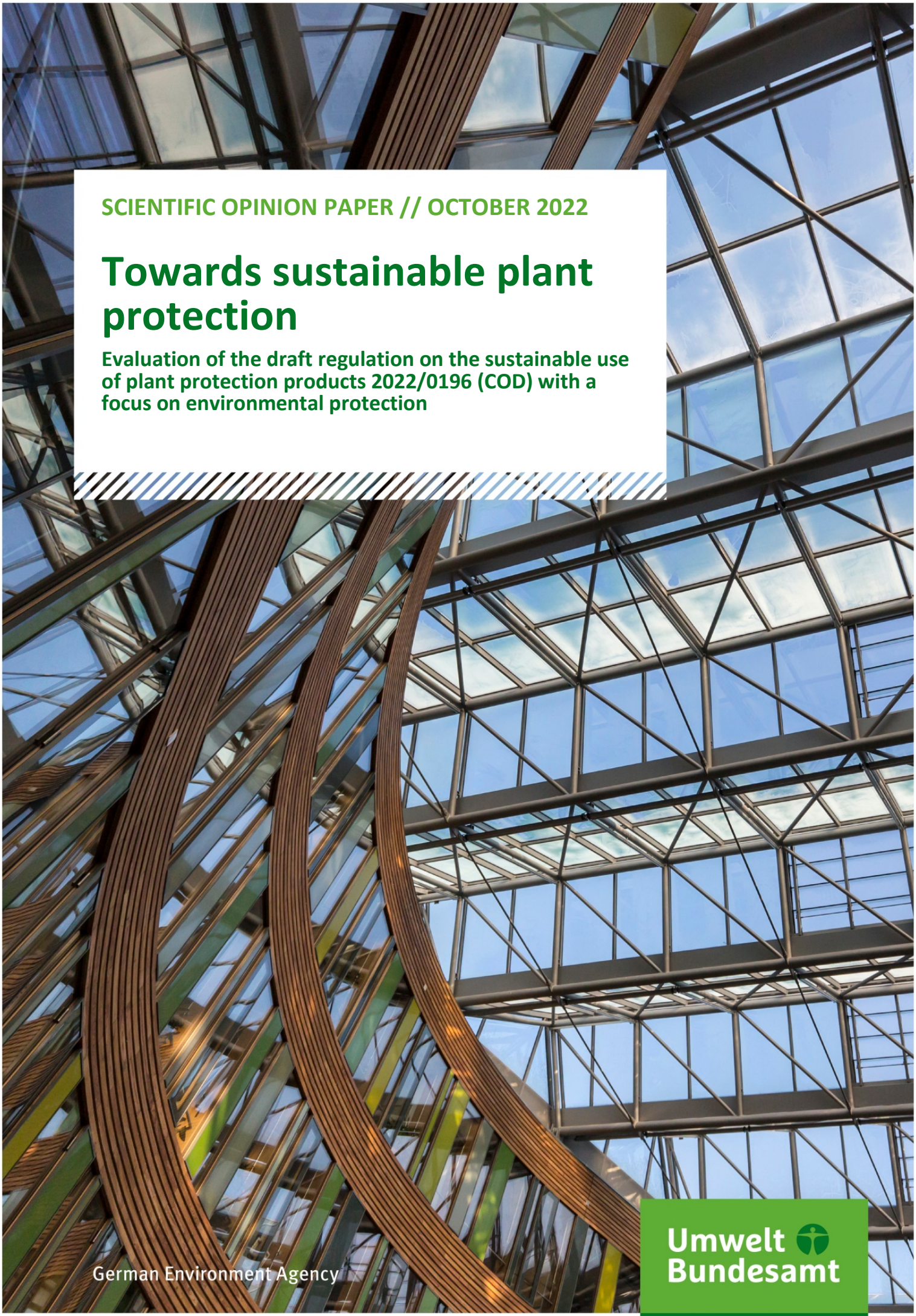

SCIENTIFIC OPINION PAPER // OCTOBER 2022

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German Environment Agency

Umwelt Bundesamt

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by

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On behalf of the German Environment Agency

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Executive Summary

With the new draft regulation of the "Sustainable Use of Plant Protection Products" (SUR), the European Commission implements the plant protection reduction target of 50% by 2030 of the Farm-to-Fork Strategy, which represents a centrepiece of the European Green Deal. The SUR sets the course for long-term food security as well as the preservation of biodiversity and resilient ecosystems in agricultural landscapes. The move away from dependency on chemical plant protection products (PPP) is synonymous with a paradigm shift, both in agriculture, among responsible authorities and in society.

