



Background Paper on Agriculture & Pesticides

Prof Birgit Wilhelm, Matthias Meissner and Markus Wolter, in collaboration with Lars Neumeister

Agriculture and pesticides

Agriculture is one of the driving forces behind a global decline in biodiversity. At the same time, agricultural production causes massive damage to our natural resources and is an important source of greenhouse gas emissions causing climate change.

Unsustainable and intensive use of our soils leads to a gradual destruction of the soil ecosystem, increased erosion and a decline in natural soil fertility. The result is a constant decline in soil biological functioning.

Despite high intensity production, the economic situation of many farmers in Germany is precarious, especially in the animal production sector. Structural change in agriculture – i.e. a continuous decline of traditional, family-managed farms of comparably smaller size – continues despite significant agricultural subsidy measures in place. There is no denying, the support system is misguided, and creates the wrong incentives, while causing massive ecological and social problems.

Agriculture plays a crucial role in our cultural landscapes and for our cultural and regional identity.

Pesticides play an important role in most of our current conventional agricultural systems. WWF Germany aims to transform this intensive agriculture by promoting sustainable and nature-conserving production methods. To reach this goal, the preservation of natural soil fertility and functioning agroecosystems is at the core of such agriculture. Many activities are needed to implement the necessary changes. Addressing the use of pesticides is one very important one.

Basic assumption

Large-scale and in part precautionary use of synthetic pesticides is the main driver of a continuous decline in species diversity in German agriculture¹. In addition, the use of pesticides is associated with reduced biological diversity in soils and water as well as with negative impacts on human health².

¹ Umweltgutachten 2016: Impulse für eine integrative Umweltpolitik, Council of Experts for Environmental Issues, Chapter 6, pp. 357-426.

http://www.umweltrat.de/SharedDocs/Downloads/DE/01_Umweltgutachten/2016_Umweltgutachten_HD.pdf

² Leuschner R. et al. (2013): A Meta-Analysis of Supply Chain Integration and Firm Performance DOI: 10.1111/jscm.12013; Beketov M. et al. (2013): Pesticides reduce regional biodiversity of stream invertebrates DOI: 10.1073/pnas.1305618110 ; Tsvetkov N. (2017): Chronic exposure to neonicotinoids reduces honey bee health near corn crops DOI: 10.1126/science.aam7470



Why and how does WWF Germany deal with pesticides?

National

- Considering currently applied quantities and application methods, the use of pesticides often takes place large scale and/or prophylactically, irrespective of damage thresholds³. Innovative, preventive plant cultivation measures are hardly taken into account⁴, although they are required within the framework of integrated pest management (IPM), which is a mandatory guideline of the Plant Protection Act.
- Compared to pesticides, agricultural measures such as site specific and diverse crop rotations, the use of pest-resistant varieties, adapted tillage and the use of mechanical weed control are more complex and often more expensive and thus entail economic disadvantages.
- Increasing resistance to active substances⁵ is becoming a problem, not only in intensive grain growing regions.
- The use of pesticides is responsible for a massive reduction of biological diversity⁶ below- and aboveground, e.g. of insects, reptiles, birds and mammals⁷. Other factors supporting the decline in species diversity are shrinking field margins and (micro-)habitats (e.g. structures, such as ponds or hedges, as well as fallow land), short crop rotations and overfertilization with nitrogen and phosphate.
- Contamination of water bodies, groundwater as well as of agricultural products with active substances or their metabolites has negative consequences for human health and is associated with high direct and indirect costs, e.g. for drinking water treatment. Given the central role of pesticides in today's conventional agricultural system, a significant reduction in usage is key in transforming global agriculture in a way it suits people and the environment.
- The use of pesticides in Germany is at a permanently high level since the 1980-ies, approx. 35,000 t active ingredient per year.

³ Damage thresholds: When using plant protection after damage thresholds, the farmer considers the severity of the infestation of the crops with pests, fungi or weeds. Depending on the expected crop failure, the farmer will then decide whether the use of PPP is worthwhile.

⁴ Neubert, S. (2018): Gift auf dem Acker? Innovation geht anders, Wiesbaden https://www.martin-haeusling.eu/images/Pestizide_WEB.pdf

⁵ Beige herbs, fungi, bacteria or even insect pests develop resistance to active substances. One example is the field foxtail, a sweet grass that appears in cereal fields and can practically not be fought with herbicides. <https://www.topagrar.com/archiv/Ackerfuchsschwanz-von-den-Englaendern-lernen-941336.html>

⁶ Geiger F., et al (2010): Persistent negative effects of pesticides on biodiversity and biological control potential on European farmland. <https://doi.org/10.1016/j.baae.2009.12.001>;

Goulson (2014): Ecology: Pesticides linked to bird declines. 17;511(7509): 295-6.

