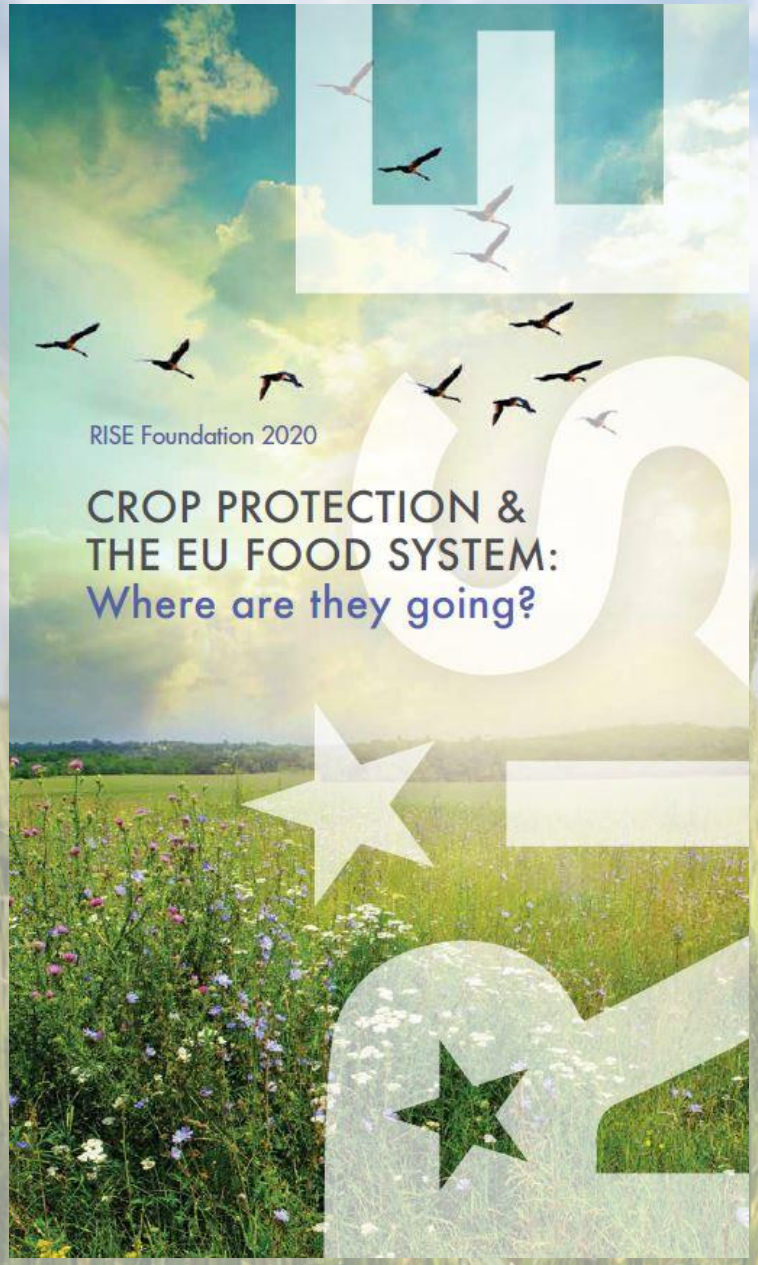

Crop protection and scenarios for the future of agriculture

INRAE

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Introduction to the RISE report

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Crop protection and the EU food system: where are they going?

- RISE study, Jan ‘19 to March ’20, by Allan Buckwell, Evelyn de Wachter, Elisabet Nadeu & Annabelle Williams plus independent expert Advisory Committee

- **Outline**
  - Crop protection is an enduring source of controversy
  - Evidence on crop protection,
    - where does this leave EU crop protection strategy?
  - The imperative for change
  - Elements of transition
  - Drawing the threads: policy recommendations

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Crop protection is a totemic issue and enduring source of controversy

- **The public, politicians**: reduce pesticide risk & use
- **Farmers**: toolbox is depleting, threats are increasing
- **Plant protection industry**: costly, unpredictable approval
- **Environmentalists**: climate damage, pollution, biodiversity loss
- **Regulators**: disappointing impact of legislation

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Evidence on crop protection

see Appendix for details

- The crop protection toolbox
- Pesticide sales and use
- Regulatory framework for pesticides
- Impacts on health
- Impacts on environment
- Has the ‘toolbox depleted’?