While effort and investment required by the European Union and its member states (MS) is high, inaction or inadequate implementation of the SUR would result in significantly higher costs in the medium- to long-term, as well as irreversible damages to the environment (e.g., through continued biodiversity loss, water and soil pollution). In Germany, current annual costs of biodiversity loss due to intensive agriculture alone amount to 50 billion Euros. Therefore, avoiding these costs makes sense from an economic point of view.

We welcome that the SUR implements basic principles of integrated pest management (IPM) in a legally binding way to reduce pesticide[1] use. However, for a successful implementation of the SUR, further preconditions beyond this liability have to be fulfilled. These preconditions and recommendations for amendments are described in this paper.

Four major recommendations for action

- **Adjust the Harmonised Risk Indicator 1 (HRI1):** The HRI1, which is intended to monitor the success of SUR reduction targets, must be adapted conceptually. **In the current version of the indicator, highly effective pesticides, which are typically characterized by low application and sales volumes, are systematically underestimated in the overall risk by several orders of magnitude.** This systematic error can be corrected by a simple standardization step, which is essential for a proper and reliable risk indication of the SUR targets. This and other corrections include:

- Standardization of sales volumes: Currently, the HRI1 adds up sale volumes of pesticides without sufficient consideration of major differences in their hazard potential for both human health and environment. **Our main recommendation is therefore to standardise sale volumes with their mean application rates.**

- Risk factor 16 for unapproved pesticides: Currently, unapproved pesticides are considered with a disproportionately high-risk factor of 64, which distorts the HRI1 trend. Since unapproved pesticides have a similar hazard potential for humans and environment as candidates for substitution, we recommend using the same risk factor of 16 for both groups.

- Further differentiation of approved pesticides: Currently, 75% of all approved pesticides are assigned to HRI group 2 and are thus treated equally with regard to their HRI risk. For a differentiation within this group, we propose that MS annually nominate particularly high-risk pesticides based on national criteria, which can be reclassified after an agreement at EU level.

[1] The legal definition of pesticides laid down in Article 3(10) of the Sustainable Use Directive includes plant-protection products and biocides. Since the scope of the Sustainable Use Directive was never extended to biocides, 'pesticides' are used for plant-protection products, in the same way the Sustainable Use Directive uses the term 'pesticides'.

For the evaluation of reduction efforts at national level, more specific indicators can be implemented in the framework of the national action plans.

- Consideration of high-risk non-chemical pesticides: Under current rules, the HRI1 is limited to chemical pesticides. To obtain a complete picture of pesticide risk, the use of non-chemical pesticides should be documented and the HRI1 should be expanded to include non-chemical pesticides with high risk.

- Exclude pesticides with indoor use: At the moment, pesticides with intended indoor use only (like inert gases, CO2) are reported differently by MS, which significantly distorts the HRI1 trend. Due to their negligible risk potential for humans and environment in combination with relatively high sales volumes in certain MS, we recommend to exclude these pesticides from the HRI1 calculation.

- Adjustment of the reference period: The HRI1 trend refers to the reference period 2015-2017. In order to describe the situation directly before the SUR came into force, we recommend shifting the reference period to 2018-2020.

1. **Provide sufficient financial resources**: Reducing use and risk of pesticides as well as necessary systemic transformation towards a sustainable agricultural crop production will involve significant costs to MS and in particular to farmers. However, providing sufficient financing to support farmers with the implementation of Integrated Pest Management measures and to compensate for economic disadvantages can help to increase acceptance of pesticide use reduction. Independent advisors are important to accompany farmers in the conversion of crop farming. Setting up a system of independent advisors in MS also involves costs. Since these costs may not sufficiently and sustainably be covered under the current Common European Agricultural Policy (CAP), MS should be obliged to designate a sufficient financial budget within their annual budget planning. This could take the form of a state fund, for example. A possible component for refinancing these costs could be the introduction of an EU-wide pesticide tax or levy. As some MS have already introduced a pesticide tax, this measure would lead to a harmonization of the European internal market.

