Environment and health

Pesticide sales

Indicator	EU indicator past trend	Selected objective to be met by 2020	Indicative outlook of the EU meeting the selected objective by 2020
Total sales of pesticides	▲	The use of plant protection products does not have any harmful effects on human health or unacceptable influence on the environment, and such products are used sustainably — 7th EAP	●
The selected indicator does not afford for an evaluation of progress towards the 2020 objective. Rather the analysis serves to highlight gaps in the knowledge base for assessing progress towards this objective			

The Seventh Environment Action Programme (7th EAP) sets the objective that by 2020 the use of plant protection products does not have any harmful effects on human health or unacceptable influence on the environment, and such products are used sustainably. Total reported sales of pesticides in the EU increased by just under 4 % from 2011 to 2014. However, the quantity of pesticides sold on the EU market cannot be directly equated to a level of risk to human health and the environment. Other factors — including the hazardous properties of pesticides and associated use patterns — play a significant role in determining these risks. It is therefore not possible to draw a firm conclusion on whether or not the 2020 goal will be reached on the basis of this evidence. Rather, the briefing serves to highlight gaps in the evidence base regarding the harmful effects of plant protection products on human health and the environment.

For further information on the scoreboard methodology please see Box I.1 in the EEA Environmental indicator report 2016

Setting the Scene

Pesticide (or plant protection product) use plays an important role in agricultural production, by keeping plants healthy and preventing their destruction by disease and infestation. However, pesticides applied to crops enter soil and surface waters via leaching and run-off and can enter groundwater, negatively affecting non-target species in both terrestrial and aquatic ecosystems. This can impact on habitat function and contribute to biodiversity loss, as well as reducing the quality of ecosystem services, such as insect-mediated pollination, soil formation and composition and the provision of clean drinking water. Pesticide residues in food can also pose a risk for human health, while residues in animal feed pose risks to animal health and can enter the food chain. Particular concerns have been raised regarding the health impacts of human exposure to pesticides with endocrine-disrupting properties (Mnif et al., 2011) and the associated costs to human health (Trasande et al., 2015). In June 2016, the European Commission presented scientific criteria to identify endocrine disruptors in plant protection products and in biocides (EC, 2016), with the aim of protecting human health and the environment. The 7th EAP (EU, 2013a) sets the objective that by 2020 the use of plant protection products does not have any harmful effects on human health or unacceptable influence on the environment, and that such products are used sustainably.

Policy targets and progress

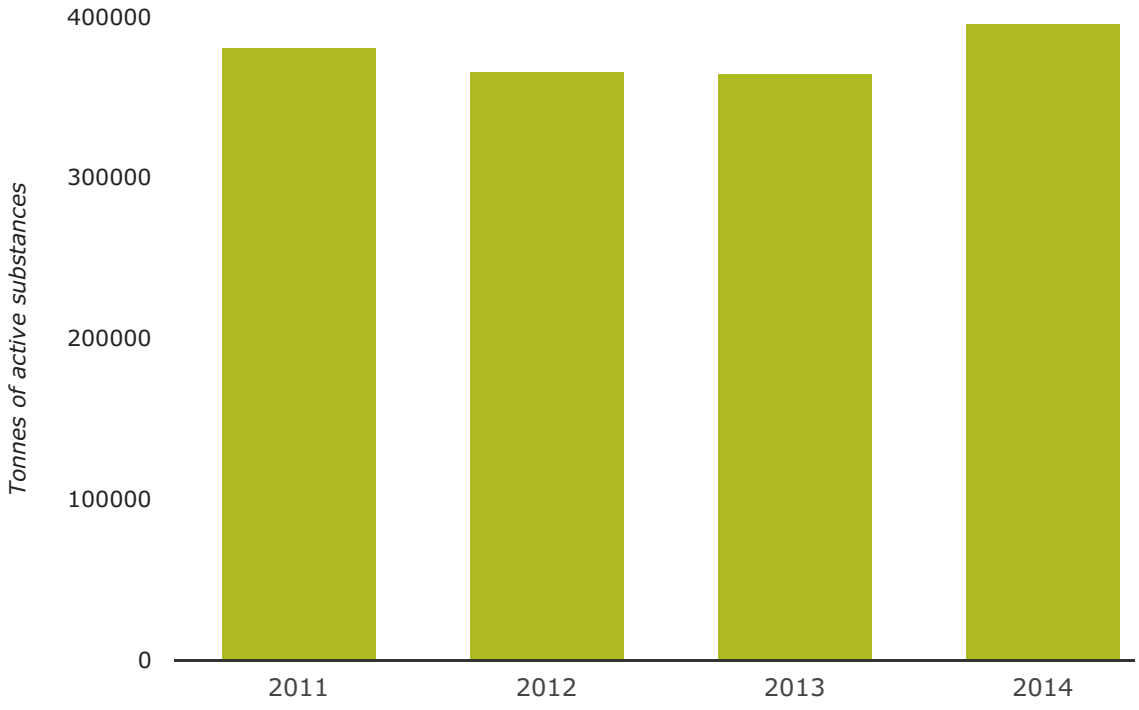
Adopted in 2009, the Directive on the Sustainable Use of Pesticides (EU, 2009a) aims to reduce impacts on human health and the environment. To this end, Member States established National Action Plans, including quantitative objectives, targets, measures and timetables. These plans should promote low pesticide input pest management and non-chemical methods, including both integrated pest management and organic farming. With the aim of protecting the aquatic environment and drinking water, Member States should adopt measures to minimise off-site pollution from spray drift, drain-flow and run-off. These include establishing buffer zones to separate the usage or storage of pesticides from rivers, lakes and waterways, in particular those used for drinking water abstraction. The first National Action Plans were communicated to the Commission in 2012 and are to be reviewed by the Member States at least every 5 years. Member States are to take all necessary means to achieve the targets set out in the National Action Plans.

