

# Joint Research Centre

the European Commission's in-house science service

*Serving society  
Stimulating innovation  
Supporting legislation*

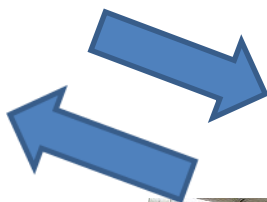
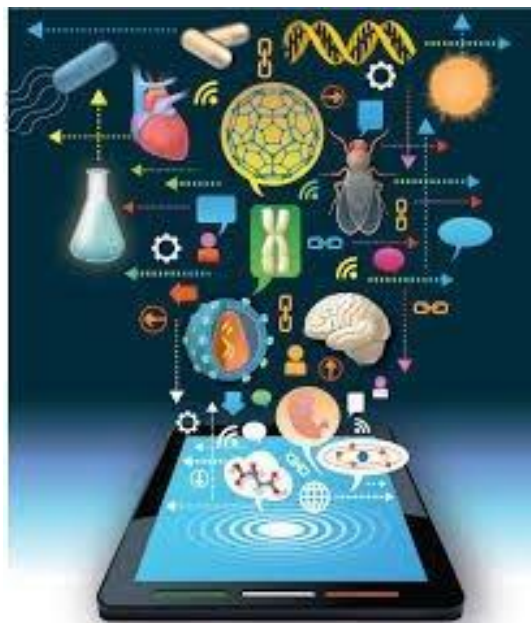
## The Agro-Economic Modelling Platform of JRC a tool for assessing plant health impacts?

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**JRC D4 Unit "Economics of  
Agriculture"**

**Parma, December 14th 2016**

[www.ec.europa.eu/jrc](http://www.ec.europa.eu/jrc)

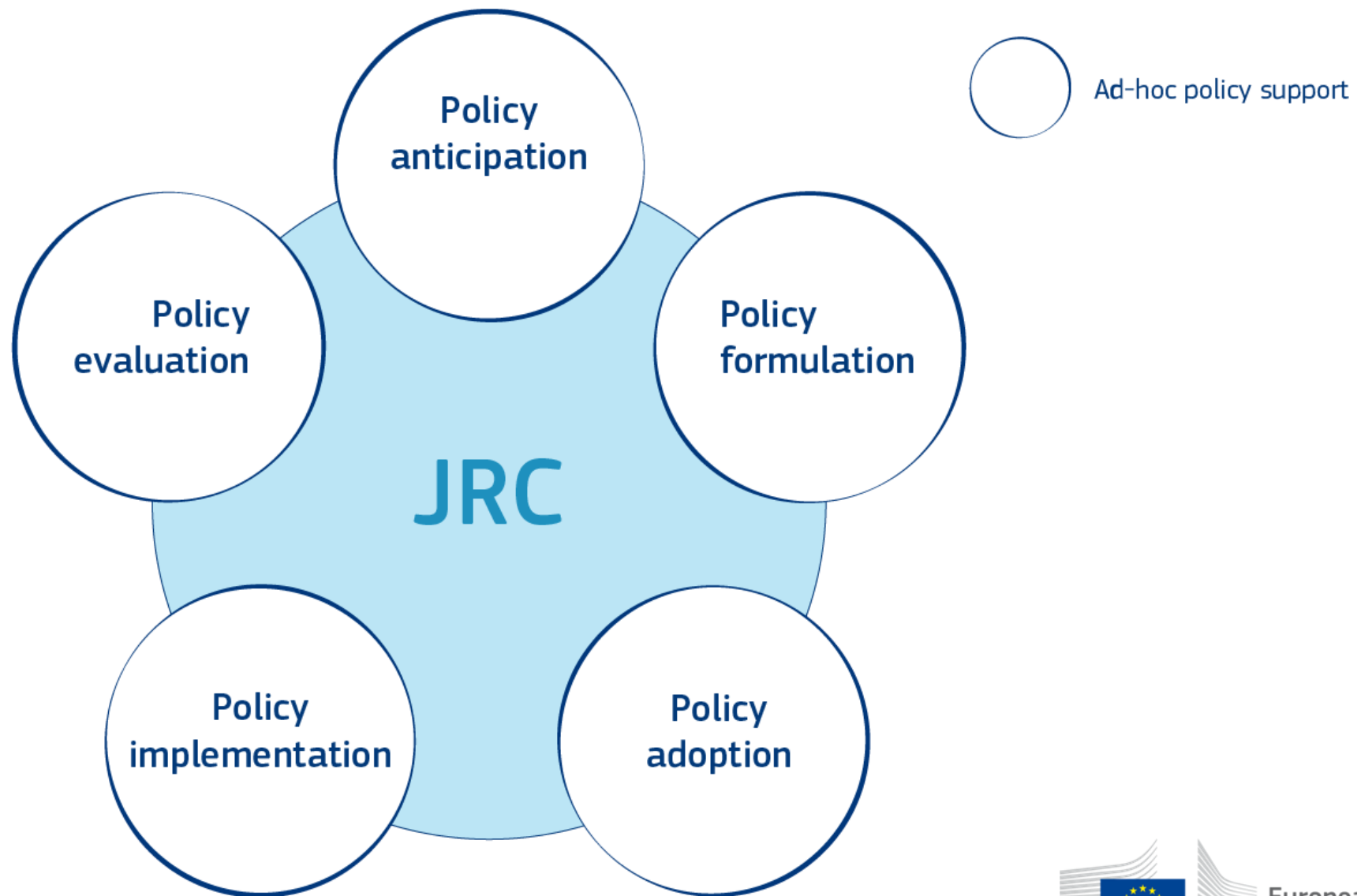
# The need for evidence to inform policy



