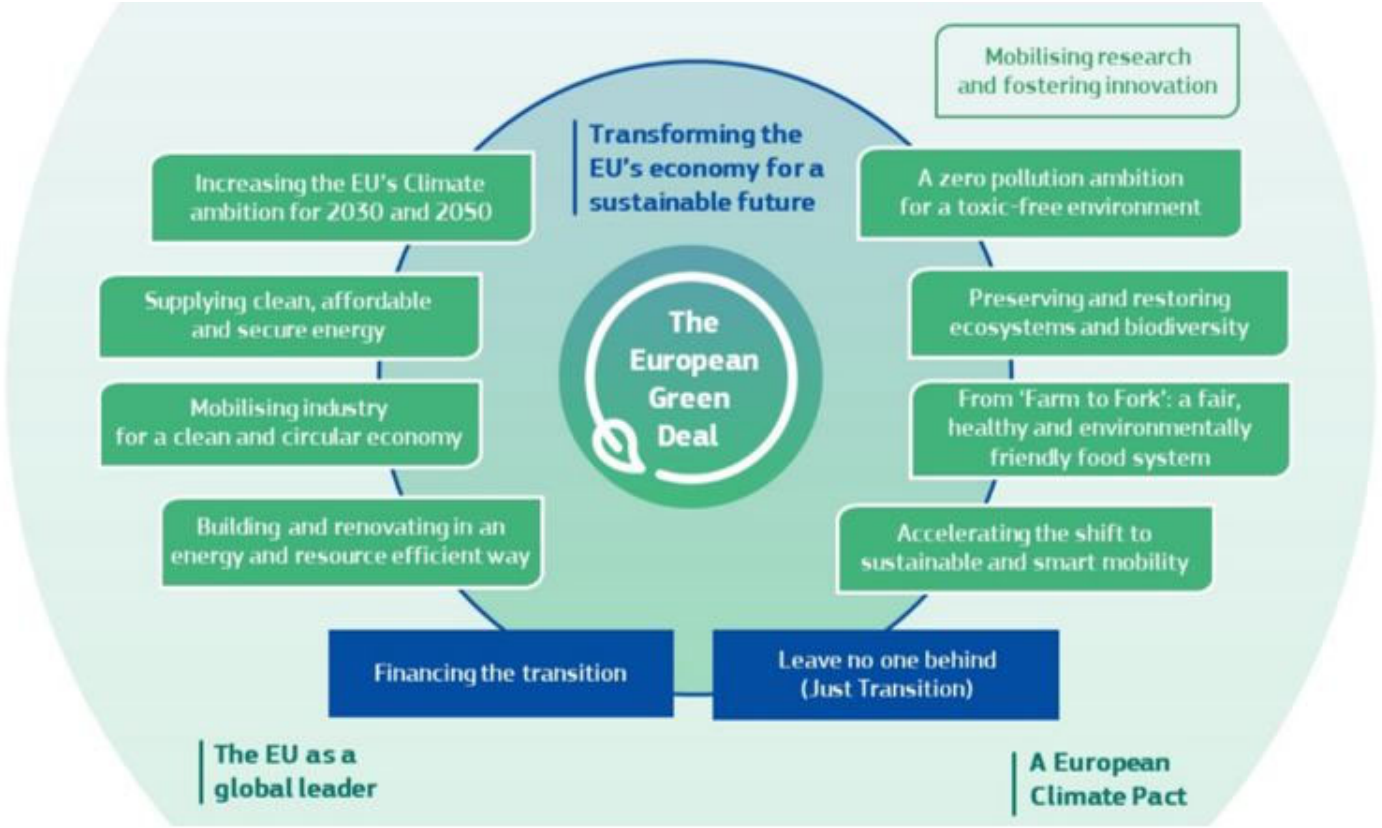
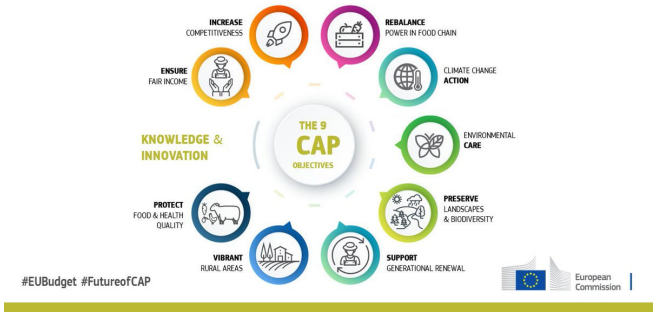
Background

2019



European Commission

Background

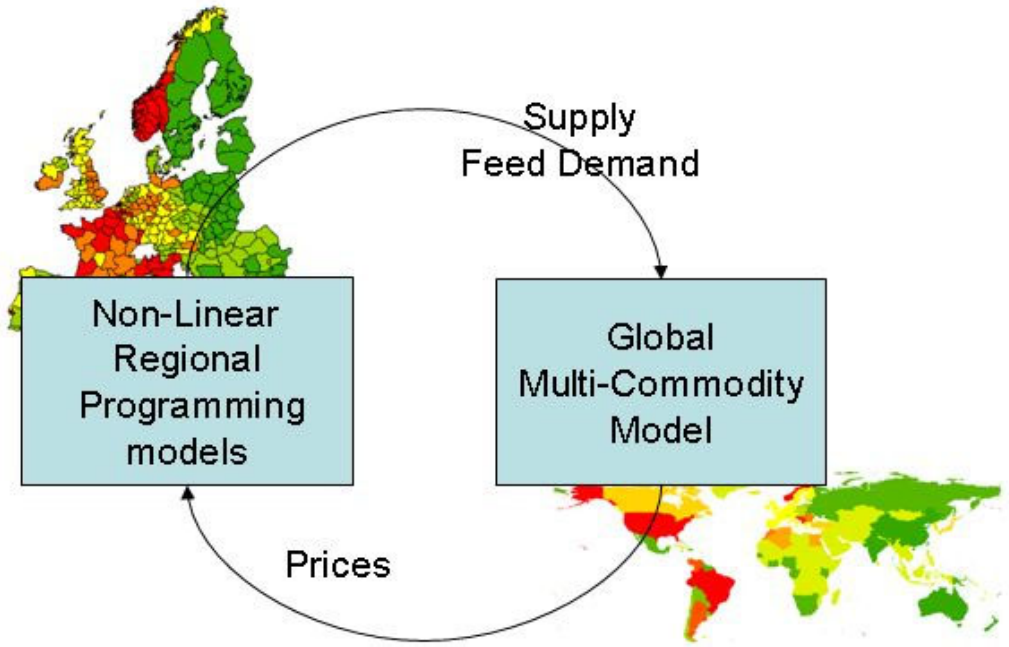


2018!