2.1 The crop protection toolbox

- **Threats**: weeds, fungi, bacteria, viruses, insects, molluscs . . .
- **Impacts**: reduced yield, quality, predictability, costs.
- **Types of protection**
  - **Prevention**
  - **Vigilance**
  - **Mechanical**
  - **Biologicals**
  - **Synthetic Plant Protection Products**
- Clear perceived benefit / cost ratio for PPP use for farmers

2.2 Pesticide sales and use

- Remarkably little robust and comparable data for EU MSs
- Technical change in the PPPs, their formulation, concentration & application technology
- EU data only since 2011, Harmonised Risk Indicators since Nov 2019 – one fell 20%, the other rose 50%
- Has total use fallen? Has the risk fallen? No strong trends in either? Use per hectare down. More applications/season. High variability by crop and MS
- High proportion of total use for cereals/oilseeds; but higher rates/ha for hortic crops & vines

2.3 EU regulatory framework for pesticides

- Three key regulations
  - **1107/2009** concerning the **placing of plant protection products on the market** repealing Dir. 91/414/EEC
  - **396/2005** on the **maximum residue levels** (MRL) tolerated in or on our food or feed
  - **Sustainable Use Directive** SUD (2009/128/EC) and its implementation through National Action Plans (NAPs)
- Plus **Enviro. regulations**: birds, habitat, water & drinking water
- EU regulates **Active Substances**, MS **Plant Protection Products**

Review of the regulatory framework

- **REFIT exercise 2018** : effectiveness, efficiency, relevance, coherence, and the EU added value of 1107/09 & 396/05
- Some broad conclusions to date
  - *"Most stringent regulation in the world"*
  - No fundamental change in system
  - Large scope to improve process
  - Scientific concerns flagged about cumulative & cocktail effects and resistance in human health
- Commission response has been delayed
- No suggestion of reverting to a risk, rather than hazard-based approach. If anything the system will tighten not loosen.

2.4 Impacts on health

- **Occupational and public exposure**
  - Farm and municipal workers, plus workers in PPP industry.
  - Legal cases in the US.
- **Dietary exposure**
  - Many possible impacts, difficult to establish causal relationships
  - EFSA statistics on pesticide residues and MRL exceedances, conclusion: "*according to current scientific knowledge, acute and chronic dietary exposure to pesticide residues is unlikely to pose concerns for consumer health*"
- Public perceptions may not reflect these conclusions

2.5 Impacts on the environment

- Degradation of biodiversity well documented
- Multiple factors responsible: climate change, habitat loss, alien species, agricultural practices including PPPs
- Soil biodiversity least well understood. No baselines or regular monitoring.
- Better data on birds, insects especially pollinators and aquatic environment.
- General conclusion: there is *"increasing evidence that PPPs could be contributing to the observed biodiversity decline and the reduced quality of EU waters and soils".*
- Magnitude of effects not established
- Enviro impact is the biggest driver of change in PPP use

2.6 Has the toolbox been depleted?

- Prior to the current (2009) regulation there was, roughly, a halving of the number of AS available from about 1000 to 500.
- Since operation of 1107/2009, the number has hardly changed
  - 23 not approved vs health, 15 not approved vs environment
  - New products appeared
- Raw numbers do not tell the story: efficacy, mode of action, availability of a range of products
- Main fear is future loss of AS – large backlog of products still to be approved, will take several years given resources
- Meanwhile increasing use of emergency authorizations
- Economic impact of reduced toolbox? Thin evidence.

2.7 Does the EU have a satisfactory strategy?

- Current **EU strategy** embodied in the regulatory framework is:
  - *"to reduce harm to health and environment by Plant Protection Products whilst not impeding competitiveness of EU agriculture".*
- EU implementation: 4 sets of Reg^{ns}. approval, MRL, SUD + Enviro – key is to move away from higher risk products
- Some argue for zero pesticides, most are not arguing for fundamental change in the strategy, rather
  - "*better implementation with clearer targets, better statistics and better monitoring of progress*"
- Lack of clarity of objectives . . .
- Problem is less the overall strategy but encouraging the use of acceptable agronomic practices

3

The imperative for change

At risk of over-simplifying, consider two future perspectives:

Continue conventional farming – with technology-assisted improved environmental performance

System switch to **sustainable farming** systems

3.1 Can / should the status quo system survive?

- The present system is **environmentally unsustainable**
  - It is undermining its own continuation. How?
    - By contributing to biodiversity loss
    - Development of resistance to products
    - Expected steady deletion of approved Active Substances
- EU food security argument is diluted: slower EU population & economic growth + over-consumption + food waste
- This political case vs PPPs has been 'won' – **Green Deal + F2F & Biodiversity strategies. S**trong targets, weak policies
- The next question is the **technical and economic feasibility** of a switch to 'sustainable farming', ie a de-intensification of EU Ag.