## JRC's Mission

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

# JRC and the EU policy cycle

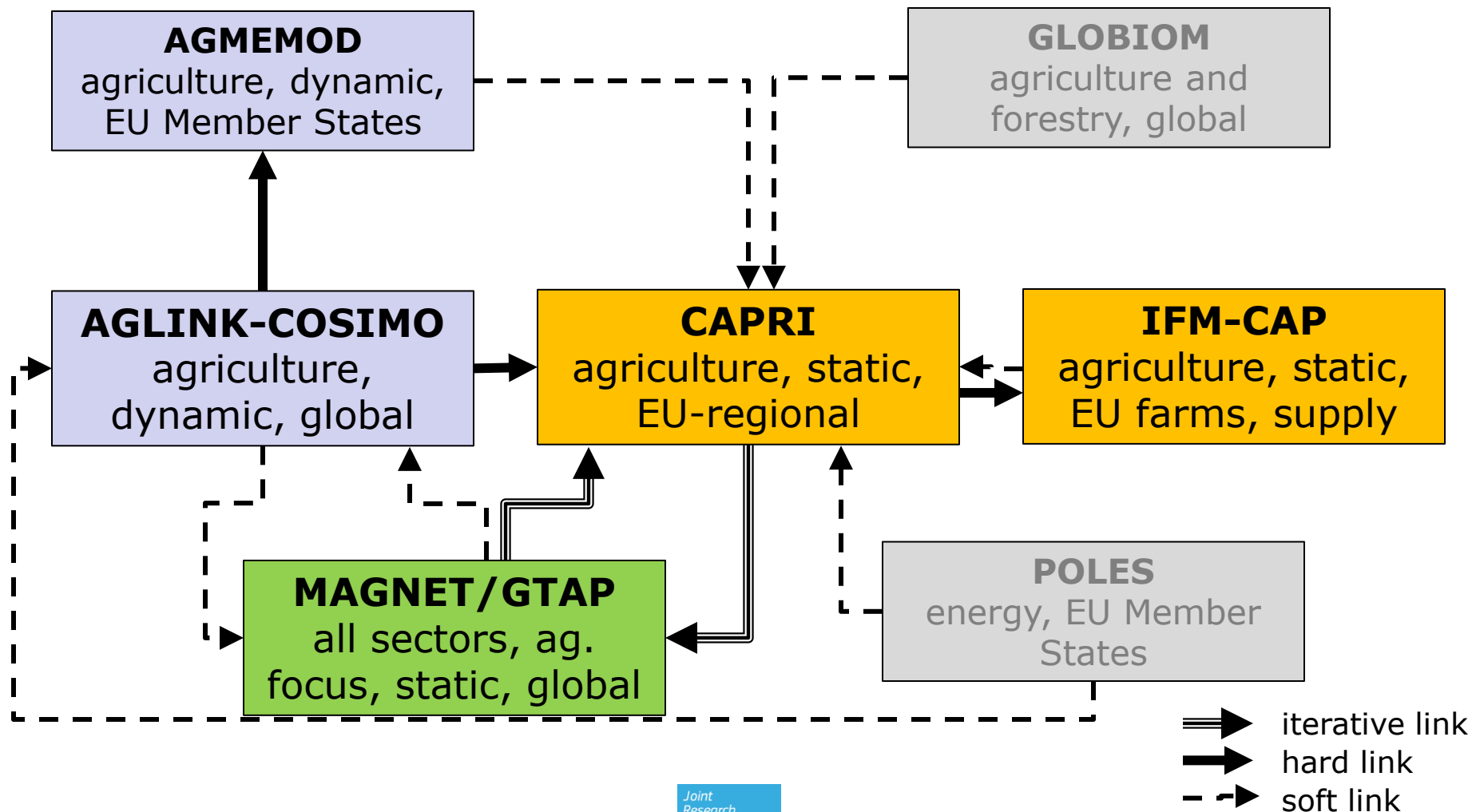


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## Unit D4: Economics of Agriculture

