Crop protection and scenarios for the future of agriculture
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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
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
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 Regns. 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
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.** Strong 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 emissions 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
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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