2. **Increase the share of pesticide-free areas:** Animal and plant species, for example field birds, insects, or wild herbs, which are adapted and related to agricultural land, are particularly affected by pesticide application. A reduction in pesticide use by 50% on every single field would not be sufficient for the protection and conservation of these species, as many pesticides have negative effects on animal and plant species even at very low concentrations. Therefore, implementation and maintenance of pesticide-free areas is particularly important. We propose to increase the share of pesticide-free areas on agricultural land or temporarily set-aside land to at least 10% of the total agricultural area excluding grassland at the regional level by 2030. The inclusion of this target in the SUR does not result in any additional requirement for reduction of pesticide use. To monitor success of target areas, MS should regularly record and report on these areas as part of the National action plans.

3. **Protect sensitive areas and waters in a more focused and realistic way**: The extensive pesticide restriction in many protected areas (e.g.; IUCN category I- IV areas, FFH areas and core and maintenance zones of biosphere reserves) envisaged in the SUR draft is necessary from a scientific point of view. However, a successful transformation needs a transition period. Exceptions, in which a more environmentally compatible use of these areas is possible

by using pesticides with a low-risk profile[2] and / or pesticides permitted in organic farming[3], are reasonable for certain types of areas when the conservation objectives are considered. In landscape conservation areas (IUCN V areas), the conversion to organic farming should be particularly encouraged. Areas directly adjacent to protected areas (excluding IUCN V areas) should only be farmed in an environmentally compatible way. Pesticides can be introduced directly into protected areas from surrounding agricultural land. In addition, animals from protected areas may temporarily migrate into adjacent areas, (e.g. when foraging) and may be harmed or even killed by contact with pesticides used in adjacent areas. Therefore, adequate buffer zones to intensively managed areas are needed. For effective protection of surface waters, permanently vegetated buffer strips of at least 5 m width must be established.

Minor recommendations for action

Electronic data register: The current SUR draft needs to be amended to ensure a transparent and meaningful data documentation (FAIR principle[4]). Above all, it is essential that application data is recorded in combination with geo-referenced areas to allow evaluations and assessments of relations between plant protection measures, biodiversity, and other site characteristics. Furthermore, data should be actively made available to all related authorities. In addition, access to these data should be also possible to other thematically involved authorities, the scientific community and the public for an unlimited period of time to enable relevant data evaluations.

Monitoring: The introduction of an area-wide national pesticide monitoring in the environmental medium air appears necessary from a scientific point of view. Therefore, MS should be obliged within the framework of the National action plans to carry out area-wide national pesticide monitoring's in the environmental medium air.

National action plans: To consistently implement the European Commission's recommendations into concrete and binding National action plans, acceptable reasons for deviations of MS should be listed.

Training, education and awareness-raising: To reduce pesticide applications, it is important to ensure that the planned awareness-raising website and training content is co-developed by agencies competent for environmental risk assessment. To meet staffing requirements of the advisory system, MS must launch training and education initiatives as soon as possible.

[2] category: "low-risk active substances" according to Regulation (EC) No. 1107/2009

[3] according to Regulation (EC) No. 2021/1165

[4] FAIR Principles - GO FAIR (go-fair.org)

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List of abbreviations

BI	Behandlungsindex
CAP	Common Agricultural Policy
CDDA	Common database on designated protected areas
CO_2	Carbon dioxide
EC	European Community
EFSA	European Food Safety Authority
EU	European Union
FFH	Flora Fauna Habitat
g	Gramm
ha	Hectar
HRI	Harmonised Risk Indicator
IPBES	Intergovernmental Platform on Biodiversity and Ecosystem Services
IPM	Integrated Pest Management
IUCN	International Union for Conservation of Nature (IUCN)
kg	Kilogramm
m	meter
MS	Member state (of the EU)
NODU	Nombre de Doses Unités
PESTICIDES	Plant Protection Products
SUR	Sustainable Use Regulation (regulation on the sustainable use of plant protection products)
TFEU	Treaty on the Functioning of the European Union
TFI	Treatment Frequency Index
UBA	Umweltbundesamt / German Environment Agency