1. **Socio-economic impacts of changes in the Common Agricultural Policy (CAP) and related policies (biofuels , trade agreements and climate policies)**
2. **Socio-economic impacts of policies regulating agricultural inputs and technologies (i.e. GMOs, animal cloning, pesticides)**
3. ***Socio-economic impacts of quarantine pests for EU agriculture?***

## Agroeconomic modelling platform



## Different criteria for matching the model chain to the research question

- Regional scope: global, EU-wide, national, region, farm or grid
- Time dimension: dynamic or static
- Sectoral coverage: agriculture (PE) or the entire economy (CGE)
- Commodity coverage: agriculture, energy, forestry, processing industry
- Policy coverage: domestic and trade policies, EU vs. non-EU, CAP
- Consideration of uncertainty: deterministic versus stochastic analysis



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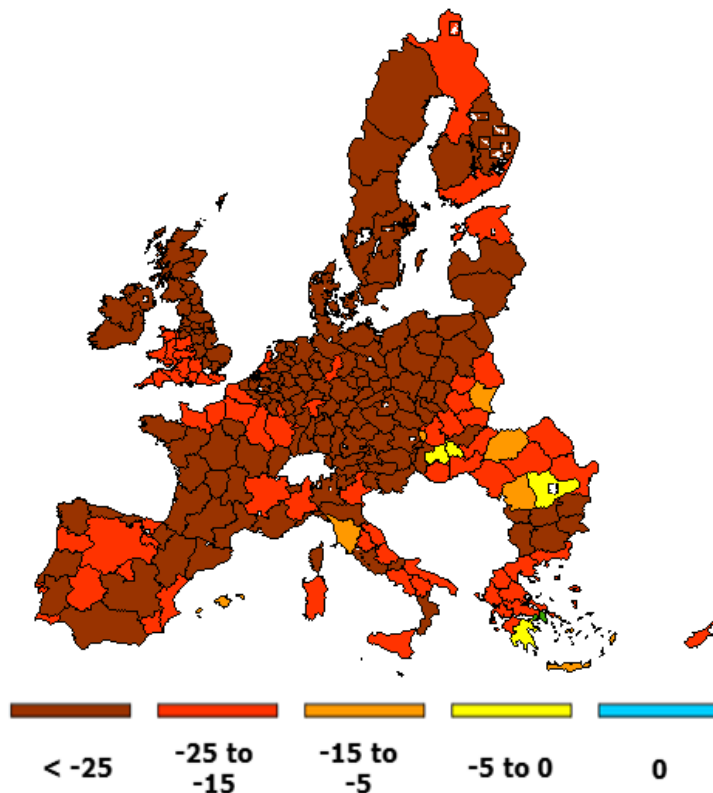
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### Beef production most affected

Changes in beef production (%) with a homogenous GHG reduction of 28%



### Emission leakage (through changes in trade)

		HET19	HET28	HOM19	HOM19ET	HOM28	HOM28ET
Agricultural emissions	Emission leakage	77	91	67	64	81	77
	Net emission reduction	23	9	33	36	19	23

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## Unit D4: Economics of Agriculture

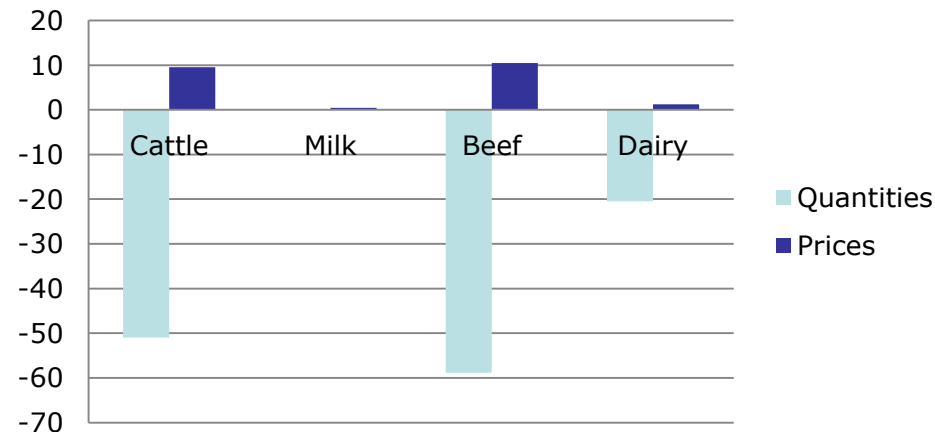
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# Example CGE model

