Cumulative impact of hazard-based legislation on Crop Protection Products in Europe

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Summary

The viability of European agriculture is put under pressure. As a result of the EU moving towards hazard-based legislations, several substances for plant protection used in the EU are at risk. While no definite decision on which active substances face withdrawal has been taken yet, earlier research identified some 75 out of the total 400 substances currently available to be phased out.

This would imply that for the cultivation of various staple as well as specialty crops no alternative method might remain on the market to treat specific common diseases, pest or weed. As part of Integrated Pest Management (IPM), diversity in substances available is crucial to face immediate pest pressure and prevent long-term resistance effects. Looking ahead, the substances withdrawn are not likely to be easily replaced. There are two reasons for that: first, the development of new active ingredients up to market introduction takes about 11 years and costs over €280 million[1]. Secondly, the pipeline of products waiting for approval for the European market is also getting emptier due to rising Research and Development (R&D) time and costs (i.e. 70 substances in pipeline in 2000, down to 28 in 2012)[2].

In this background, the study aims to shed light on the current value of the 75 substances for European agriculture. It focuses on 7 staple crops at the EU level and 24 specialty crops across 9 EU member states. Together this represents 49% (in value)[3]. The various crops are studied by themselves; possible effects on pesticide use of specific crop rotations (or any significant change in the rotations) have not been taken into consideration. The analysis is based on 5-year average productivity and costs (2009-2013) in order to average out yearly variations:

- The team builds largely on the risk list of 87 substances that has been drafted by Andersons[4] with DEFRA as key source. 12 substances have been taken out as these are based on UK-specific regulation or at low risk, thereby aiming to get to likely EU-wide conclusions;
- We studied the nine largest EU agricultural markets (representing 62% of EU crop value of the staple crops[5]) and extrapolated these effects to the EU level;
- Within the nine country studies, the crop coverage ranges from a minimum of 25% in the Netherlands up to 70% in France of national crop value;
- The selection of crops included in the scope of the study is based on relevance of various crops and data availability for the countries covered;
- We use the best available national and EU databases on crop production, cost structures (e.g. EUROSTAT, FAOstat, FADN, WUR, Teagasc, DEFRA).

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[1] Phillips McDougall, Agrochemical Research and development: The Costs of New Product Discovery, Development and Registration, 2016

[2] Phillips McDougall, R&D trends for chemical crop protection products, Sept 2013

[3] Total volume of EU crop output is €204bln, FOASTAT

[4] "The Effect of the Loss of Plant Protection Products on UK Agriculture and Horticulture and the Wider Economy", The Andersons Centre supported by AIC, NFU, CPA; 2014. The Andersons Centre also draws on insights from the ADAS report on 'The Impact of Changing Pesticides Availability on Horticulture' from 2010. This study's methodology and substance list are in line with these previous analyses.

[5] Stable crops include: wheat, barley, maize, oilseed rape, potatoes, sugar beet and vine. Specialty crops include: durum wheat, carrots, apples, beans, hops, onions, brassica, mushrooms, rice, tomatoes (open & glass), pears, peaches/nectarines, soy, hazelnut, olives, tulip bulbs, apple trees, bell pepper, black currants, citrus fruits, cherry, sunflower and peas for selected countries

The study focus is the immediate effects on yields in line with the WUR 2008 and Andersons' study, and expected long-term (resistance) effects are stated separately.

Key findings

1. Using the 75 substances identified for the production of 7 key staple crops in the EU (potato, barley, wheat, sugar beet, rapeseed, maize and vine) contributes to 98 million ton or €17b in crop value:
   - Barley, wheat, rapeseed and maize could face 10-20% lower yields, while potato and sugar beet might decrease by up to 30-40%; vine yields could decrease by 20%;
   - At current speed of technological progress, it would take 15-20 years to make up for this loss[6];
   - Higher yields and lower production costs for these crops support farmer income by €17b (i.e. €14b additional revenue, €3b lower costs);
   - Overall farm profitability is with the 75 substances 40% higher (€17b of a total of €44b)[7];
   - In value, wheat benefits the most with €4b of value, while sugar beet shows the largest profitability surplus (+100%);
   - The 7 staple crops relate to 1.2m direct jobs. Of these, 30% face a medium or high risk of job loss due to relatively 'thin' margins these crops.