Under the Regulation on plant protection products (EU, 2009b), the Commission is required to identify active substances with certain properties as candidates for substitution. Member States will then evaluate whether or not these active substances might be replaced by other pesticides that are less harmful. While this process is currently in the early stages of implementation, over time it should promote the use of less harmful pesticides and provide incentives to industry to develop pesticides with less hazardous properties.

Water quality legislation also generates obligations to control environmental exposure to pesticides. The contamination of surface waters with pesticides is managed under the Water Framework Directive (EU, 2000), which requires upstream controls to reduce emissions, discharges and losses of those pesticides that have been identified as priority substances or priority hazardous substances under the Priority Substances Directive (EU, 2013b). The Drinking Water Directive (EU, 1998) stipulates a maximum concentration of 0.1 μg/l for any single pesticide and its relevant metabolites (to a maximum of 0.5 μg/l for total pesticides) in potable water. Thresholds are also applied for pesticide residues in food and feed (EU, 2005), and as undesirable substances in animal feed (EU, 2002).

As shown by Figure 1, total sales of pesticides across the EU as a whole declined from 2011 to 2013, before increasing in 2014 to just under 400 000 tonnes, a level 4 % above that seen in 2011. This suggests that EU demand for pesticides has remained relatively stable, despite implementation of the National Action Plans under the Directive on the Sustainable Use of Pesticides.

Figure 1. Total EU pesticides sales



Note:
2011 data is missing for Bulgaria, Czech Republic, Croatia and Cyprus; 2012 data is missing for Croatia and Cyprus; 2013 data is missing for Cyprus and Luxembourg; and 2014 data is missing for Luxembourg.

Data sources: Eurostat. Pesticide sales statistics (aei_fm_salpest09)

However, this indicator tells us little about the risks associated with pesticide use. It is not possible to directly equate the quantity of pesticides sold with resulting risks to human health and the environment. The risks of pesticide use depend on both the hazard characteristics of the active substances included in the pesticide product and on application methods and use patterns. The climate, landscape, habitat and soil characteristics of the receiving ecosystem, as well as proximity to water bodies, influence how pesticides disperse in the environment. These various aspects strongly influence risk to environment and health, and are not accounted for by measuring the volumes sold on the market.

With the aim of enabling an assessment of EU-level progress in reducing the risks and adverse effects of pesticides on human health and the environment, the Directive on the Sustainable Use of Pesticides foresees the establishment of harmonised risk indicators. Development of these indicators is dependent on access to data on pesticide use. The Regulation on pesticide statistics (EU, 2009c) is expected to deliver data in 2016 on the agricultural use of pesticides by crop for 5-year periods, which should facilitate a better understanding of the risks to the environment and human health.