2020

Approach

the CAPRI model



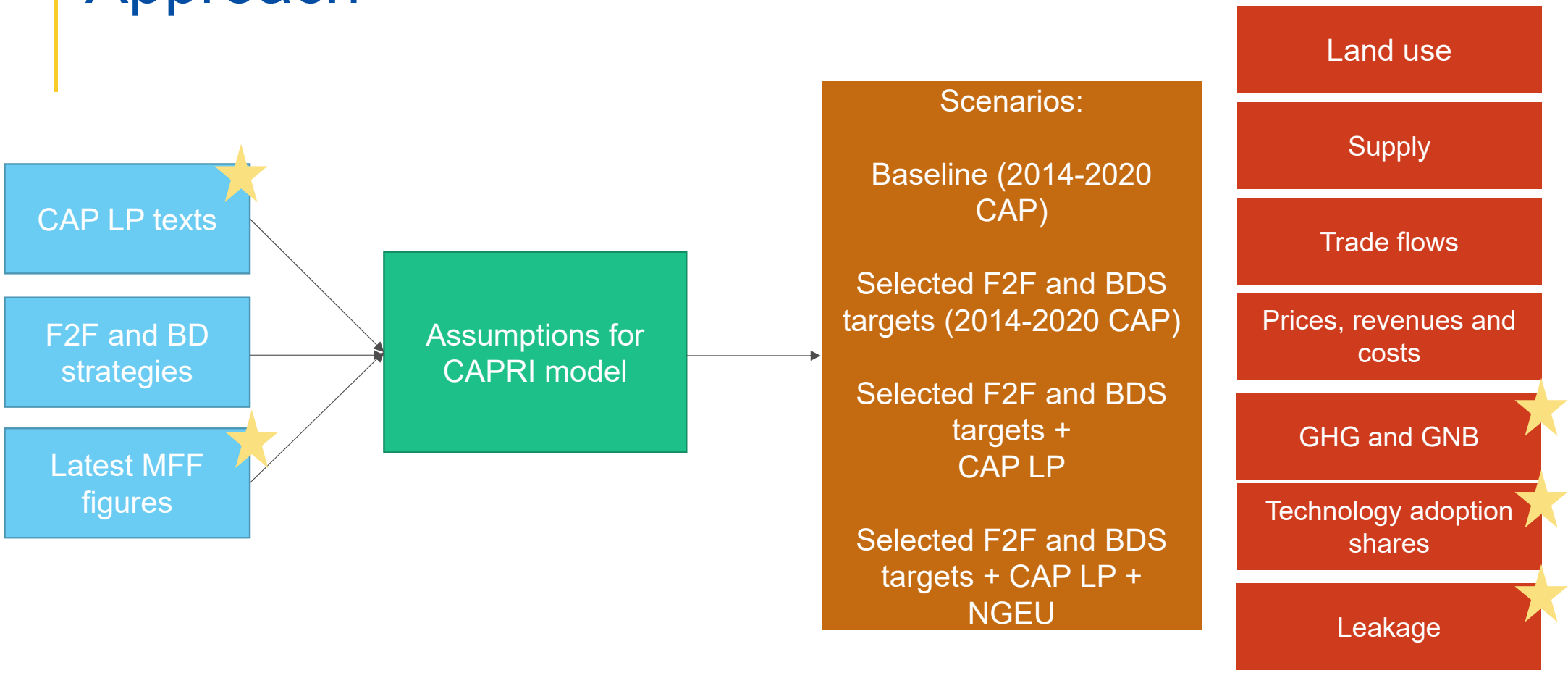
Nitrogen and carbon cycle

Detailed representation of *some* technologies

Regional diversity on farm systems

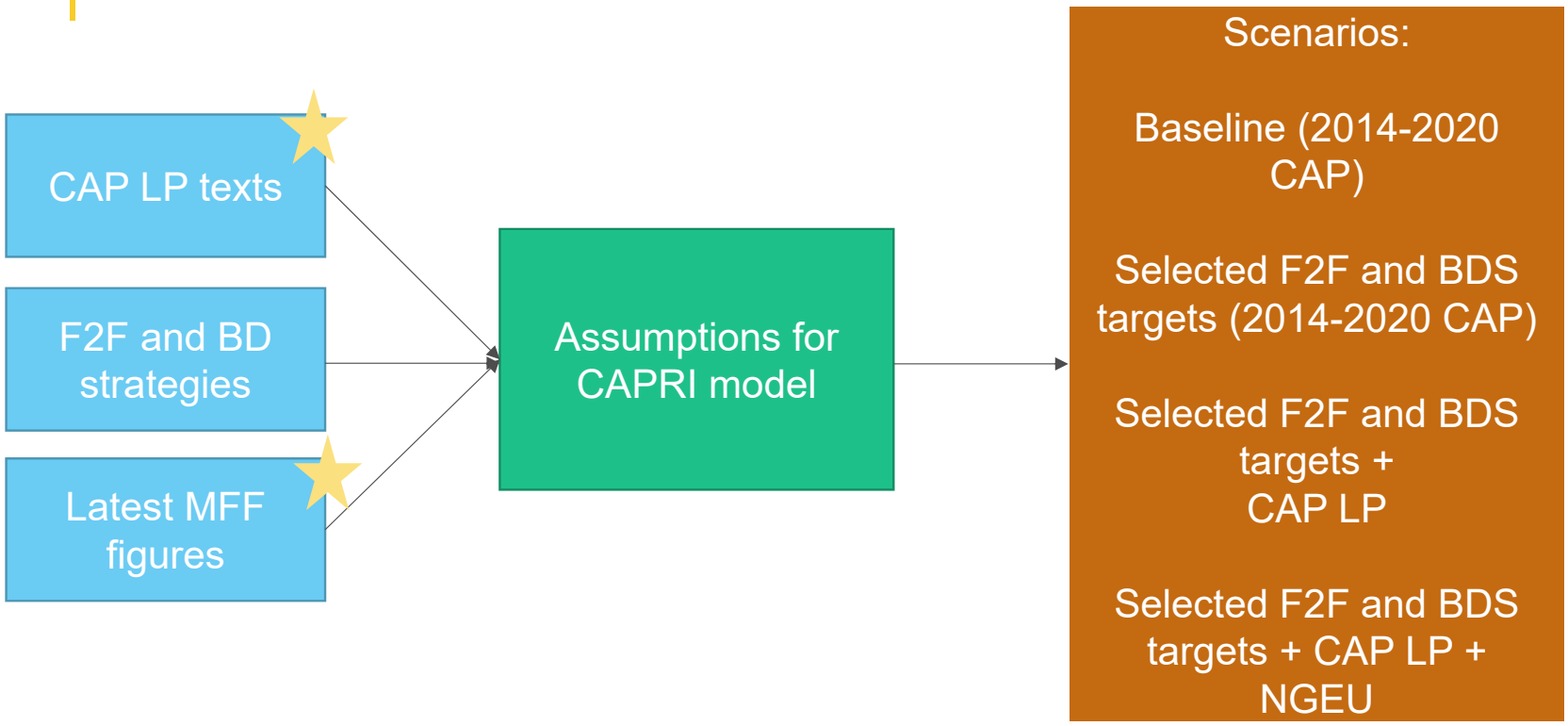
European Commission

Approach



European Commission

Approach


CAP LP texts
F2F and BD strategies
Latest MFF figures
Assumptions for CAPRI model
Scenarios:
Baseline (2014-2020 CAP)
Selected F2F and BDS targets (2014-2020 CAP)
Selected F2F and BDS targets + CAP LP
Selected F2F and BDS targets + CAP LP + NGEU

4 targets of the F2F and BDS Strategies

- Most direct relationship with the agricultural sector
- Most adequate for targeting CAP support

Reduction of overall use of pesticides and risk of chemical pesticides by 50% and the use of more hazardous pesticides by 2030	Reduction of 50% of the costs of plant protection products Increase of other costs to reflect alternative management options 10% decrease of yield
Reduce nutrient losses by at least 50% while ensuring that there is no deterioration of soil fertility. This will reduce the use of fertilizers by at least 20% by 2030	Progressive reduction of nitrogen surplus depending on 2030 levels Technologies to enhance the nitrogen efficiency use available for farmers (i.e. precision farming, nitrification inhibitors)
reach the objective of at least 25% of the EU's agricultural land under organic farming by 2030 and a significant increase in organic aquaculture.	Increase of organic farming taking into account project baseline level for 2030 (i.e. 12% - shock +13%) No mineral fertilizer or plant protection products + reduce yield based on actual differences from FADN
At least 10% of agricultural area is under high-diversity landscape features.	Increase of fallow land taking into account project baseline level for 2018 (i.e. 4.7% - shock + 5.3%) No inputs no outputs

What is missing from the F2F and BDS Strategies

- Action plans to facilitate the transition
  - Integrated nutrient management plan
  - Action plan on organic farming
  - Changes in taxation of food products
  - Food labelling initiative
- Other targets
  - Reduction of food waste
  - Planting of 3 billion trees
  - Broad-band in rural areas
  - Sales of antimicrobials

CAP LP - Scenario assumptions ★

- Budget- latest figures of the 2018 proposals for the Multi-Annual Financial Framework (MFF)
  - *25% of the Basic Direct Payments Budget is allocated to Eco-Schemes (ECS)*
  - *30% of the Rural Development funds are allocated to Agro-environmental and Climate Measures (AECM) excluding payments for Areas with Natural Constraints (ANC)*
  - *Voluntary Coupled Support*
    - *Extensive beef, sheep and dairy*
    - *Includes the additional 2% of Pillar I for protein crops.*
  - *Additional 9 billion euros in constant prices proposed by the Commission in June 2020 as reinforcement of long-term budget not included*
- New green architecture
  - Mandatory measures (conditionality) and voluntary measures (incentives via ECS - 25% of direct payments and AECM - 30% of rural development funds).

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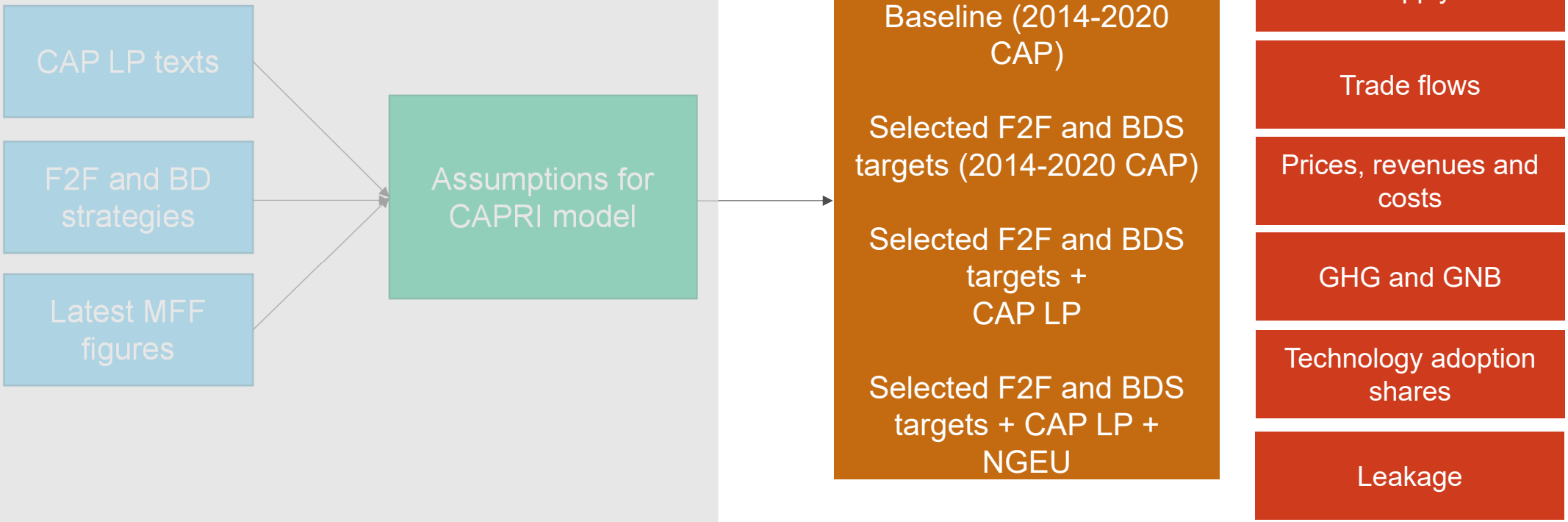
Scenario assumptions (cont.)

- **CAP LP + NGEU**
  - Additional scenario incorporating NextGenerationEU budget – 15 billion euros supposed to support to digitalization and investments in the agricultural sector in line with the Green Deal Priorities
  - Assumption: 30% reduction in cost for technologies for which investments are needed (*precision farming, anaerobic digestion, breeding measures and ammonia measures for housing and storage*)

Approach



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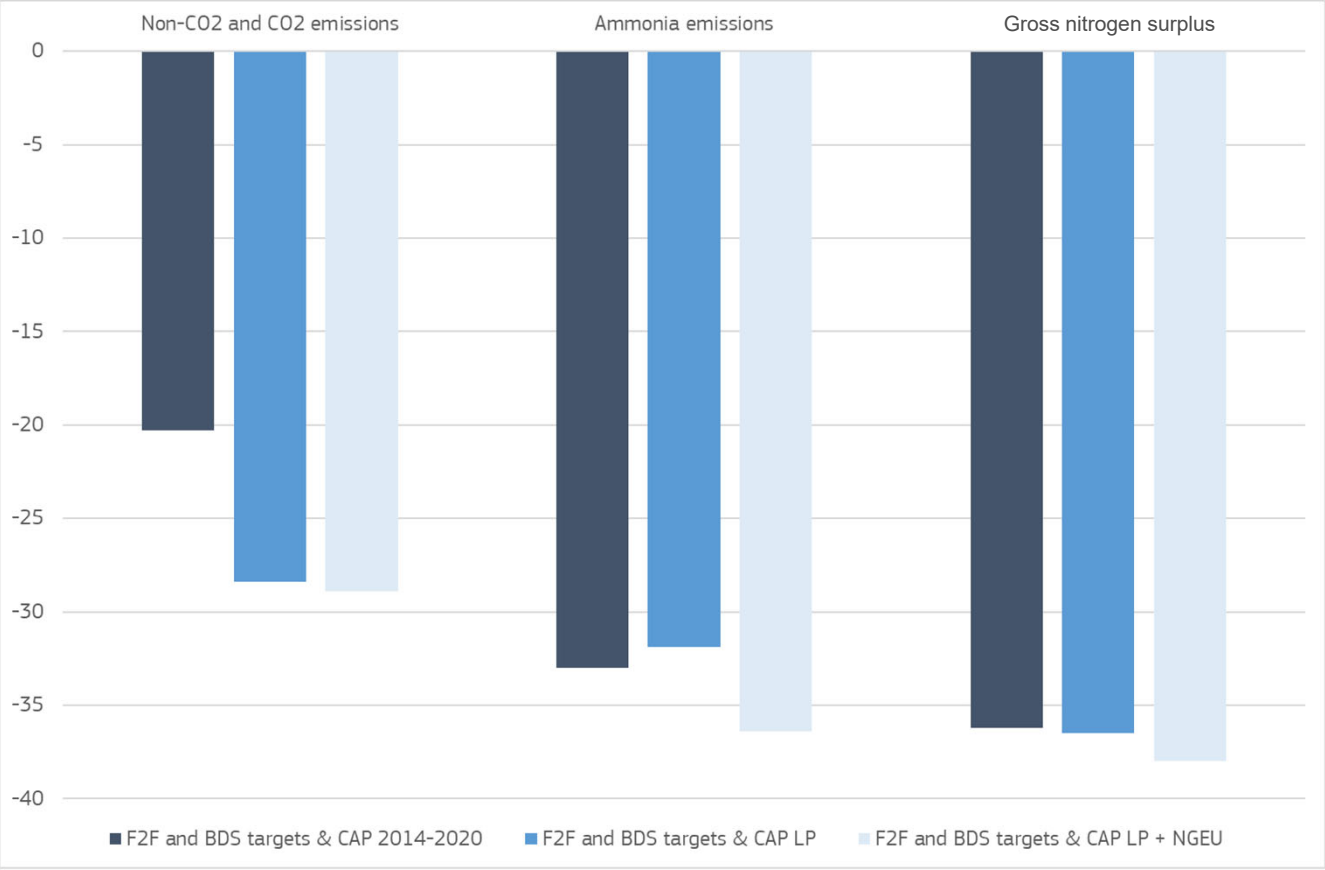
Provision of environmental benefits



- F2F and BDS targets improve environmental performance of the agricultural sector
- The implementation of the CAP LP further increases the improvement
- Again the most challenging aspect is the nitrogen balance of the agricultural sector