1 Introduction

The current large-scale use of pesticides causes a major damage to environment and human health. The resulting costs are not reflected in prices of agricultural products and are currently paid by society. According to the Boston Consulting Group[5], external costs of German agriculture alone amounts to a total of 90 billion Euros per year, of which 50 billion Euros alone are caused by biodiversity loss and the associated loss of ecosystem services. In this context, the use of pesticides in agriculture is considered as one of the main causes of this biodiversity loss (IPBES, 2016[6] and 2019[7]).

The legislation of pesticides in Europe is based on two conceptual pillars. The first pillar is represented by the EU regulation [(EC) No 1107/2009[8]], which focuses solely on the risk assessment of pesticides in order to regulate their placing on the market and their intended use. However, EU regulation as an instrument for environmental protection has clear limits. According to the regulation (EC) No 1107/2209[8], pesticides shall only be approved if they do not have any unacceptable effects on the environment and human health. However, this goal is unrealistic, especially with regard to environmental protection. Most pesticides are applied on a large scale to the environment and bear therefore inevitably unacceptable effects, especially on the biodiversity. In addition, registration and the associated evaluation of pesticides considers only individual pesticides and pesticide products, in most cases. Within the approval assessment, actual agricultural practice is not considered, while typically several pesticides are applied in tank mixtures or spray series on one single field.

Against this background, the great importance of the second pillar of EU plant protection law can be explained. The second pillar consists of various frameworks aimed at a sustainable use of pesticides as well as reducing the dependence on pesticides. In particular, the directive 2009/128/EC[9] considered the impact of their use as a whole, defined reduction targets in terms of quantities and risks, and provided MS with structures, pathways and measures for achieving these targets. About ten years after this directive came into force, various reports evaluated its success, including the report of the European Commission[10], the European Parliament's Scientific Service[11] and the European Court of Auditors[12]. The reports revealed clear weaknesses in its implementation. In particular, a lack of incentives and obligations for the implementation

[5] Kurth, T., Rubel, H., Felde, A. Z. M., Krüger, J. A., Zielcke, S., Günther, M., & Kemmerling, B. (2019). Die Zukunft der deutschen Landwirtschaft nachhaltig sichern. Denkanstöße und Szenarien für ökologische, ökonomische und soziale Nachhaltigkeit. Berlin.

[6] IPBES (2016). The assessment report of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services on pollinators, pollination and food production. S.G. Potts, V. L. Imperatriz-Fonseca, and H. T. Ngo (eds). Secretariat of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, Bonn, Germany. 552 pages. https://doi.org/10.5281/zenodo.3402856

[7] Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. E. S. Brondizio, J. Settele, S. Díaz, and H. T. Ngo (editors). IPBES secretariat, Bonn, Germany. 1148 pages. https://doi.org/10.5281/zenodo.3831673

[8] EU, European Union, 2009. 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. Official Journal of the European Union. L309/1. EUR-Lex - 32009R1107 - EN - EUR-Lex (europa.eu)

[9] EU, European Union, 2009. Directive 2009/128/EG oft he European Parliament and of the Council of 21. October 2009 establishing a framework for Community action to achieve the sustainable use of pesticedes (EUR-Lex - 02009L0128-20091125 - EN - EUR-Lex (europa.eu)

[10] European Commission, 2020. Report from the commission to the European Parliament and the Council On the experience gained by Member States on the implementation of national targets established in their National action plans and on progress in the implementation of Directive 2009/128/EC on the sustainable use of pesticides.

[11] REMAC, M., 2018. Directive 2009/128/EC on the sustainable use of pesticides, EPRS: European Parliamentary Research Service.