Monitoring data on pesticides in the European environment and in the human population would provide a robust basis for assessing exposure that, in combination with (eco)toxicity data, could enhance our understanding of current risks to human health and the environment. Under the Water Framework Directive, Member States have established a comprehensive network of monitoring stations through which to investigate the presence of priority substances and priority hazardous substances in surface waters. Several of these substances are pesticides, with monitoring data due to be reported to the EEA in 2016. With regard to human exposure, efforts are ongoing at European level to establish a European Human Biomonitoring Initiative to deliver data on the exposure of the European population to chemicals, including pesticides. These activities should serve to support a more robust assessment of the risks from pesticides to human health and the environment.

The selected indicator does not enable an evaluation of progress towards the 2020 objective. Rather it serves to highlight current gaps in the knowledge base for assessing progress towards this objective.

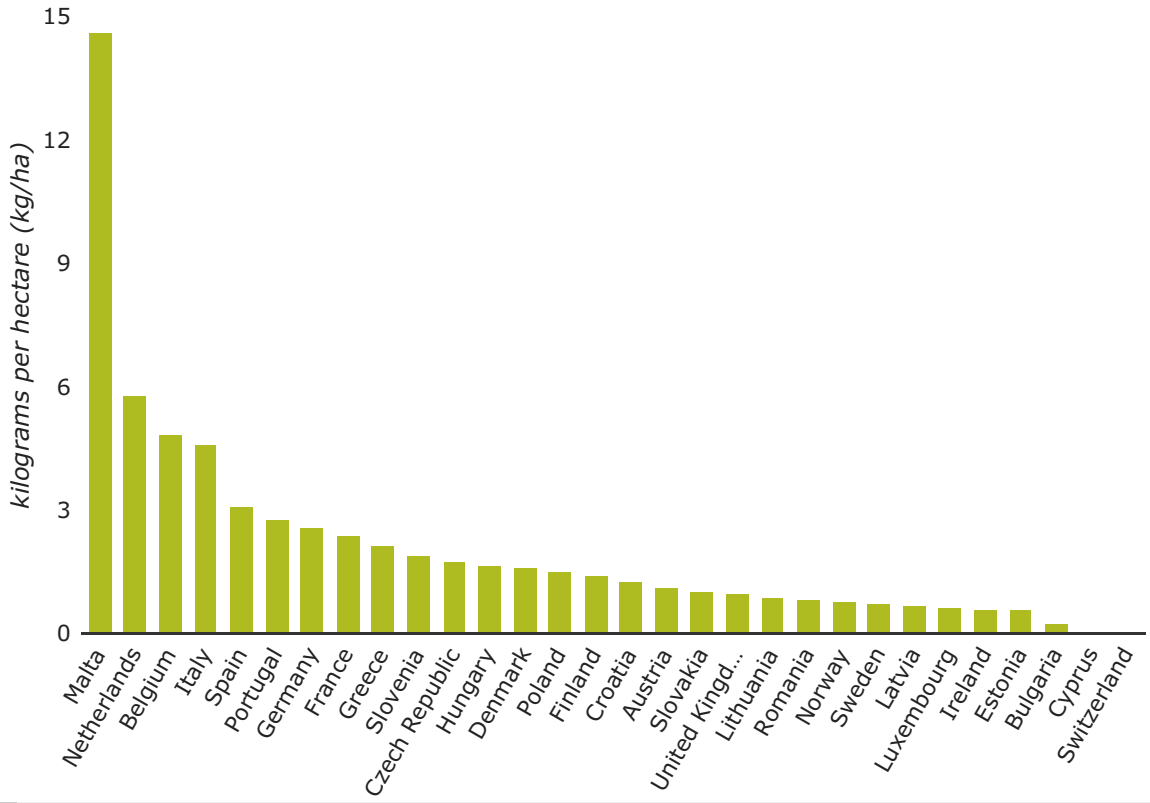
Country level data

In 2014, the countries in which the highest quantities of pesticides were sold were Spain, France, Italy, Germany and Poland, together making up 73 % of the EU-28's pesticide sales. In terms of trends in the sales of pesticides at Member State level, 2011 to 2014 saw reductions in the volumes sold in 13 Member States, with significant reductions in Denmark (63% reduction), Ireland (26% reduction), Malta (16% reduction), Greece (15% reduction) and Romania (12% reduction). Meanwhile, pesticide sales increased in 11 countries, with significant increases in