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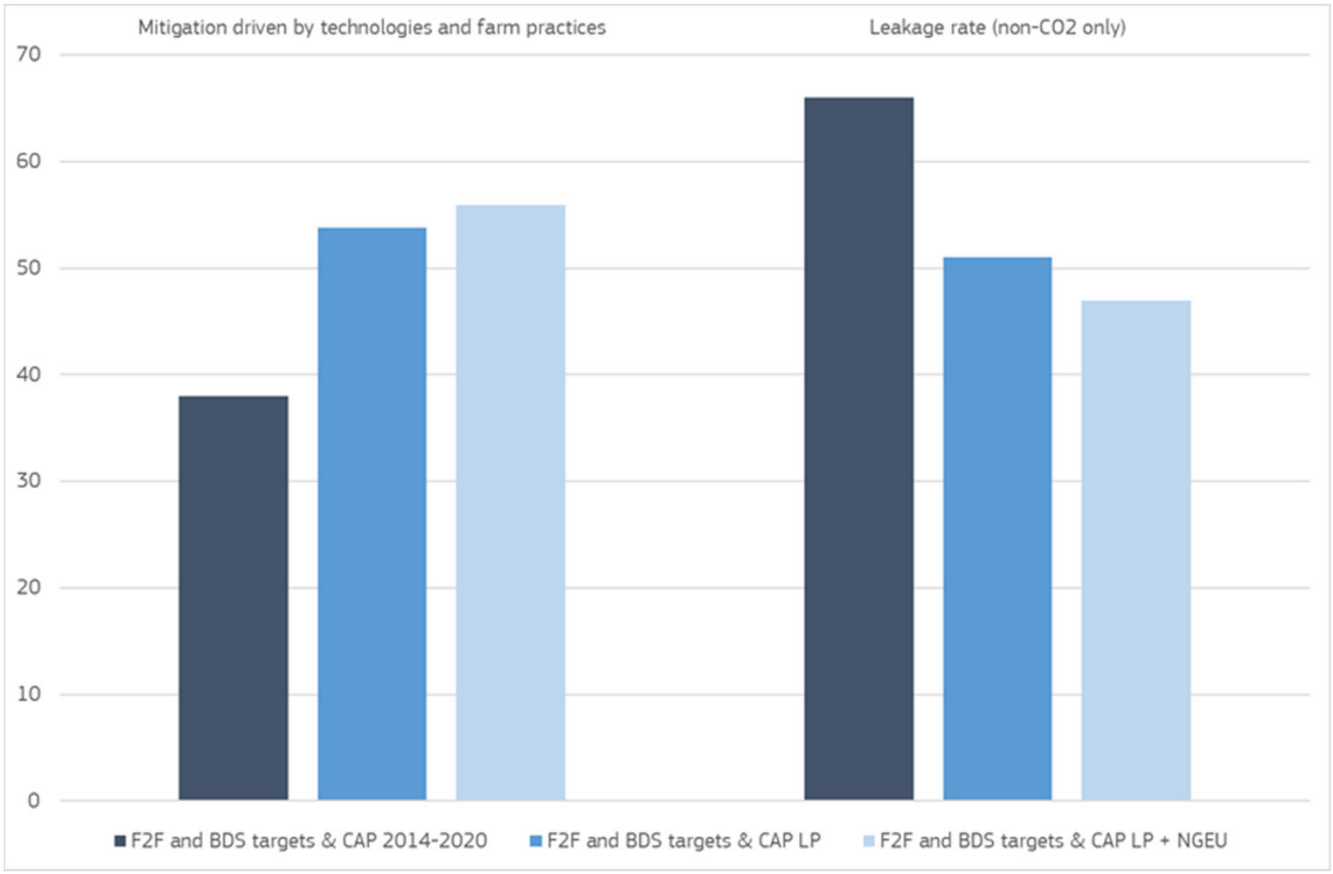
From reduced production to improved efficiency – the case of GHG emissions



- The implementation of the CAP LP allows meeting the Climate targets via technology instead of via reduced production
- The integrity of the effort improves as leakage to the rest of the world falls
- Including technologies and practices focusing on nitrogen could replicate this trend

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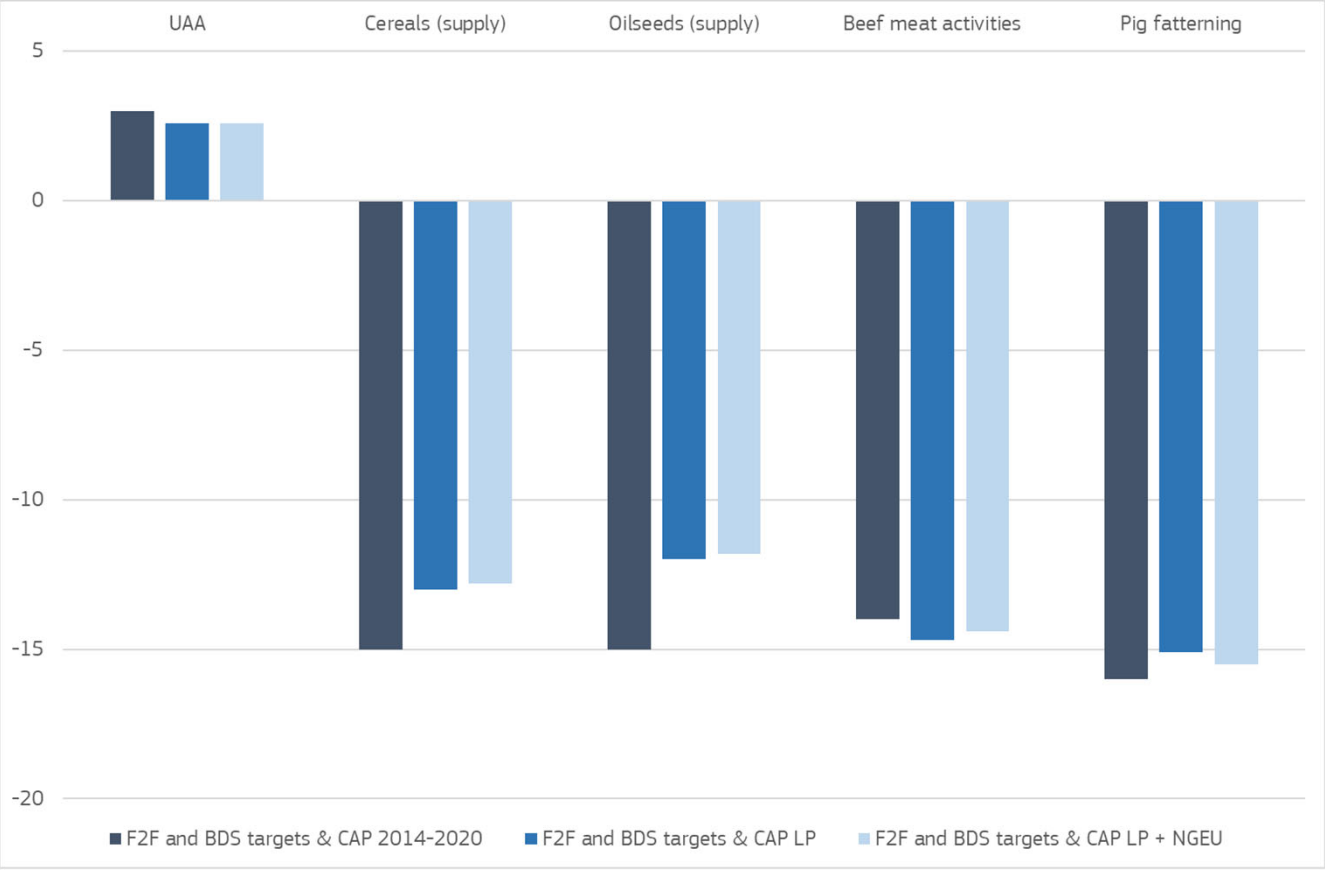
Change in agricultural production

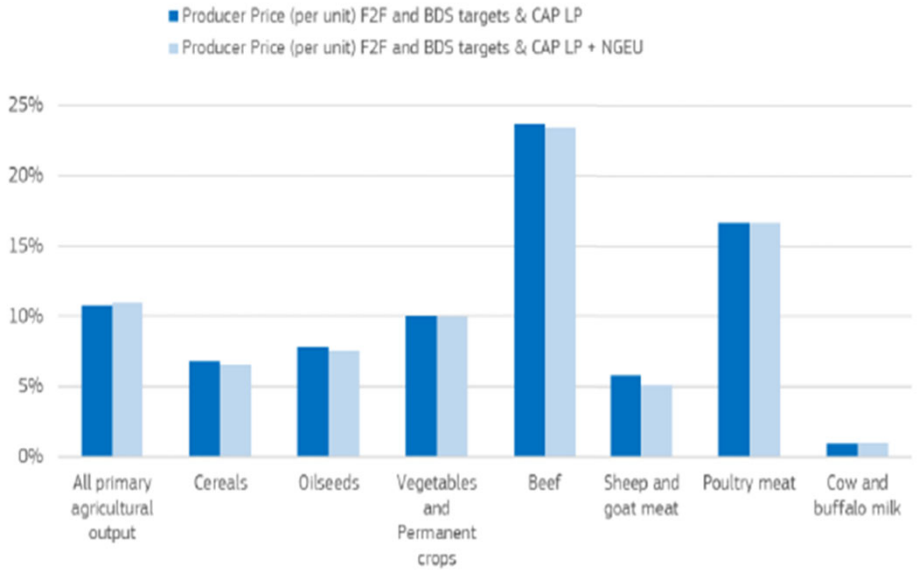


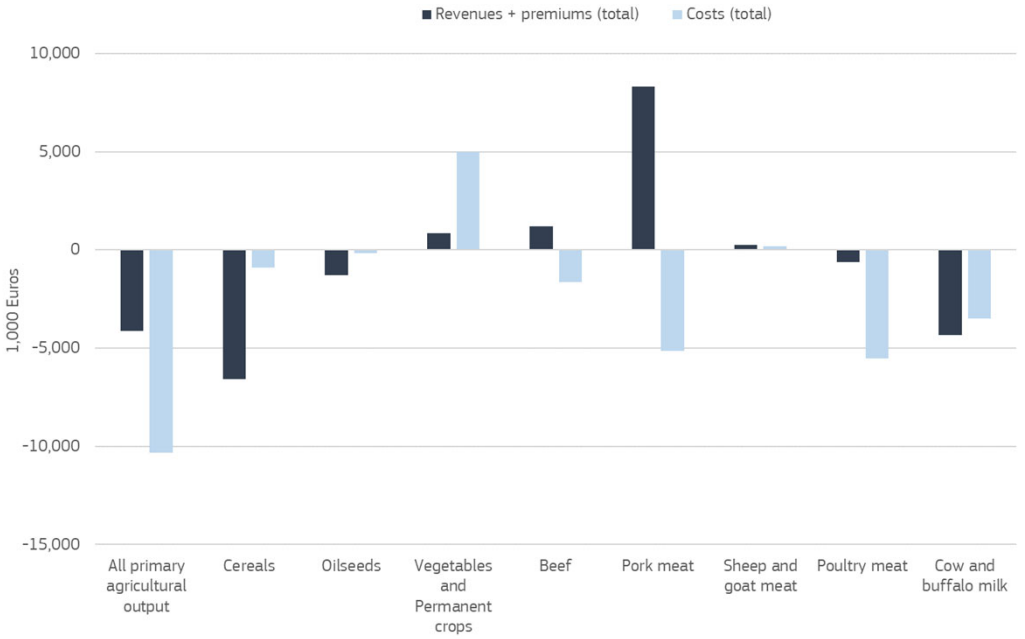
- Reduction in production mainly driven by the nitrogen restriction
- The implementation of the CAP LP eases the pressure in agricultural production
- Farm level analysis shows that it is possible to further reduce the impact via efficiency gains

European Commission

Impact on prices and income

Targets + CAP LP only





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Conclusion

- Our analysis confirms the **positive impact of the Farm to Fork and Biodiversity strategies on our environment and climate**, showing that agriculture is indeed essential to achieving the Green Deal objectives.
- **The environmental benefits** of the F2F and BDS may come at a **cost for the EU agricultural sector** regarding production and income, but a strong EU policy can **mitigate these effects** by accelerating the transition towards sustainable food systems creating new opportunities for farmers.
- The green architecture of the **future CAP has the right tools to support such a transition through the enhanced conditionality, a ringfenced budget and the eco-schemes. The future CAP will be instrumental to implement the** (production-related) **targets of the Green Deal**.