[12] Europäischer Rechnungshof, 2020. Sonderbericht 05, Nachhaltige Verwendung von PSM: begrenzter Fortschritt bei der Messung und Verringerung von Risiken.

of integrated pest management measures, ineffective indicators for pesticide risk based on highly aggregated pesticide statistics, and a lack of access to pesticides with a low-risk profile were described as points of criticism. In addition to this negative expert evaluation, concern within society regarding the use of pesticides increases. This concern was revealed, for example, in various European citizens' initiatives[13].

In this context, the European Commission presented the European Green Deal in 2020, which includes measures for various sectors, such as agriculture and forestry. The Farm-to-Fork strategy[14] is a key strategy of the European Green Deal and describes a holistic approach of transformation towards a sustainable agriculture. The core requirements include a 50% reduction in use and risk of synthetic chemical pesticides, and the expansion of organic farming up to 25% by 2030. With this SUR draft, the Commission is now not only proposing a legally binding implementation of the Farm-to-Fork strategy, but is also addressing the criticism and failed implementation of the Directive 2009/128/EC.

The SUR represents an important instrument and a necessary supplement to the regulation (EC) No 1107/2009 in terms of i) promoting the use of pesticides with comparatively favourable side-effect profiles and ii) minimizing negative impact of pesticides on biodiversity. To ensure that the SUR objectives are achieved, substantive changes to the draft regulation are necessary, which are captured in the following chapters 2 to 9 .

[13] https://europa.eu/citizens-initiative/initiatives/details/2019/000016_de

[14] Farm to Fork Strategy (europa.eu)

2 Adaption of the harmonised risk indicator (HRI1 or Annex I)

Recommendation for action

1. **Adjust the Harmonised Risk Indicator 1 (HRI1):** The HRI1, which is intended to monitor the success of SUR reduction targets, must be adapted conceptually. **In the current version of the indicator, highly effective pesticides, which are typically characterized by low application and sales volumes, are systematically underestimated in the overall risk by several orders of magnitude.** This systematic error can be corrected by a simple standardization step, which is essential for a proper and reliable risk indication of the SUR targets. This and other corrections include:

- Standardization of sales volumes: Currently, the HRI1 adds up the sales volumes of pesticides without sufficient consideration of major differences in their hazard potential for both human health and environment. **Our main recommendation is therefore to standardize the sales volumes with their mean application rates.**

- Risk factor 16 for unapproved pesticides: Currently, unapproved pesticides are considered with a disproportionately high-risk factor of 64, which distorts the HRI1 trend. Since unapproved pesticides have a similar hazard potential for humans and the environment as candidates for substitution, we recommend using the same risk factor of 16 for both groups.

- Further differentiation of approved pesticides: Currently, 75% of all approved active substances are assigned to HRI group 2 and are thus treated equally with regard to their HRI risk. For a differentiation within this group, we propose that the MS annually nominate particularly high-risk pesticides based on national criteria, which can be reclassified after an agreement at EU level. For the evaluation of reduction efforts at national level, more specific indicators can be implemented in the framework of the national action plans.

- Consideration of high-risk non-chemical pesticides: Under current rules, the HRI1 is limited to chemical pesticides. To obtain a complete picture of pesticide risk, the use of non-chemical pesticides should be documented and the HRI1 should be expanded to include non-chemical pesticides with high risk.

- Exclude pesticides with indoor use: At the moment, pesticides with intended indoor use only (like inert gases, CO2) are reported differently by MS, which significantly distorts the HRI1 trend. Due to their negligible risk potential for humans and the environment in combination with relatively high sales volumes in certain MS, we recommend to exclude these pesticides from the HRI1 calculation.

- Adjustment of the reference period: The HRI1 trend refers to the reference period 2015-2017. In order to describe the situation directly before the SUR came into force, we recommend shifting the reference period to 2018-2020.

With the Directive (EU) 2019/782[15] of the European Union, the harmonized risk indicators HRI1 and HRI2 came into force in June 2019. Both indicators were created to quantify the reduction of

[15] EU, European Union, 2019. Commission Directive (EU) 2019/782 of 15 May 2019 amending Directive 2009/128/EC of the European Parliament and of the Council as regards the establishment of harmonised risk indicators

risks associated with the use of pesticides. However, already in 2020, the European Court of Auditors[12] questioned the validity of the HRI and recommended a corresponding correction or further development of the underlying methodology[7]. To date, the methodology has not been adjusted in this regard. Since the method of the HRI1 is decisive for the risk indication of pesticide applications in the SUR, the present statement primarily addresses its points of criticism and explains the necessary adaptation steps in the following subchapters.