Newton I. (2004): The recent declines of farmland bird populations in Britain: an appraisal of causal factors and conservation action. <https://doi.org/10.1111/j.1474-919X.2004.00375.x>

⁷ Gottwald F., K. Stein-Bachinger (2013), Grundlagen für einen Naturschutzstandard im Ökolandbau. http://www.landwirtschaft-artenvielfalt.de/wp-content/uploads/2015/02/WWF_LFA_Studie_WEB.pdf



- The pesticide policy of the Federal Government has not achieved its goal of significantly reducing the use of pesticides and new impulses are needed.
- The National Action Plan for Plant Protection (NAP) set up by the federal ministry of food and agriculture (BMEL) is no longer a representative entity, as all environmental NGOs have left the forum. Responsibilities are not clearly defined, and it is not obvious how decisions will be implemented. Moreover, the overall objective of the NAP has never been made clear⁸.

International

- Pesticides are an issue in the international debate on "sustainable agriculture" as well. For instances, in conventional large-scale monocropped crops like palm oil, soybean or bananas, massive use of pesticides is the rule rather than the exception.
- Major certification systems – some of which are also supported by WWF – in some cases still address the issue inadequately. For this reason, WWF is committed to ensuring that IPM is introduced as a mandatory part of certification systems. Furthermore, WWF supports a ban of WHO 1A and B and WHO 2⁹ pesticides and highly dangerous pesticides according to the PAN list¹⁰. Glyphosate has been included in this list in 2017.
- Within the WWF network, a positioning on the topic of "pesticides" on these agricultural commodities is advocated by WWF Germany and WWF Switzerland. One example is the discussion on the extension of paraquat within the RTRS standard.

WWF Germany Projects

- Regulation of pesticide usage within WWF Germany projects for more sustainable agriculture (e.g. with WWF's collaboration with retailer Edeka): In the WWF-Edeka LfA project WWF works exclusively on organically managed farms, as in these systems measures for more biodiversity are most effective. In all agricultural projects of WWF and EDEKA, the usage of WHO 1A and B pesticides were banned. At the same time, WWF expects a reduction in pesticide use based on the "toxic load indicator". WWF works towards banning PAN-listed compounds and particularly environmentally harmful substances and pursues a vision of a world free of herbicides.

⁸ Very good also the evaluation of PAN (2016) within the NAP questionnaire:

http://www.pan-germany.org/download/NAP_Fragebogen_I_Workshop_Halbzeitbewertung_PAN_fin.pdf

⁹ World Health Organization (2009). The WHO recommended classification of pesticides by hazard and guidelines to classification 2009.

https://apps.who.int/iris/bitstream/handle/10665/44271/9789241547963_eng.pdf?sequence=1&isAlloved=y

¹⁰ PAN (2018): PAN International List of Highly Hazardous Pesticides.

<https://pan-germany.org/download/pan-international-list-of-highly-hazardous-pesticides/>



What is WWF committed to?

To preserve biological diversity and natural resources, the use of pesticides in agricultural systems must be drastically reduced.

WWF expects the German government to work on proposals and strategies to achieve a sustainable agriculture, where possible without the use of chemical-synthetic pesticides in a reasonable timeframe. It is the responsibility of the state to create legislation that limits the use of pesticides to guarantee a greater common good (i.e. preservation of the nature and economic basis, as well as the protection of human health).

WWF pursues a vision of a future agriculture free of synthetic pesticides.

Organic agriculture has shown since decades that sustainable cultivation is possible by using agroecological alternatives to chemical-synthetic pesticides. WWF is committed to the further disseminate and promote organic farming practices worldwide.

Copper in organic farming¹¹:

Since the end of the 19th century, copper has been used in Germany as an agent against fungal diseases, mainly in permanent crops, such as hops or in vineyards and orchards. In organic farming systems, copper as a pesticide is mainly used for fruits and vegetables. A maximum permissible quantity of pure copper of 6 kg/ha per year has been agreed upon in the EC Organic Regulation in 2006¹². This legally binding maximum load is reduced further e.g. via guidelines of German Organic Farming Associations (e.g. Bioland < 4 kg/ha and year for hops), or completely banned in certain crops (e.g. in potatoes by Demeter). In 2010 the Federation of Ecological Food Producers (BÖLW e.V.), Bioland e.V., Demeter e.V., ECOVIN Federal Association for Organic Viticulture e.V., Gäa e.V. - Federal association Naturland e.V., in cooperation with conventional cultivation associations, developed a strategy paper for further minimizing the use of copper in plant protection and started its implementation. At a European copper conference in 2017, first results of copper monitoring were presented¹³.

WWF is aware that a ban of problematic substances alone is not an effective long-term strategy of reducing the use of pesticides in agriculture. However, WWF sees such bans as an immediate necessity that can trigger first important steps in practice.

WWF is prepared to participate in discussions on possible timeframes and necessary individual steps to notably reduce the use of pesticides in favor of biodiversity in the agricultural landscape.