European Commission

Policy initiative	Coming from….		Covered in analysis?
	Farm to fork	BIODIVERSITY	
Reduction in pesticides			
Reduction in nutrient loads			
Integrated nutrient management action plan			
Increased area under organic farming			
Organic farming action plan			
Increased area under high-diversity landscape features			
Facilitate the placement on the market of sustainable and innovative feed additives			
Stimulation of healthier and sustainable diets			
Revision of animal welfare legislation and option for animal welfare labelling			
Code of conduct for responsible business and marketing practice			
Reduction in food losses and waste			
Reduction in sales of antimicrobials			
Shift to sustainable fish and aquaculture			
Revision of competition rules for collective initiatives promoting Sustainability			
Contingency plan for ensuring food supply and food security to be put in place in times of crisis			
Revision of marketing standard			
Harmonized mandatory front-of-pack nutritional labelling			
Change in taxation of food products			
….and many more!			

What next?

- Change of paradigm – from restriction to production inputs
- The baseline is a moving target – i.e. impacts of no action on biodiversity loss need to be incorporated
- Significant changes such as those implied by the level of targets put at risk the plausibility of many parameters
  - Models get out of their comfort zone
  - Examples of the impossible becoming reality exist (e.g. carbon free production processes for steel)
- A supply side analysis - Systemic changes affect also fundamentals of behavior all along the value chain (processors, retailers & consumers)

Evaluación ex-ante utilizando modelos agro-económicos: los objetivos de las estrategias de la granja a la mesa y de biodiversisad

DG AGRI

EX-ANTE

Apoyo a la implementación de actos delegados de la legislación: evaluando el impacto de plagas para su prioritización

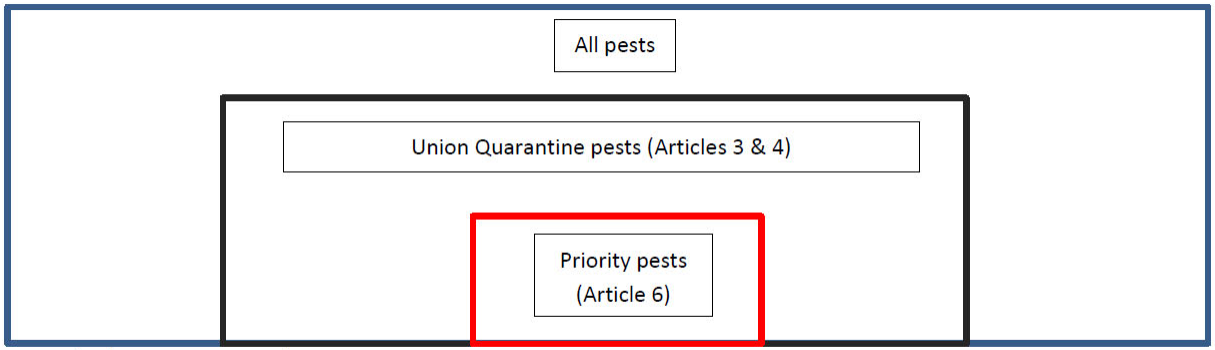
DG SANTEI

Impleme ntation

European Commission

European Commission

Pest categorization



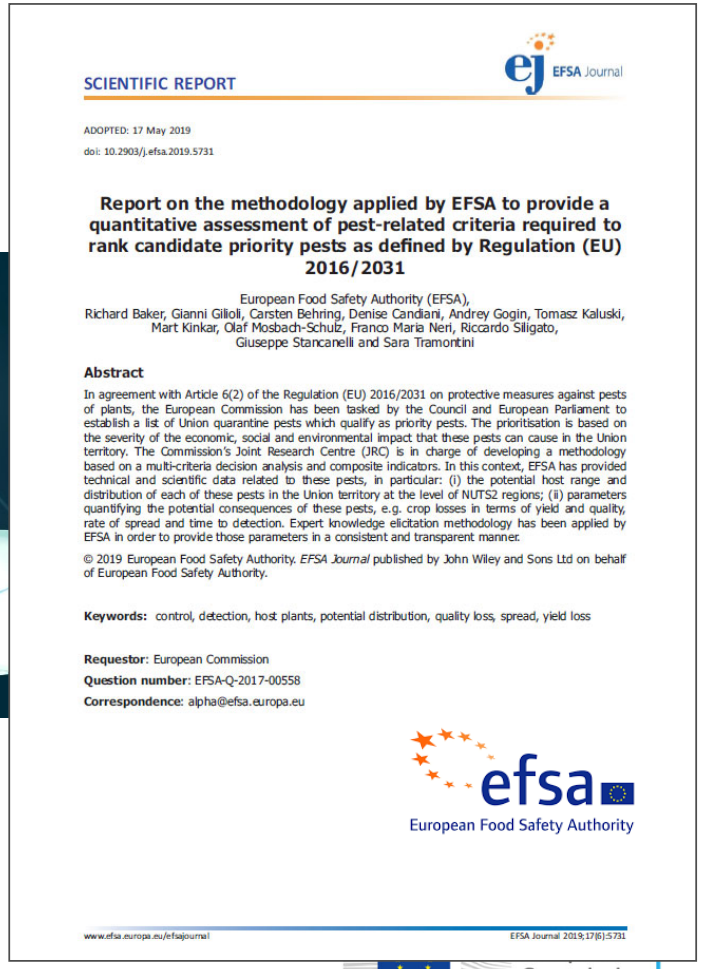
Note: the figure is not to scale

- Not present in the EU, present in a limited area or with scarce, irregular, isolated and infrequent presences.
- Most severe economic, environmental **or** social impact

Annual surveys (Art. 24)
Contingency plan (Art. 25)
Simulation exercises (Art. 26)
Action plan for eradication (Art. 27)

European Commission

JRC & EFSA: integrating economics & pathology



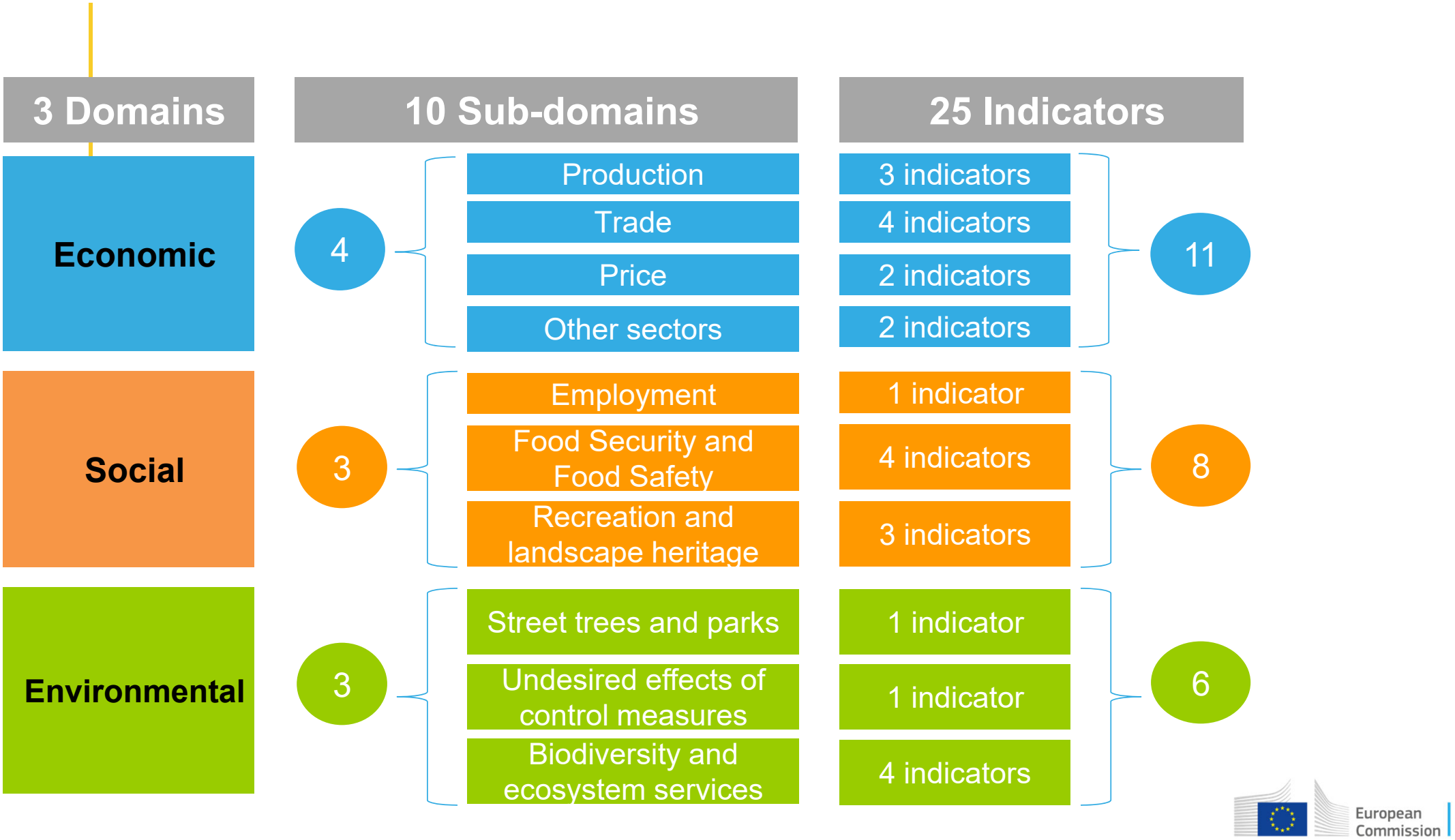
Commission

Structure of the IZPZ

1. Indicators selection
(Reg. criteria/data availability)

Quantitative / qualitative measures by HOST / PEST

European Commission



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Different data sources

EFSA*

Data on Hosts; Potential distribution; Y,Q loss; Spread/detection rate; Quarantine; Treatments

MS and experts

Ad-hoc data requests on Forestry; Cultural heritage; street-park trees; prices

Secondary data

Data on production (EUROSTAT,FAO); trade (COMEXT); Soil erosion(articles)

Data calculated by JRC

All indicators per pest

*Note: data for a maximum spread scenario based on the current environmental conditions and production practices, within a time frame long enough to take into account the temporal variation

Indicators by PEST

THE IMPACT INDICATOR FOR PRIORITY PEST (I2P2) — **Anastrepha_ludens**

Domain	Sub-domain	Indicator	Result
Economic Impacts	Production impacts	I.1 Maximum value of poduction losses (Million euros)	295.4
		I.2 Share of EU production value affected (%)	5.13%
		I.3 Difficulty of eradication	18,017
	Trade impacts	I.4. Number of importing countries banning trade	127
		I.5 Value of export losses (Million euros)	809.3
		I.6 Share of export losses over total production (%)	7%
		I.7 Trade dispersion	0.91
	Price and market impacts	I.8 Change in domestic price (%)	9%
		I.9 Change in domestic production over imports (%)	0%
	Impacts on other agents	I.10 Upstream effect (Million euros)	291.2
		I.11 Downstream effect (%)	5%
Social impacts	Impact on employment	I.12 Job losses (jobs)	5,760
	Impact on Food Security and Food safety	I.13 Share of caloric supply (kcal/capita/day)	0.072%
		I.14 Share of protein supply (g/capita/day)	0.037%
		I.15 Share of fat supply quantity (g/capita/day)	0.014%
		I.16 Ability to produce fungal toxins (y=1/n=0)	0
	Impact on recreation, landscape and cultural heritage	I.17. Share of holdings with other gainful activities (%)	40%
		I.18 Products covered by EU quality labels (number of designations)	29
		I.19 Presence of affected hosts on cultural heritage landmarks	28.88
Environmental impacts	Impact on street trees, parks and natural and planted areas	I.20 Use of hosts as street trees and in parks	19
	Undesired impacts of control measures	I.21 Undesired effects of control measures	1
	Impact biodiversity and ecosystem services	I.22 Soil erosion	0.7812
		I.23 Number of protected species and habitats related to hosts	1
		I.24 Share of Natura 2000 area and sites affected (%)	50.0%
		I.25 Share under sustainable management practices (%)	0.21%