Standardizing sales volumes of chemical pesticides in terms of effectiveness

In the current version of the HRI1 (see Methodology Annex I and Annex VI), all chemical pesticides are classified into four groups with increasing hazard potential for human health and the environment (1- low-risk pesticides, 2- approved pesticides, 3- candidates for substitution, 4- non-approved pesticides)[16]. The basic assumption of the current HRI1 is that all pesticides within each HRI group have a similar hazard potential for human health and the environment and, thus, it is acceptable to sum up their annual sales volumes. However, this basic assumption is incorrect, because pesticides from the same HRI group can differ in their hazard potential by several orders of magnitude. In order to estimate differences in the hazard potential of pesticides, we suggest using their mean application rates. For example, to manage aphids in arable crops, either 250 g/ha of acetamiprid (belonging to the group of bee-hazardous neonicotinoids) or alternatively about 37.500 g/ha of the active substance maltodextrin (polysaccharide) can be applied. Both pesticides are assigned to HRI group 2, but this example shows that 1 g acetamiprid/ha is about 150 times more effective against aphids than 1 g maltodextrin/ha.

Furthermore, it can be assumed that observed differences in the effectiveness towards target organisms are accompanied by a similar difference in the potential hazard to the environment. This means that any application of a pesticides against one pest or pathogen (e.g., aphids) may also affect closely related non-target species (e.g., other insects such as bees) that are similarly sensitive to the pesticide applied. In other words, any desired effect causes undesired side effects on closely related species. It is therefore essential to standardize the data on sales volumes in terms of effectiveness and, thus, with regard to their hazard potential for human health and the environment before they are summed up and combined into one HRI group.

In concrete terms, we propose to first divide the sales volumes (in kg) by the mean application rates (in kg/ha) per each pesticide. The mean application rate per pesticide (kg/ha) describes the quantity required to achieve the desired effect (= effective unit)[17]. This first calculation step results in the number of effective units of a pesticide used per hectare.

This basic idea of standardizing the sales volumes of pesticides by effect units is not new. The approach is already established in the risk indication of pesticides and part of various national

[16] For reference, see criteria for low-risk pesticides and candidates for substitution according to annex II of Regulation (EC) 1107/2009.

[17] Definition of effective unite: An effective unit corresponds to the mean single application rate per active substance in L or kg per hectare evaluated in the EU active substance review according to Regulation (EC) No 1107/2009 based on representative example applications and published via EFSA (Conclusions on the peer review of the pesticide risk assessment of the European Food Safety Authority).

trend indicators, such as the French "Nombre de Doses Unités - NODU[18]", the Danish "Treatment Frequency Index - TFI[19] " or the German "Behandlungsindex - BI"[20].

Adjusting the proposed risk factor for unapproved pesticides (HRI group 4)

After the standardization of the sales volumes described above, the number of effect units can be summed up for each HRI group. Nevertheless, there are still significant differences in the hazard potential of pesticides for human health and the environment between the HRI groups, which are considered in a further calculation step by the use of risk factors. In the current SUR draft, following risk factors are proposed for this purpose: factor 1 for low-risk pesticides (HRI group 1), factor 8 for approved pesticides (HRI group 2), factor 16 for candidates for substitution (HRI group 3) and factor 64 for non-approved pesticides (HRI group 4).

We consider the currently proposed risk factors for HRI groups 1 to 3 to be plausible and acceptable. Pesticides in HRI group 1 are classified as low-risk. These substances degrade rapidly and, due to their properties and application patterns, do not require any risk mitigation measures for environmental protection. Therefore, we agree to associate them with the lowest risk factor of 1. Approved pesticides of HRI group 2 occupy a medium position that is addressed with a risk factor of 8. In contrast, pesticides classified as 'candidates for substitution' in HRI group 3 show a broad spectrum of potential hazards with regard to toxicity, persistence and/or bioaccumulation. Hence, these pesticides are assigned with a comparatively high-risk factor of 16.