2. The 75 substances are crucial for the economic viability of the 24 specialty crops in scope:
   - The yield supported ranges from 40-100%, a total of 12 million tons[8];
   - The size of the crop protection toolbox of many specialty crops is already limited and is the key driver of the high potential yield losses;
   - These 24 specialty crops relate to 300,000 direct jobs of which almost 60% are at high risk of job loss due to relatively large loss of margins.

3. At current crop demand, the 75 substances support the EU's self-sufficiency for wheat, barley, potato and sugar beet, while limiting the import levels of rapeseed and maize:
   - In contrast to the current situation with a positive trade balance, without the substances the EU is likely to depend on imports for more than 20% of its staple crop demand;
   - Matching the demand with imported crops bears the risk of selling crop produced with non-EU standards on the European market;
   - Meeting the demand for specialty crops seems even more challenging as sufficient import amounts are not always readily available;
   - An additional 9 million ha farmland might need to be integrated to feed Europe. This is equal to half of the total used agricultural area of the UK[9];
   - This would increase the carbon emissions with up to 49 million t CO_2-eq (i.e. 10% EU agriculture, 1% of EU, similar to the total emissions of Denmark[10] or twice the

[6] "The technology challenge", FAO, High Level Expert Forum, 2009
[7] Profitability based on gross margin changes. Gross margin is defined as the difference of total revenues and total variable costs. The choice to report on gross margins has been made due to data availability: while the official sources on variable costs in various countries provide estimates in the same range information on fixed costs lack consistency
[8] Includes durum wheat, carrots, apples, beans, hops, onions, brassica, mushrooms, rice, tomatoes (open & glass), pears, peaches/nectarines, soy, hazelnut, olives, tulip bulbs, apple trees, bell pepper, black currants, citrus fruits, cherry, sunflower and peas for selected countries
[9] Total used agricultural area in the UK was 17,326,990 ha in 2013, Eurostat
[10] Total Danish greenhouse gas emissions (including international aviation and excluding LULUCF) in 2013 were 57.1 million ton CO2eq., Eurostat

international aviation emissions of Germany[11]), putting the CO_2 aims of European legislation at risk;[12]
- In monetary terms, that might mean additional emissions worth €500 million[13].

4. Mediterranean crops analysed benefit from using the 75 active substances because they have a wide range of pest diseases and most of them are minor crops that currently benefit from a strict number of registered active substances:
   - In a short term overview, vine yields will decrease by 20% (-22% in France, -13% Spain, -20% Austria and Italy even -30%);
   - The EU is currently self-sufficient for vine. Losing the 75 active substances will require the EU to import some 4Mt vine from third countries;
   - Yields are expected to decrease by -92% in carrots, -60% in apples, -65% in pears, -40% in olives, -36% in tomato, -36% in citrus fruit and -15% in cherry.

5. Smaller local crop supply will also affect EU value chains with higher costs and less jobs:
   - Primary crop processors in the EU could face difficulties with their supplies, e.g. if tomatoes indeed become economically unviable to be cultivated locally, the long-term perspective for the processors is uncertain;
   - Effects are likely to trickle down the value chain up to the consumer but also to affect trading partners of the EU.

[11] German greenhouse gas emissions related to international aviation in 2013 were 25.7 million ton CO2eq., Eurostat
[12] Agriculture makes up 10% of European total emissions in 2012 of a total 4,683 million tons, Eurostat
[13] €10 per ton, average 2009-2013 ETS prices