Estonia (30% increase), Latvia (32% increase) and France (23% increase). Data was not available to assess trends in four Member States. In Norway, pesticide sales increased by 4 % from 2011 to 2014, while in Switzerland sales remained stable (Eurostat, 2016a).

Figure 2 shows the quantities of pesticides sold on the market against the land area that was utilised for agricultural production in 2013 by each Member State. In 2013, Bulgaria had the smallest proportion of pesticide sales per hectare of utilised agricultural area, with 0.22 kg/ha. Ireland, Estonia, Finland, Denmark, Latvia, Romania, Greece, Sweden and Lithuania all had quantities of sold pesticides under 1 kilogram per ha of utilised agricultural area. Slovenia, France, Germany, Spain, Portugal, Italy, Belgium, the Netherlands, Cyprus and Malta all had quantities of pesticides sold per hectare above 2 kg/ha. Malta recorded the highest quantity of pesticides sold per hectare, with a value of 9.97 kg/ha (Eurostat, 2016b).

Figure 2. Pesticide sales per utilised agricultural area, by country for 2013



Note:
Data missing for Cyprus for 2011, for Croatia for 2011, for Bulgaria for 2011 and for Luxembourg for 2014

Data sources:
a. Eurostat. Crop statistics (from 2000 onwards) (apro_acs_a)
b. Eurostat. Pesticide sales (aei_fm_salpest09)

Outlook beyond 2020

There are a number of conflicting trends expected to influence future demand for pesticides. The implementation of National Action Plans by Member States should foster the sustainable use of pesticides in the long term, as well as promoting integrated pest management and organic farming. The EU has seen an upward trend in organic farming, with the total organic area in the EU (i.e. the area fully converted to organic production and the area under conversion) having increased by 21 % from 2010 to 2015 to cover 11.1 million hectares (Eurostat, 2016d). While a continuation of this trend in future years may serve to reduce overall EU demand for pesticides, there is a significant variation in the proportion of organic farming in agricultural production among different EU Member States. On the other hand, global food production will need to increase in order to feed a population estimated to rise above 9.6 billion by 2050 (EEA, 2015). The associated increase in demand may drive further intensification of agricultural production and lead to an increased demand for agrochemicals.

In terms of technological developments, precision agriculture offers the potential to optimise the relationship between productivity and inputs, thereby increasing the sustainability of agricultural production. The approach employs sensors and global navigation satellite systems to manage spatial and temporal variability in the demand for agricultural inputs. In the case of pesticides, this involves ensuring that application rates are precisely tailored to needs, for example by responding to variability in the scale and density of crops or the presence of natural enemies of insect pests. Further research is required to fully understand the environmental benefits of precision agriculture and to promote its uptake, where relevant (JRC, 2015).

About the indicator

The indicator provides data on the volumes of sales of the active substances contained in pesticides. Sales data for active substances are reported by the Member States to Eurostat under the Regulation on pesticide statistics (EU, 2009c). This Regulation covers pesticides, or plant protection products, defined as products consisting of or containing active substances, safeners or synergists, and intended for one of the following uses:

- protecting plants or plant products against all harmful organisms or preventing the action of such organisms, unless the main purpose of these products is considered to be for reasons of hygiene rather than for the protection of plants or plant products;
- influencing the life processes of plants, such as substances influencing their growth, other than as a nutrient; preserving plant products, in so far as such substances or products are not subject to special European Community provisions on preservatives;
- destroying undesired plants or parts of plants, except algae, unless the products are applied on soil or water to protect plants; or
- checking or preventing undesired growth of plants, except algae.

An active substance is a substance or micro-organism, including viruses, that has general or specific action against harmful organisms or on plants, parts of plants or plant products. This indicator does not address biocides.