In contrast, we criticize the proposed risk factor for HRI group 4 (non-approved pesticides). In the current draft of the SUR, pesticides of HRI group 4 are weighted by the highest risk factor of 64, which has the following consequences: In case of an expiring pesticide approval, the HRI1 trend has to be recalculated and, by doing so, the previous indicator values of the pesticide with expiring approval increases disproportionately, which leads to an unreasonably high influence on the overall risk of the HRI1. We argue that decreasing sales volumes of pesticides with expiring approval already lead to a reduced risk. Furthermore, pesticides with expired approval show in most cases a comparable spectrum of potential hazards for humans and the environment like candidates for substitution of HRI group 3. Therefore, we recommend using the same risk factor of 16 for both HRI groups, candidates for substitution (HRI group 3) and pesticides without approval (HRI group 4), instead of the currently used risk factor of 64. We are aware that in a few cases the risk factor of 16 would also be applied to pesticides whose approval expired for economic reasons instead of a high hazard potential to human health or environment. However, we consider the associated overestimation of the risk as acceptable, since such substances are expected to be sold in small quantities and therefore have only a minor influence on the risk indication.

Overall, we support the Commission's proposal to keep the HRI1 for indication of pesticide risks as simple as possible, at European level. Alternative risk indicators, that derive the hazard potential substance-specific and based on registration data (e.g., data on ecotoxicological effects or environmental behavior) pursue the goal of achieving a high degree of precision and objectivity. However, such indicators are very complex and associated with high demands on data availability as well as data interpretation. Especially due to their high degree of complexity,

[18] Fabre, J., Le Grusse, P., Mandart, E., Mghirbi, O., & Ayadi, H., 2015. EToPhy: logiciel de calcul d'indicateurs de risques sur la santé et l'environnement résultant de l'utilisation des produits phytosanitaires. In 45. Congrès du Groupe Français des Pesticides: Devenir et Impact des Pesticides: Verrous à Lever et Nouveaux Enjeux (p. 40).

[19] Kudsk, P., & Jensen, J. E., 2014. Experiences with implementation and adoption of integrated pest management in Denmark. In Integrated Pest Management (pp. 467-485). Springer, Dordrecht.

[20] Roßberg, D., 2007. NEPTUN oder „Wie oft wird gespritzt?". Gesunde Pflanzen, 59(2), 55-65.

substance-specific indicator approaches are mostly less transparent and communicable. Therefore, we consider the HRI1 approach, based on a few HRI classes, as a simple and yet sufficiently meaningful alternative. Relevant aspects of pesticide hazard potentials are addressed (e.g. toxicity, longevity, bioaccumulation, risk to human health) and can be documented in a comprehensible and transparent way. In contrast, a substance-specific description of pesticides regarding their (eco-) toxicological profile is hampered by poor data availability and quality, so that a short- to mid-term implementation is currently not considered feasible. For instance, data from active substance approval at EU level is only partially available in a digital format and available databases show critical data gaps. In addition, many computational steps are required to combine the large number of data points on environmental fate and toxicity to different groups of organisms and human health into a single final indicator value (or risk value) for each pesticide. The necessary aggregation steps to achieve an indicator value require weighting or modeling methods, which are (i) mostly subjective or (ii) require policy decisions and national specific considerations (e.g., emphasis on groundwater protection due to geological conditions). As a consequence, such complex approaches are not suitable at EU level to enable a transparent and harmonized communication on the success of the SUR reduction targets. However, at MS level, more specific indicators could be used to guide and monitor national reduction efforts. The national action plans (Chapter II of the current SUR draft) provide a good basis for the development and implementation of national indicators. An example for a differentiated and established indicator on national level is the Danish *Pesticide Load Index*[21] that considers substance-specific data on human health, the environment as well as the environmental behavior of pesticides.