3.2 What *is* sustainable agriculture?

- *It restores soil & above ground biodiversity to maximise natural & circular processes for plant nutrition & in-built health, pest & disease resistance to create a resilient production system*.
- Many such systems, eg **Organic Farming,** common features are negative and positive actions for lower intensity farming.
- Technical and economic feasibility for substantial expansion?
  - Delivery of consistent, blemish & mycotoxin-free produce at scale?
  - Economic impacts: farm income, food prices, trade
  - Beliefs, skills and knowledge
- Wholesale switch to such systems implies
  - Higher prices, reduction in consumption & waste
  - Changes in social welfare given higher EU prices
  - Trade policy on imports
- Meanwhile, does Net Zero GHG emisions by 2050 require reduced agricultural area?

3.3 So where are we heading?

- Change is imperative, transition towards sustainable agriculture
- Suggested new goal for crop protection.

  "To re-establish ecosystem functions on agricultural land to provide nature-based solutions for pest, disease and weed threats, increase system resilience and to utilise all means to eliminate harms caused to health and environment by use of PPPs."

- By encouraging multi-track transitional development path embracing best agricultural & ecological science to help a wide variety of production systems to converge on achieving the stated goal.

4 Elements of the transition

- **Real transition will involve**
  1. **Restoring ecosystem function -** push this hard for cereals/oilseeds sector, get indicators, avoid rigid certification
  2. **IPM** - insist on evidenced, conscious uptake
- **Doing better with current crop protection** can be helped by
  3. **Biocontrol –** nature based so expected lower risk, but lower efficacy, more difficult to use? Help needed plus specific approval regulation
  4. **Precision agriculture** – to minimise use and negative effects whilst PPPs still used + big data applications for all farming systems
  5. **New Breeding Techniques –** potential for in-built resistance and resilience. RNAi – NBT or biocontrol? Review of regulation underway.

5

Conclusions and policy recommendations

5.1 Drawing the threads together

- Environmental unsustainability is a big pill to swallow
- Restoring natural ecosystem functioning through farming system change requires change in food prices, consumption, social welfare & trade policy.
- To do this requires top-level strategic political commitment in EU institutions = **Green Deal**
  - Green Deal & its strategies are not yet accepted by the Council and Parliament – buy-in of society at large
  - The Food System (F2F), Biodiversity, Forestry, Climate and Land Use strategies insufficiently analysed & integrated – especially the balance between de-intensified agriculture, and land use change for climate protection.

5.2 Policy recommendation headings

- Top level political consent, then
  - Agricultural and environmental policy change
  - Specific crop protection policy
  - Enabling measures

Agricultural and environmental policies

- The CAP has to be a principal instrument in securing the system change
- It must broaden its objectives to refer to climate protection and restoring ecosystem function + food security, viable farming & thriving countryside
- Support for sustainable farming systems & practices & enviro outcomes
- Adoption of IPM should be a condition of any payments

Crop protection policy

- Teeth to deliver targets on pesticide use & sustainable farming?
- Contrast Danish and French experience.
- Revisions to risk assessments relating to cumulative and cocktail effects
- New regulation for biocontrol products
- More teeth to the Sustainable Use Directive – make it a regulation?
- The regulation of New Breeding techniques

Enabling policy measures

- Definitional, training & educational tasks
- Indicators for ecosystem functioning, more comprehensive pesticide use statistics & risk indicators
- Research gaps, including food system – intensity – land use – production - consumption & trade analysis.

Final words

No single fix. No single food system solution

Wide spectrum from contained ‘vertical’ farming to extensive sustainable systems –many variants in between

Substantial shift in production system demands corresponding shift in consumption (diets & waste), and hence prices and trade.

Thank you for listening, we look forward to reactions – but please read the report.

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