Pesticide sales data can only provide a proxy for the actual use of pesticides, as they do not account for storage for later use, any wastage or the transport of pesticide products across borders. Data on the actual application of pesticides by crop and by region would allow improved understanding of the risks to human health and the environment.

Footnotes and references

EC, 2016, Communication from the Commission to the European Parliament and the Council on endocrine disruptors and the draft Commission Acts setting out scientific criteria for their determination in the context of the EU legislation on plant protection products and biocidal products (COM(2016) 350 final).

EEA, 2015,European environment — state and outlook 2015: Assessment of global megatrends, European Environment Agency, Copenhagen.

EU, 1998, Council Directive 98/83/EC of 3 November 1998 on the quality of water intended for human consumption (OJ L 330, 5.12.1998, p. 32–54).

EU, 2000, Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy (OJ L 327, 22.12.2000, p. 1–73).

EU, 2002, Directive 2002/32/EC of the European Parliament and of the Council of 7 May 2002 on undesirable substances in animal feed (OJ L 140, 30.5.2002, p. 10–22).

EU, 2005, Regulation (EC) NO 396/2005 of the European Parliament and of the Council of 23 February 2005 on maximum residue levels of pesticides in or on food and feed of plant and animal origin and amending Council Directive 91/414/EEC (OJ L 70, 16.3.2005, p. 1–16).

EU, 2009a, Directive 2009/128/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for Community action to achieve the sustainable use of pesticides (OJ L 309, 24.11.2009, p. 71–86).

EU, 2009b, Regulation (EC) No 1107/2009 of the European Parliament and of the Council of 21 October 2009 concerning the placing of plant protection products on the market and repealing Council Directives 79/117/EEC and 91/414/EEC (OJ L 309, 24.11.2009, p. 1–50).

EU, 2009c Regulation (EC) No 1185/2009 of the European Parliament and of the Council of 25 November 2009 concerning statistics on pesticides (OJ L 234, 10.12.2009, p. 1–22).

EU, 2013a, Decision No 1386/2013/EU of the European Parliament and of the Council of 20

November 2013 on a General Union Environment Action Programme to 2020 'Living well, within the limits of our planet', Annex A, paragraph 54e (OJ L 354, 28.12.2013, p. 171–200).

EU, 2013b, Directive 2013/39/EU of the European Parliament and of the Council of 12 August 2013 amending Directives 2000/60/EC and 2008/105/EC as regards priority substances in the field of water policy (OJ L 226, 24.8.2013, p. 1–17).

Eurostat, 2016a, 'Pesticide sales', aei_fm_salpest09 (http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=aei_fm_salpest09&lang=en) accessed 18 November 2016.

Eurostat, 2016b, 'Pesticides sales statistics' (http://ec.europa.eu/eurostat/statistics-explained/index.php/Pesticide_sales_statistics) accessed 18 November 2016.

Eurostat, 2016c, 'Crop statistics', apro_acs_a (http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=apro_acs_a&lang=en) accessed 18 November 2016.

Eurostat, 2016d 'Organic farming statistics' (http://ec.europa.eu/eurostat/statistics-explained/index.php/Organic_farming_statistics)

JRC, 2015,Precision agriculture: An opportunity for EU farmers — Potential support with the CAP 2014-2020, DG for Internal Policies, Study, Joint Research Centre of the European Commission, Seville.

Mnif, W., Hassine, A. I. H., Bouaziz, A., Bartegi, A., Thomas, O. and Roig, B., 2011, 'Effect of endocrine disruptor pesticides: A review',International Journal of Environmental Research and Public Health, (8.6) 2265–2303.

Trasande, L., Zoeller, R. T., Hass, U., Kortenkamp, A., Grandjean, P., Myers, J. P, DiGangi, J., Bellanger, M., Hauser, R., Legler, J., Skakkebaek, N. E., and Heindel, J. J., 2015, 'Estimating burden and disease costs of exposure to endocrine-disrupting chemicals in the European Union',The Journal of Clinical Endocrinology and Metabolism, (100.4) 1245–1255.

Environmental indicator report 2016 – In support to the monitoring of the 7th Environment Action Programme, EEA report No30/2016, European Environment Agency