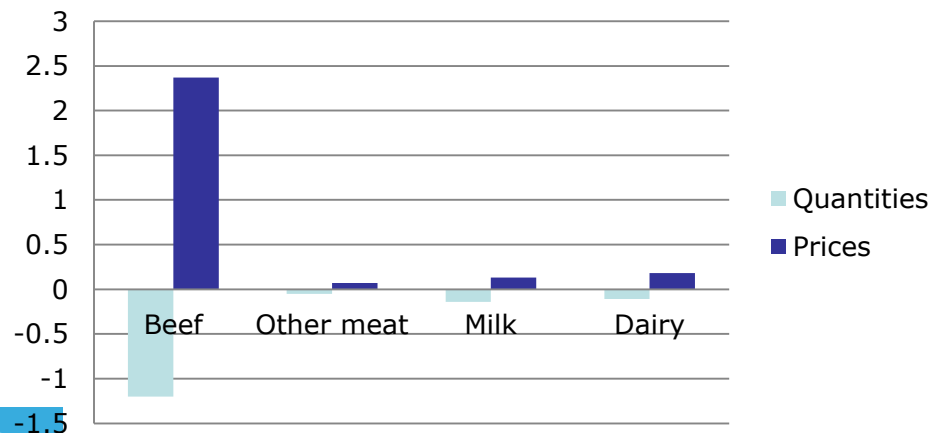


Global economic & trade model to assess impacts of EU banning imports of beef produced in countries allowing cloning.

## EU imports, % Change, Ban Scenario



## EU consumption, % Change, Ban Scenario



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3. ***Socio-economic impacts of quarantine pests for EU agriculture?***

- **The problem of quarantine pests is not new but has intensified with increased global trade**
  - More and faster trade
  - Increased trade in fresh commodities
  - New travel/trading routes/smuggling
- **Provide more accurate assessments of the possible socio-economic costs of quarantine pests**