Structure of the I2P2

1. Indicators selection
(Reg. criteria/data availability)

Quantitative / qualitative measures by HOST / PEST

RANKING

Pest	I2P2		Ranking by domains		
	Rank	Value	Economic	Social	Environmenta
Xylella fastidiosa (Pierce's disease)	1	0.8104	1	1	1
Popillia japonica (Japanese beetle)	2	0.5117	4	3	2
Thaumatotibia leucotreta (Citrus codling moth)	3	0.4714	8	2	3
Candidatus liberibacter (Citrus greening)	4	0.3750	2	5	5
Conotrachelus nenuphar	5	0.3349	10	6	4
Anthonomus eugenii	6	0.2960	5	9	7
Pericera cockerelli	7	0.2792	7	4	14
Rhagoletis pomonella (Apple maggot fly)	8	0.2728	3	12	10
Spodoptera frugiperda (Fall armyworm)	9	0.2246	11	10	
Bactrocera (Oriental fruit fly)	10	0.2068	17	11	
Mediterranean fruit fly)	11	0.2051	16		
Aculus	12	0.1983	15		
Lobesia botrana (grapevine)	13				

2. Normalization and weighting

Aggregate indicators and compare pests

European Commission

RANKING (pest affecting crops example)

Pest	I2P2		Ranking by domains		
	Rank	Value	Economic	Social	Environmental
Xylella fastidiosa (	1	0.8104	1	1	1
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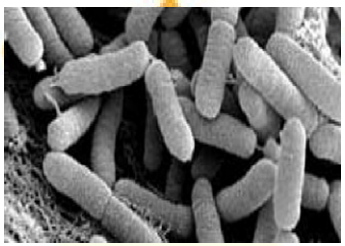
Rhagoletis pomonella (Apple maggot fly)	8	0.2728	3	12	10
Spodoptera frugiperda (Fall armyworm)	9	0.2246	11	10	11
Bactrocera dorsalis (Oriental fruit fly)	10	0.2068	17	11	8
Anastrepha ludens (Mexican fruit fly)	11	0.2051	16	14	6
Bactrocera zonata (Peach fruit fly)	12	0.1983	15	13	9
Grapevine flavescence doree (Flavescence doree of grapevine)	13	0.1958	9	16	12
Ralstonia solanacearum (Bacterial wilt; Brown rot)	14	0.1747	12	7	17
Thrips palmi	15	0.1707	20	8	13
Xanthomonas citri (Citrus canker)	16	0.1321	19	18	15
Phyllosticta citricarpa (Black spot of citrus)	17	0.1262	18	19	16
Tilletia indica (Karnal bunt of wheat)	18	0.1220	6	20	20
Clavibacter michiganensis ssp. Sepedonicus (Bacterial ring rot of potato)	19	0.1126	13	15	19
Synchytrium endobioticum (Wart disease of potato)	20	0.0930	14	17	18

Some figures for the pests in the podium



Xylella fastidiosa

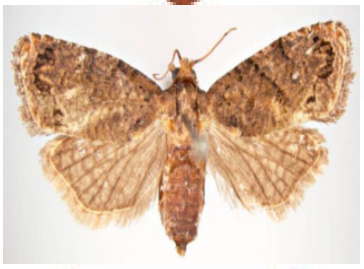
5.5 billion EUR of agricultural production at risk

103 protected habitat and species potentially affected

Popillia japonica (Japanese beetle)

2.4 billion EUR of agricultural production at risk

158 countries we trade with might restrict imports from EU



Thaumatotibia leucotreta (Citrus codling moth)

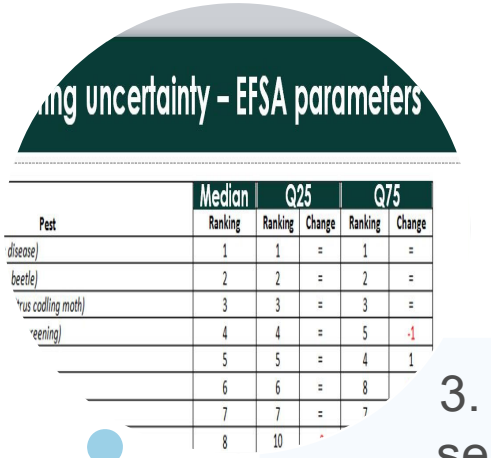
1.2 billion EUR of agricultural production at risk

0.21% of total protein intake at risk

Note - Results for the median scenario

European Commission

Structure of the I2P2



Pest	Median Ranking	Q25 Ranking	Q25 Change	Q75 Ranking	Q75 Change
disease)	1	1	=	1	=
beetle)	2	2	=	2	=
rus codling moth)	3	3	=	3	=
eening)	4	4	=	5	-1
	5	5	=	4	1
	6	6	=	8	
	7	7	=	7	
	8	10			

Stakeholder consultation

MS feedback

3. Uncertainty and sensitivity analysis

Pest	I2P2 Rank	I2P2 Value	Ranking by domains Economic	Social	Environmenta
Xylella fastidiosa (Pierce's disease)	1	0.8104	1	1	1
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of grapevine)	13				

2. Normalization and weighting

Aggregate indicators and compare pests

1. Indicators selection (Reg. criteria/data availability)

Quantitative / qualitative measures by HOST / PEST

European Commission

COMMISSION DELEGATED REGULATION (EU) 2019/1702

of 1 August 2019

supplementing Regulation (EU) 2016/2031 of the European Parliament and of the Council by establishing the list of priority pests

ANNEX
List of priority pests

Agrilus anxius Gory

Agrilus planipennis Fairmaire

Anastrepha ludens (Loew)

Anoplophora chinensis (Thomson)

Anoplophora glabripennis (Motschulsky)

Anthonomus eugenii Cano

Aromia bungii (Faldermann)

Bactericera cockerelli (Sulc.)

Bactrocera dorsalis (Hendel)

Bactrocera zonata (Saunders)

Bursaphelenchus xylophilus (Steiner et Bührer) Nickle *et al.*

Candidatus Liberibacter spp., causal agent of Huanglongbing disease of citrus/citrus greening

Conotrachelus nenuphar (Herbst)

Dendrolimus sibiricus Tschetverikov

Phyllosticta citricarpa (McAlpine) Van der Aa

Popillia japonica Newman

Rhagoletis pomonella Walsh

Spodoptera frugiperda (Smith)

Thaumatotibia leucotreta (Meyrick)

Xylella fastidiosa (Wells *et al.*)

Evaluación ex-ante utilizando modelos agro-económicos: los objetivos de las estrategias de la granja a la mesa y de biodiversisad

DG AGRI

EX-ANTE

Apoyo a la implementación de actos delegados de la legislación: evaluando el impacto de plagas para su prioritización

DG SANTE

Implementation

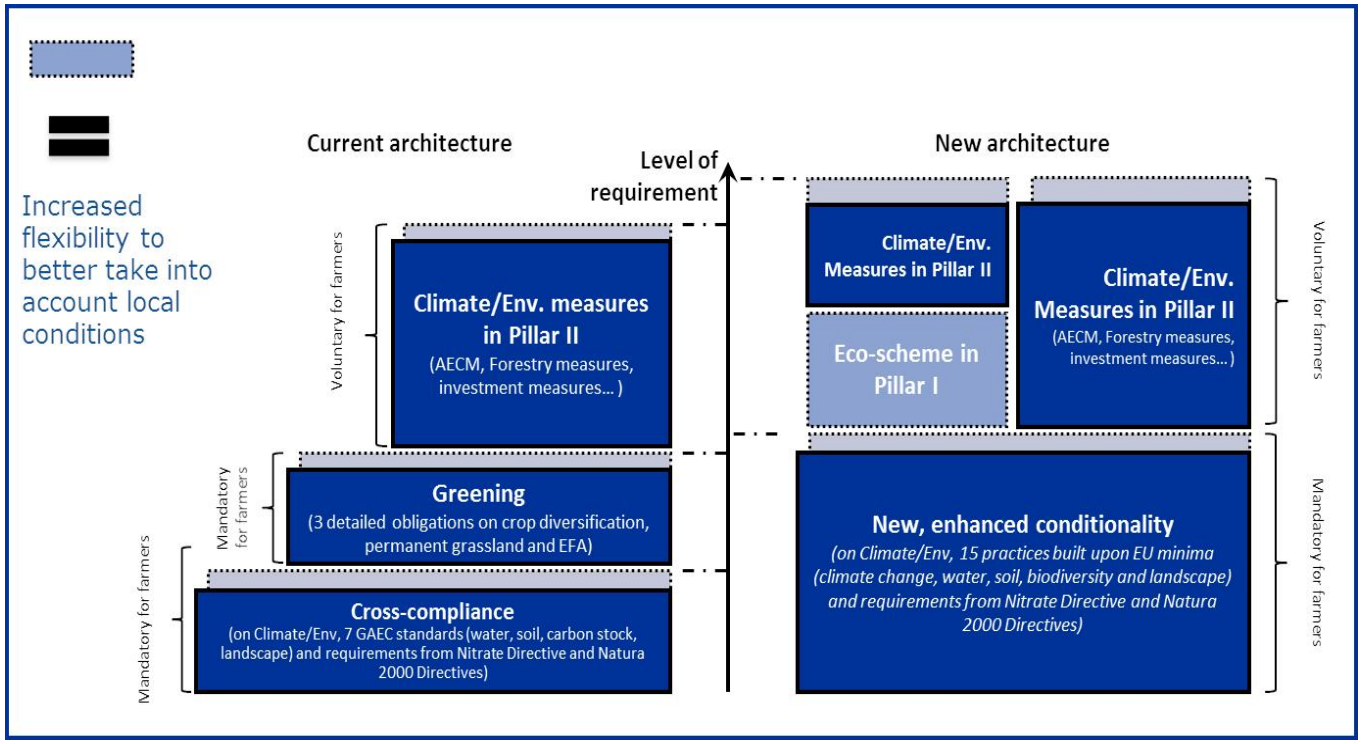
Apoyo a la implementación de actos delegados de la legislación: evaluando el impacto de plagas para su prioritización