¹¹ <http://kupfer.julius-kuehn.de/index.php?menuid=31>

¹² "Organic farming and production has been regulated at EU level since 1991. Today the European requirements for organic production are set by Council Regulation (EC) No 834/2007 defining the aims, objectives and principles of organic farming and production, and by two implementing regulations (No 889/2008 and No 1235/2008) detailing the organic production, labelling, control and import rules. All products labelled as organic and sold in the EU must be produced in accordance with these regulations." IFOAM 2019 <https://www.ifoam-eu.org/en/what-we-do/organic-regulations>

¹³ European Conference on Copper. <https://www.boelw.de/news/europaeische-kupfertagung18/>



WWF claims

- **Development and introduction of a pesticide reduction plan** that includes clear reduction targets, indicators and a timeframe towards an agriculture without the use of synthetic chemical pesticides. In that respect, progress of the National Action Plan for the Sustainable Use of Plant Protection Products (NAP) is insufficient so far.
A ban of the use of pesticides in drinking water protection areas (equivalent to about 14% of arable land) must be mandatory.
A ban of the use of herbicides in cereals would be a subsequent important step during the implementation of this reduction plan. The majority of the agricultural land in Germany is planted with cereals. Herbicides are the largest polluters of groundwater in these areas. Thus, with a ban of herbicides, a quick, positive impact on biodiversity could be reached. Mechanical measures can be implemented as an alternative.
- We are aware that a ban of single active substances and/or groups of active substances is insufficient and may even lead to an increased use of other – possibly even more toxic – substances. Nevertheless, WWF supports the call for a **gradual ban on highly dangerous pesticides** (PAN petition), as well as petitions for a ban on all neonicotinoids and broad-spectrum systemic herbicides (such as glyphosate), as alternative cropping practices do render these substances futile.
- **Economic incentives to reduce the use of pesticides:** Development and enforcement of a levy on all pesticides based on toxicity and, for insecticides and herbicides, on the area to be treated. The revenue resulting from this levy is to be used to provide plant protection advice and financial support for preventive plant protection measures (e.g. IPM).
- **Transparency of the actual use of active ingredients:** Up until now, no detailed information on the use of pesticides needs to be published. However, in order to obtain clarity about the effects and possible reduction potentials, WWF calls for the establishment of an overall register in which the following information ought to be published: Application and active substance quantities, data on the applications (quantities and/or treated area) with indication of toxicity classes (WHO classification) per crop, per hectare, per year for all relevant crops (wheat, barley, rye, triticale, maize, rape, sugar beet, wine, apple, strawberries, asparagus, hops...) as well as transparency on the monitoring system for the detection of damage thresholds.
- **Review and adjustment of the regulation criteria for pesticides in Europe, in particular concerning their impact on the environment:** Current risk assessment methods consider the toxicity of the active substances and possible exposure scenarios only, but neglect effects on ecosystems. Even the least toxic pesticide eliminates food sources and/or habitats on which wildlife species depend. Therefore, effects of pesticide use on trophic 'levels' should be considered in the approval procedure¹⁴. Also, during the approval procedures only one active substance is tested at a time for its effects. In practice, however, several pesticides are often used simultaneously or within a short period of time. The possible

¹⁴ Poulin B., G. Lefebvre, L. Paz (2010): Red flag for green spray: Adverse trophic effects of Bti on breeding birds. *Journal of Applied Ecology* 47(4):884 - 889. <https://doi.org/10.1111/j.1365-2664.2010.01821.x>



superimposition and/or cumulation effects have not yet been examined and taken into account in any admission procedure. Further, monitoring of water pollution by pesticide inputs must also be intensified in order to obtain valid data on water pollution¹⁵, as prognostic models used for the approval for water exposure have been shown to underestimate the real exposure¹⁶.

- **Development of legally binding enforcement of "best practices" including *integrated plant protection* for all relevant crops** (e.g. at least a fourfold crop rotation with at least 10 % grain legumes, untreated control parcel, damage threshold principle, preference for non-chemical measures, success control, etc.). There are "best practice" guidelines for certain cultures (e.g. hops), but these are missing for other crops and, at the same time, they are not legally binding.
- **A comprehensive transformation of agriculture, aiming to reduce the use of pesticides to protect biological diversity and natural resources, requires a holistic approach.** Farmers cannot be left alone with economic losses. Consumers as well as the state must participate financially in a transformation with the aim to provide services of general interest. Agricultural research is also called upon here to develop practices that make the use of pesticides superfluous. The argument of global food security cannot be used as argument with which the reduction of pesticides is prevented, because global hunger is seen as a problem of distribution, consumption and waste and not of production.

¹⁵ Umweltgutachten 2016: Impulse für eine integrative Umweltpolitik, Council of Experts for Environmental Issues, Chapter 6, pp. 357-426.

http://www.umweltrat.de/SharedDocs/Downloads/DE/01_Umweltgutachten/2016_Umweltgutachten_HD.pdf

¹⁶ Knäbel A., K. Meyer, J. Rapp and R. Schulz (2014): Fungicide field concentrations exceed FOCUS surface water predictions: urgent need of model improvement. *Environ Sci Technol* 48:455-463; Knäbel A., S. Stehle, R. Schäfer, R. Schulz (2012): Regulatory FOCUS surface water models fail to predict insecticide concentrations in the field. *Environ Sci Technol* 46:8397-8404; Stehle S., R. Schulz (2015): Pesticide authorization in the EU - environment unprotected? *Environ Sci Pollut Res DOI: 10.1007/s11356-015-5148-5*