# A case study of current relevance



## Xylella Fastidiosa

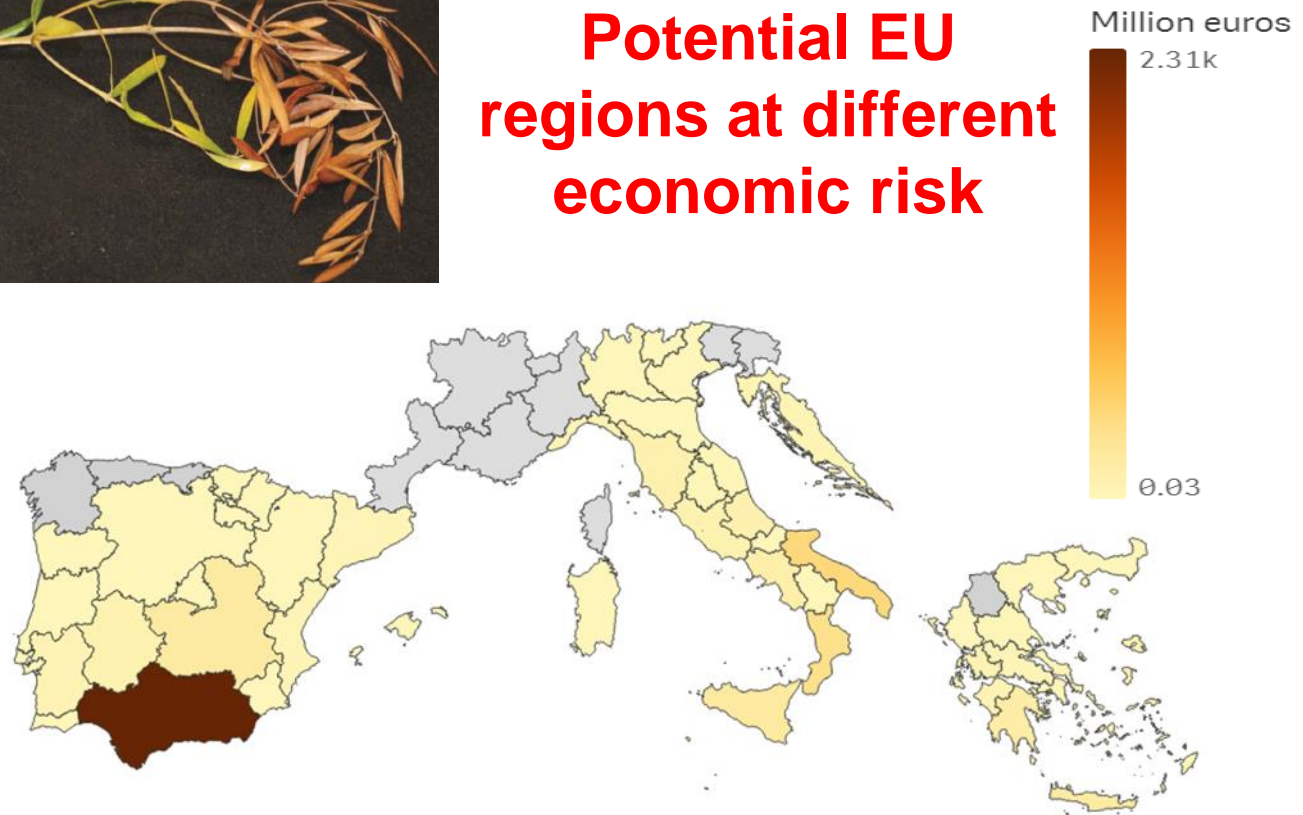
Branch dieback



Leaf scorch



**Potential EU regions at different economic risk**



Olive oil production value at basic price (By NUTS2 regions- EUROSTAT 2013)

- **Assessing impacts is challenging and requires agronomic and economic data not readily available *ex ante***
  - Six types of impact (FAO, 2011)
    - **Production:** i.e. yield losses, increased pesticide costs
    - **Prices and markets:** supply-price elasticity, consumer reaction
    - **Trade:** could be major (lost markets)
    - **Food/Nutrition Security:** for developing countries
    - **Human health/Environment:** i.e. increased pesticides
    - **Control, mitigation and eradication campaigns costs:** research, technology and information transfer to growers, monitoring costs



## Economic tools to assess impact of pests (1)

### Production

Farm level data: basis of any further impact analyses

Partial budgeting choice method, but needs agronomic data and economic data not readily available, *particularly when there is no disease history in the EU (ex-ante)*

### Prices and markets

Provided production impacts are available, the choice is a partial equilibrium model (CAPRI)

### Trade

CAPRI : trade changes resulting from supply/price changes can be modelled. Export bans can be modelled too (CGE models).

## **Economic tools to assess impact of pests (2)**

### **Food security / nutrition**

Unlikely to be an issue for EU

### **Environment / Health/ other non-market impacts**

Methodologies exist ("willingness to pay", etc) but not routinely used

CAPRI provides information on some environmental parameters

### **Control/Erradication costs**

Estimate from literature and/or information from authorities

# CAPRI model

## STRENGTHS

- High level of resolution (Regions, commodities)
- Flexibility of aggregation
- Detailed representation of agricultural policy instruments
- Integration of EU results into world market dynamics
- Experienced network of developers
- Expandable to new areas – GHG / Water, Impact of Pests??
- Reference for linking the agricultural sector into other models (land use, forestry,)

## WEAKNESSES

- Complexity / entry barriers
- Lack of formal coordination
- Lack of stability
- Some areas of the module outdated or improvable
- Does not cover forest/wood production (where many quarantine pests exist)

**Soft wheat**  
**Durum wheat**  
**Rye and Meslin**  
**Barley**  
**Oats**  
**Paddy rice**  
**Maize**  
**Other cereals**

**Pulses**  
**Potatoes**  
**Sugar beet**  
**Flax and hemp**  
**Tobacco**  
**Other**  
**industrial crops**

**Rapeseed**  
**Sunflower**  
**Soya**  
**Olives for oil**  
**Other oilseeds**

**Tomatoes**  
**Other vegetables**  
**Apples, pear & peaches**  
**Citrus fruits**  
**Other fruits**  
**Table grapes**  
**Table olives**  
**Table wine**  
**Nurseries**  
**Flowers**  
**Other marketable crops**

# Conclusions



- Very little done so far: need to increase quantitative information on the economic impacts
- Farm level data essential but difficult to obtain for pests with no EU history
- Indirect effects: agro-economic modelling tools available (JRC) but need fine tuning and need to be fed with good farm level data
- Agro-economic models don't cover forests
- A combination of qualitative and quantitative assessment is likely the best approach (multi-criteria analysis; real farm case studies; cost-benefits; cost-effectiveness analysis)



## Stay in touch



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