DG AGRI

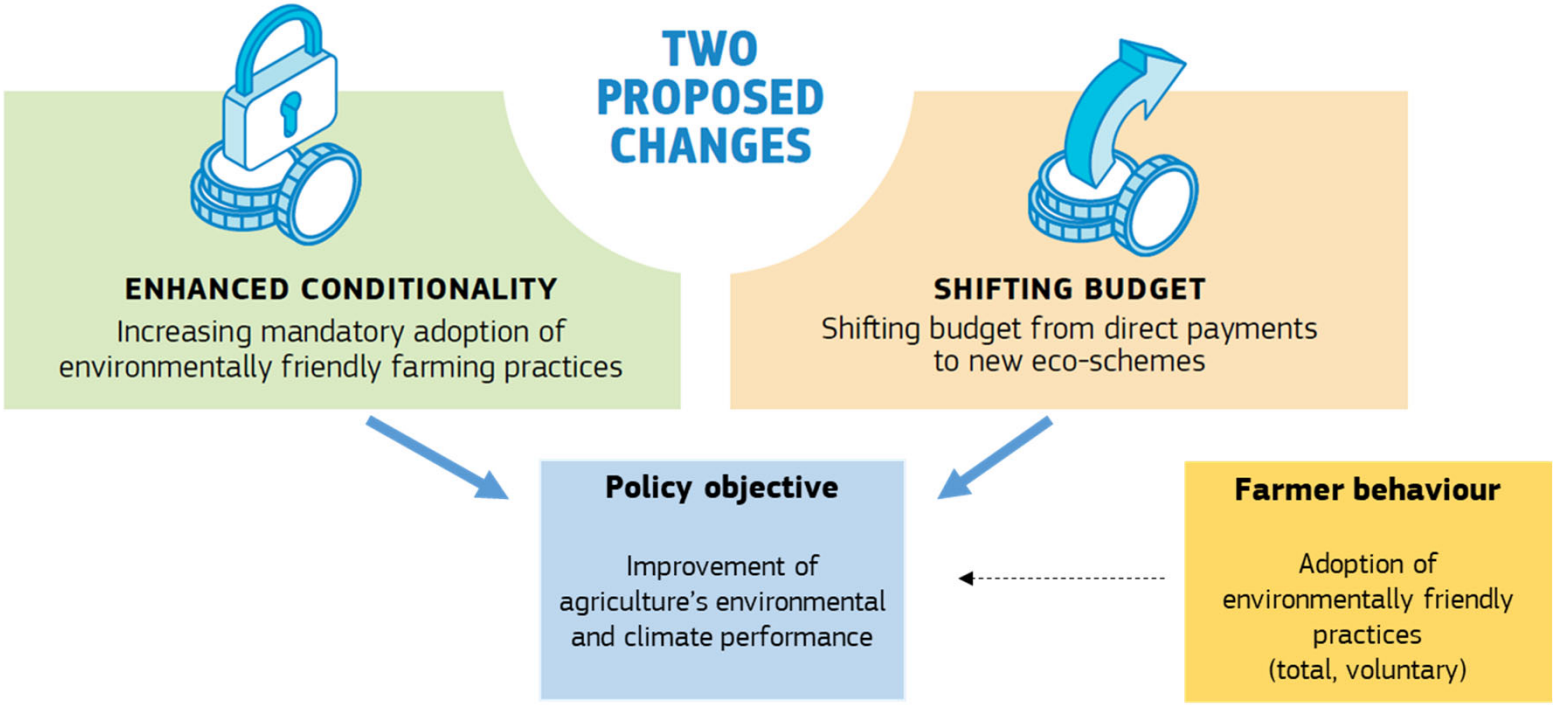
Exploratorio

European Commission

European Commission



European Commission



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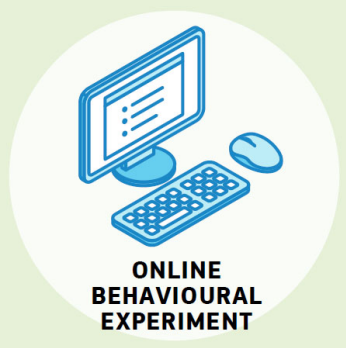
Crowding out effect / mental accounting / Moral licensing – when mandatory increases voluntary decreases

Crowding in effect – when mandatory decreases voluntary increases due to injunctive norms

Lower endowment leads to lower contribution in absolute terms

European Commission



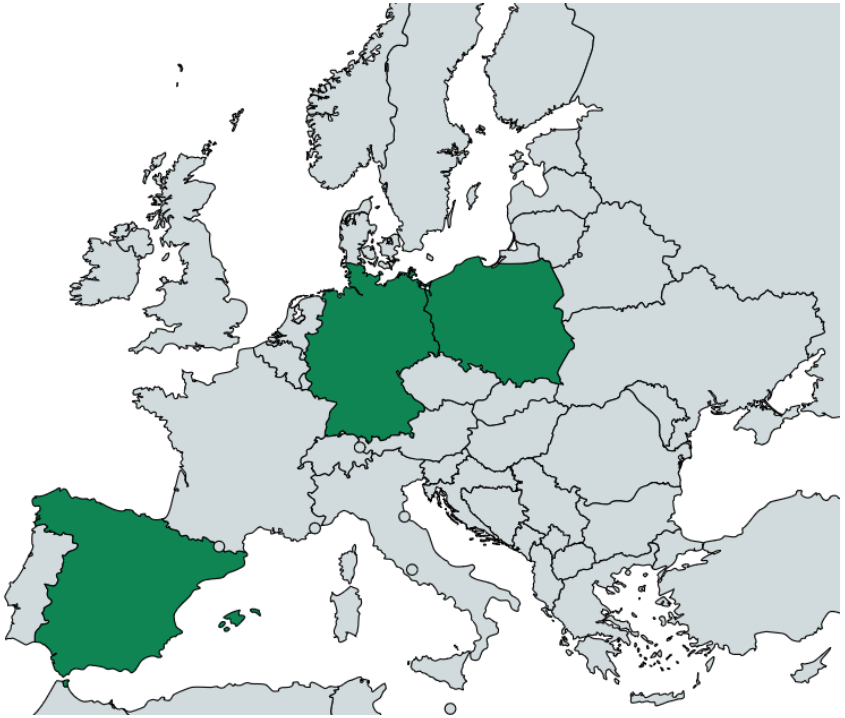
Self-administrated

Semi-contextualised

Incentivized

Pre-registered

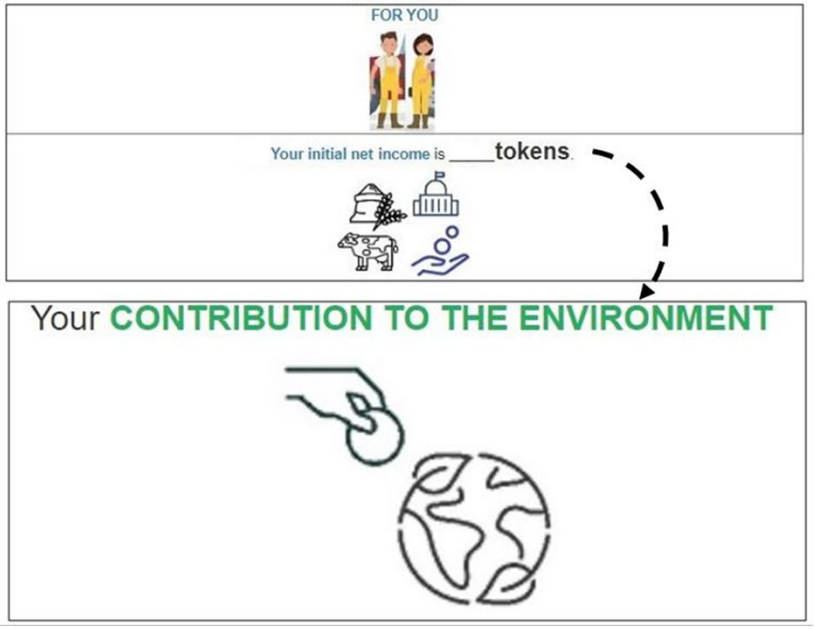
AS PREDICTED

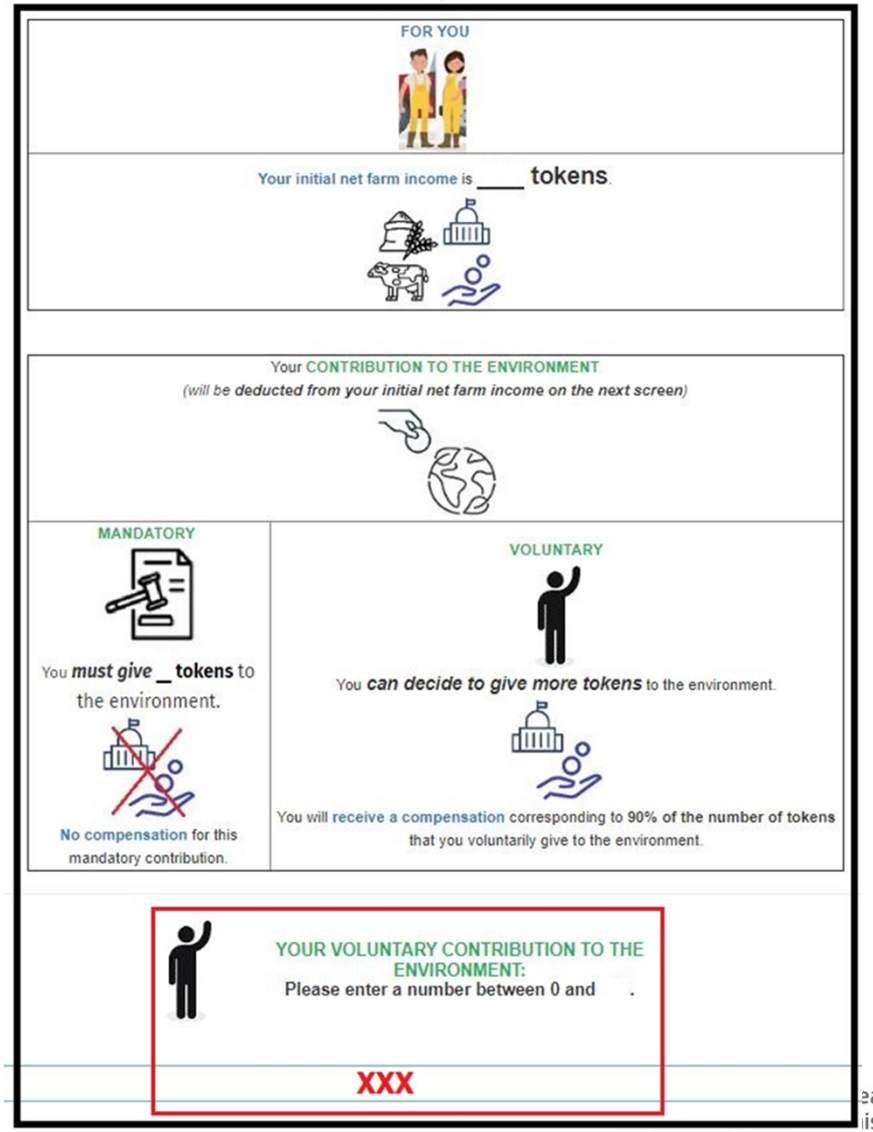


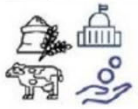
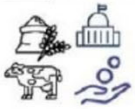
600 farmers (200 x country)

Soft quotas for size, age and farming activity

European Commission


FOR YOU
Your initial net income is ____tokens.
Your CONTRIBUTION TO THE ENVIRONMENT


FOR YOU
Your initial net farm income is ____ tokens.
Your CONTRIBUTION TO THE ENVIRONMENT
(will be deducted from your initial net farm income on the next screen)
MANDATORY
You must give _ tokens to the environment.
No compensation for this mandatory contribution.
VOLUNTARY
You can decide to give more tokens to the environment.
You will receive a compensation corresponding to 90% of the number of tokens that you voluntarily give to the environment.
YOUR VOLUNTARY CONTRIBUTION TO THE ENVIRONMENT:
Please enter a number between 0 and .
XXX

	Framing of variation	Parameters	Within-subject factor (Every participant was exposed to all three levels, one after the other, in random order) Level 1	Level 2	Level 3
Between-subject factor (Every participant was randomly allocated to one and only one of these two experimental conditions)	Variation in mandatory contribution to the environment	Held constant: Your initial net income is **300** tokens 	MANDATORY  You *must give* **5** tokens to the environment.	MANDATORY  You *must give* **40** tokens to the environment.	MANDATORY  You *must give* **90** tokens to the environment.
		Gap from Level 1		+ 35 tokens	+ 85 tokens
		Disposable initial net income (= initial net income – mandatory contribution)	295 tokens (= 300 – 5)	260 tokens (= 300 – 40)	210 tokens (= 300 – 90)
	Variation in income, framed as variation in direct payments	Held constant: MANDATORY  You *must give* **5** tokens to the environment.	Your initial net income is **300** tokens 	Your initial net income is **265** tokens 	Your initial net income is **215** tokens 
		Gap from Level 1		– 35 tokens	– 85 tokens
		Disposable initial net income (= initial net income – mandatory contribution)	295 tokens (= 300 – 5)	260 tokens (= 265 – 5)	210 tokens (= 215 – 5)

Individuals assigned randomly to one of two treatments

Levels presented in random order

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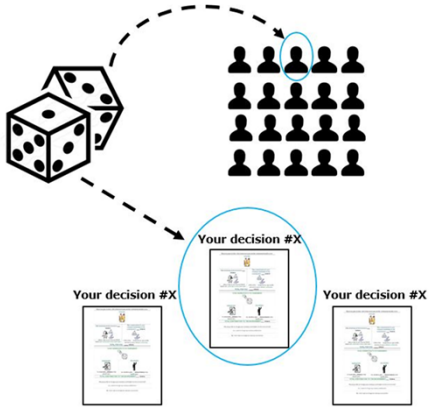


Incentivisation

TOTAL FOR YOU ___ tokens → ___ € /zł

+

DE+ES: amazon.com Gift Card

PL: allegro

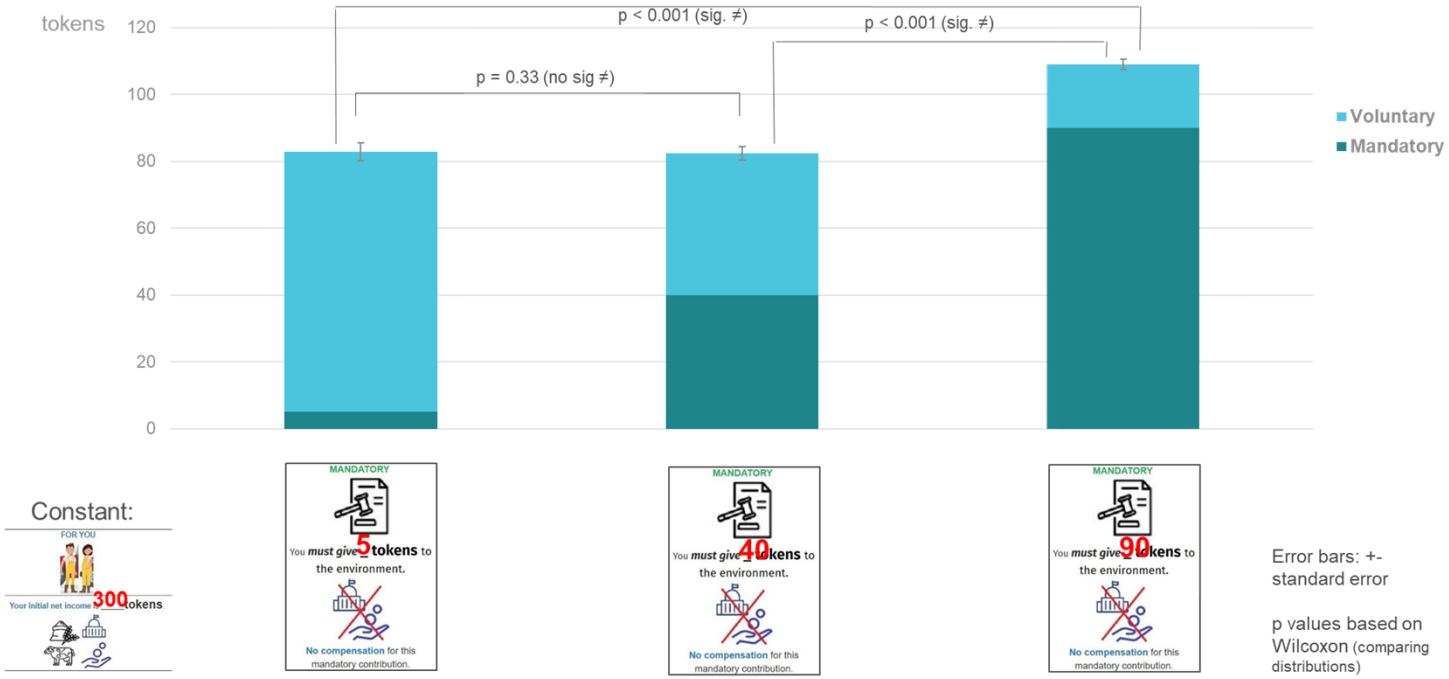
YOUR TOTAL CONTRIBUTION TO THE ENVIRONMENT ___ tokens → ___ € /zł

a Tree for You

+

European Commission

TOTAL CONTRIBUTION TO THE ENVIRONMENT



Error bars: +- standard error

p values based on Wilcoxon (comparing distributions)

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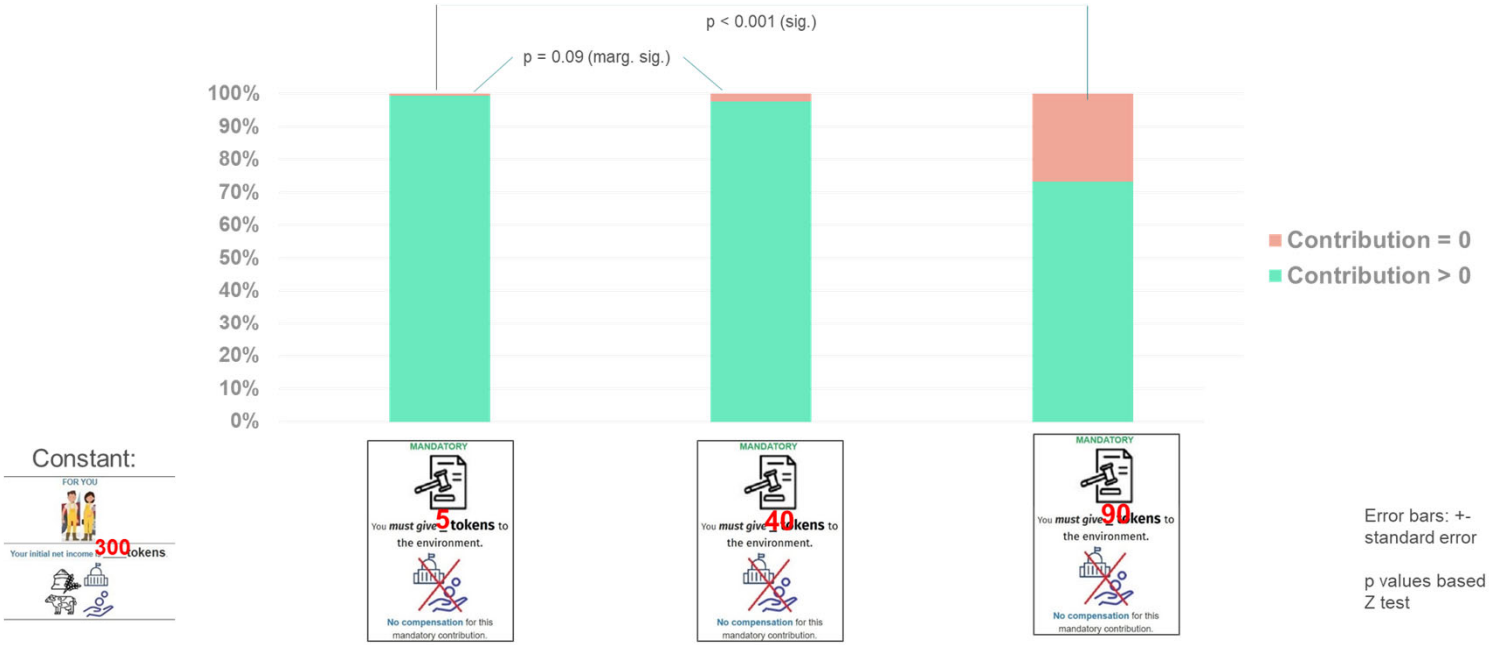
SHARE OF ZERO CONTRIBUTIONS



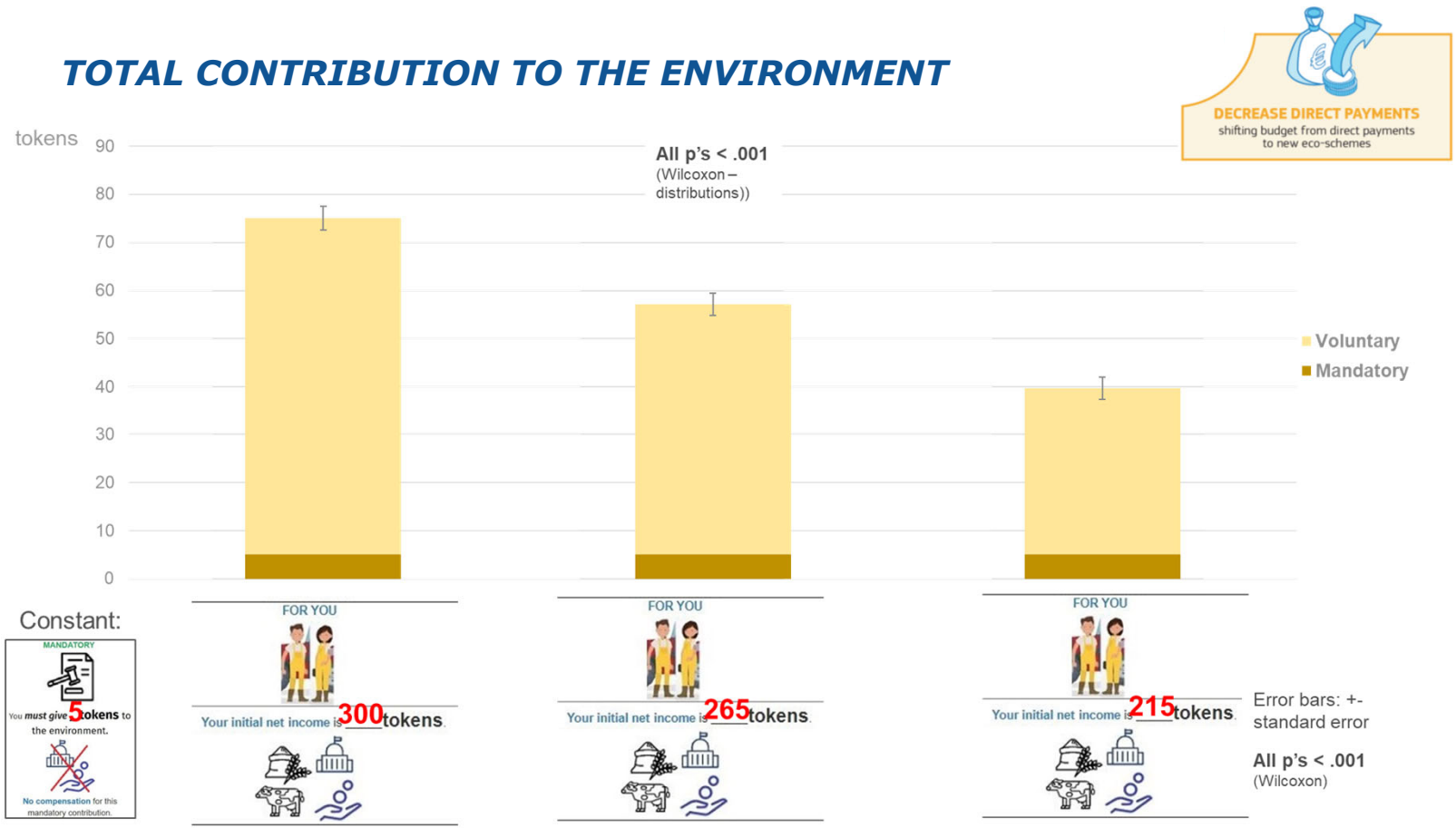
Constant:

Error bars: +- standard error

p values based on Z test

European Commission

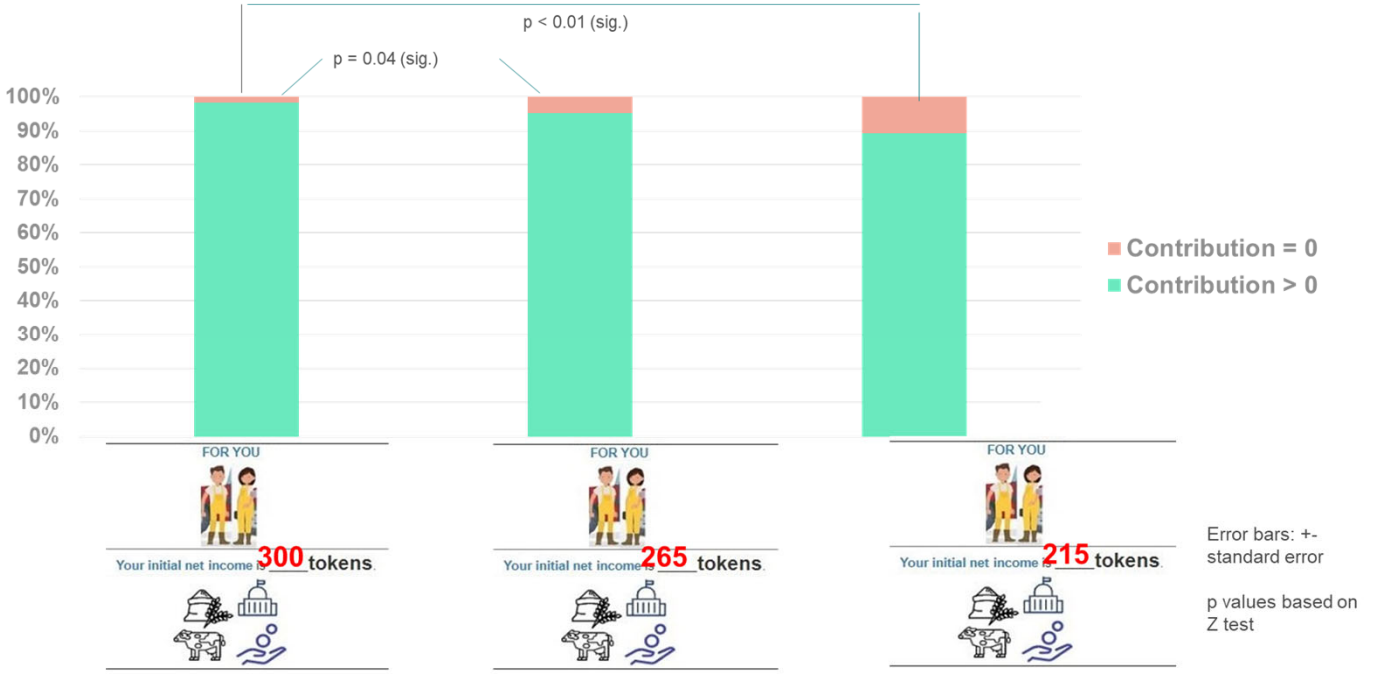
TOTAL CONTRIBUTION TO THE ENVIRONMENT



European Commission

SHARE OF ZERO CONTRIBUTIONS

Constant:

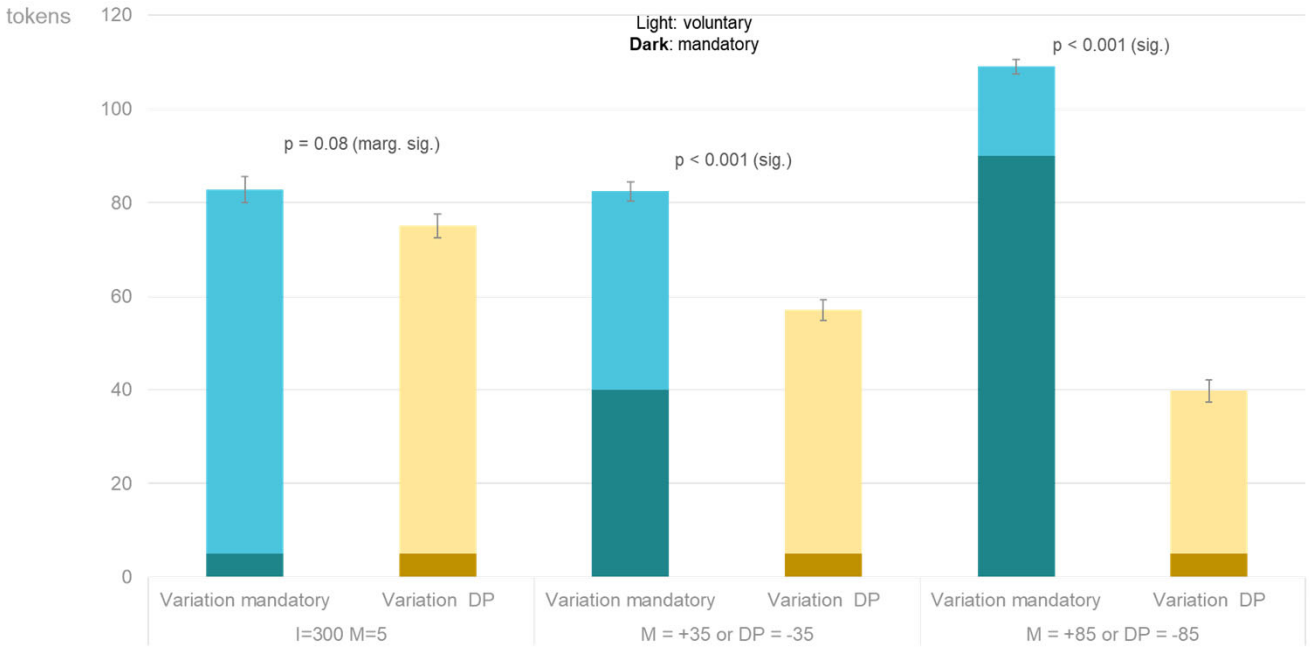


Error bars: +- standard error

p values based on Z test

European Commission

TOTAL CONTRIBUTION TO THE ENVIRONMENT

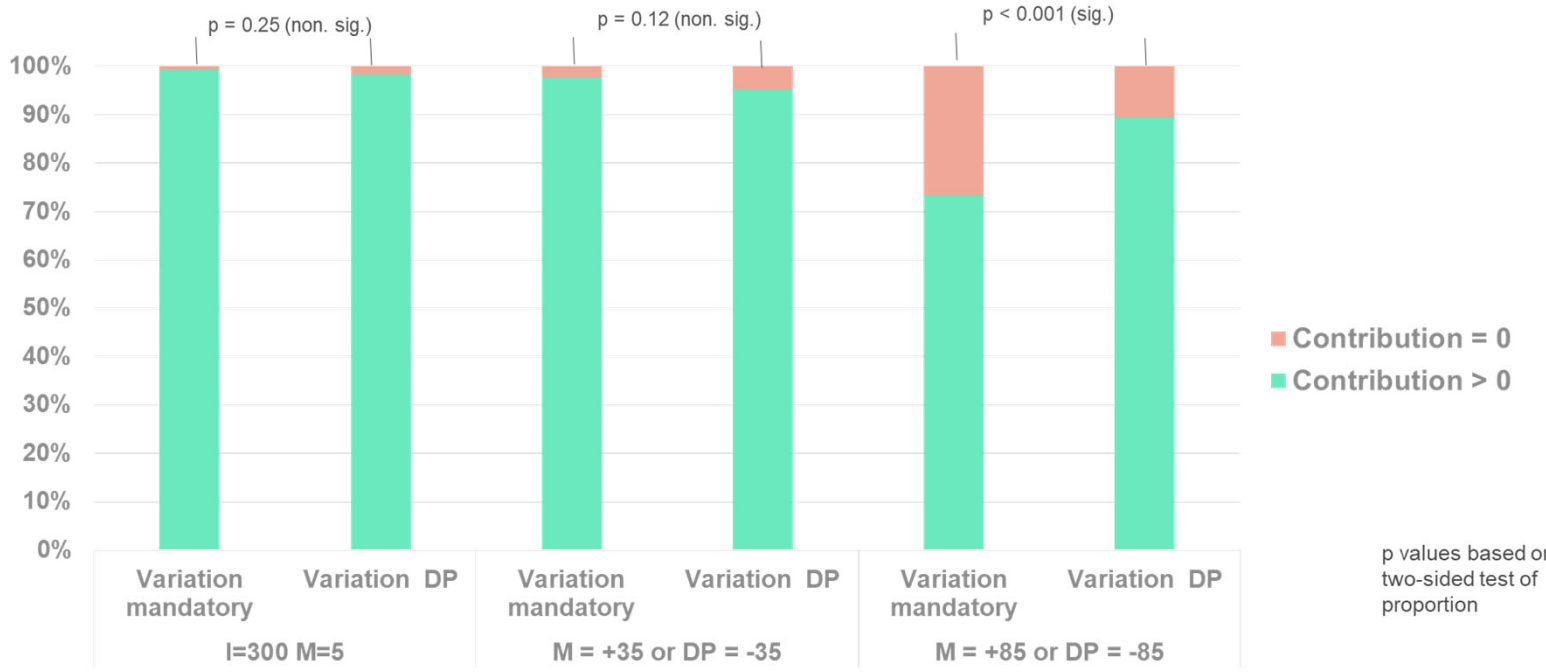


Error bars: +- standard error

p values based on Mann Whitney U

European Commission

SHARE OF ZERO CONTRIBUTIONS



p values based on two-sided test of proportion

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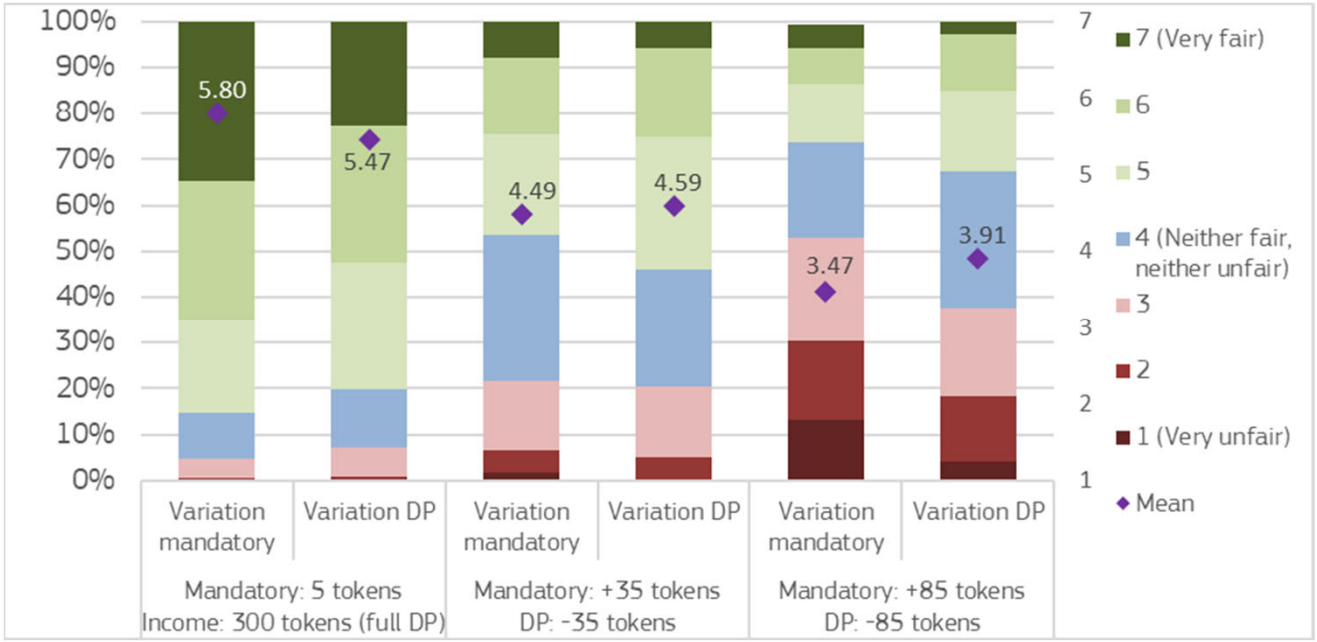
FAIRNES PERCEPTION OF OPTIONS



European Commission

Enhancing conditionality may not necessarily increase the overall adoption of environmentally friendly practices…

… unless the increase in requirements is substantial.

Decreasing BISS payments in favour of eco-schemes may not increase overall adoption of environmentally friendly practices.

… but the picture could be different in real life and for higher compensation rates

Voluntary contribution more sensitive **to variation of mandatory contribution than to equivalent variation of endowment**

Evidence of moral licensing effect?

European Commission

Thank you

European Commission