Further differentiation of pesticides within the HRI groups

The HRI group 2 currently includes all approved pesticides which are not low-risk substances (HRI group 1) or candidates for substitution (HRI group 3). Therefore, HRI group 2 displays the majority of all approved pesticides within the EU (approx. 75%)[22] and it is likely that these substances can be further distinguished with regard to their hazard potential towards non-target organisms as well as humans. Therefore, we recommend to further differentiate pesticides of HRI group 2 already at EU level and independently of additional, national risk indicators. For this purpose, we propose to refer to the knowledge of each MS. Every year, MS could nominate five pesticides of HRI Group 2 to the European Commission, which they consider to be of particular high risk. Based on these national nominations, the most critical active substances can be agreed throughout Europe and assigned to HRI Group 3 with the highest risk factor. HRI group 3 would have to be renamed accordingly. The criteria and/or methods for the national selection of five pesticides should be selected by MS and can, for example, be based on specific national circumstances (e.g. groundwater protection, dominance of certain crops or ecosystems), monitoring data or further data from the approval assessment of pesticides. It needs to be ensured that the selection is documented in a transparent and comprehensible way. Such an additional selection procedure by MS allows to (i) consider current developments in science and technology at an early stage within the risk assessment of pesticides, (ii) acknowledge national efforts to reduce the use of particularly high-risk pesticides, and (iii)

[21] Kudsk, P., Jørgensen, L. N., & Ørum, J. E. (2018). Pesticide Load—A new Danish pesticide risk indicator with multiple applications. Land Use Policy, 70, 384-393.

[22] https://food.ec.europa.eu/plants/pesticides/eu-pesticides-database_en

include other relevant aspects of the hazard potential in risk indication, such as the specificity[23] of pesticide substances.

Extending the HRI1 to include non-chemical pesticides with high risks

According to the current SUR draft, reduction targets and the central HRI1 indicator for monitoring success and progress are limited to chemical pesticides (see Articles 4 and 5, Annex I and Annex IV). According to the definition of chemical pesticides in Article 3(1), non-chemical pesticides are not included in the HRI indicators and are not linked to the reduction target. Non-chemical pesticides are those *"containing natural agents of biological origin or substances identical to them, such as microorganisms, semiochemicals, extracts from plant products as defined in Article 3(6) of Regulation (EC) No 1107/2009, or invertebrate macroorganisms".* Non-chemical pesticides should be promoted, aiming to reduce chemical plant protection measures, which is also in line with the central objective of the Farm-to-Fork Strategy[14]. However, not all non-chemical pesticides can be supported without restriction and some non-chemical pesticides possess non-negligible risks to the environment. Examples include the plant extracts azadirachtin (neem extract) and pyrethrins, which have a relatively nonspecific effect on non-target organisms and are therefore not classified as low-risk substances due to their chemical and/or ecotoxicological properties.

We generally appreciate that the SUR is intended to foster the use of low-risk pesticides, whether chemical or non-chemical (see Article 15(6)). In contrast to non-chemical pesticides (with or without low-risk profile), chemical pesticides are included for the HRI and, thus, they are considered for the reduction target of the SUR. Against this background, we recommend to publish the information which active substances are classified as non-chemical pesticides (e.g.; within the *European Pesticides database or SUR)*. Furthermore, the agricultural use of non-chemical pesticides should be recorded and documented. A central documentation could illustrate whether the objectives of the SUR are reached and if there is a shift to a higher use of non-chemical pesticides. Finally, reduction targets as well as their recording within HRI1 should be complemented by selected non-chemical pesticides. This primarily concerns non-chemical pesticides, that cannot be classified as low-risk due to their known potential hazard to the environment, as demonstrated, for example, by necessary mitigation measures for their use.

Excluding certain pesticides for the HRI

Pesticides that are used exclusively indoors and for stockpile protection (e.g., inert gases) should not be included in the HRI calculations. In particular, the active substance carbon dioxide (CO2) should be excluded as it is used exclusively for stockpile protection. Following its intended use, CO2 is nontoxic, residue-free and sold in high volumes. Inert gases account for about a quarter of the total sales volume of pesticides in Germany.

According to the communication between the German Environment Agency and the Federal Office of Consumer Protection and Food Safety (as of 2020), MS of the EU have different reporting practices for inert gases. While Germany and Austria report the sales of inert gases to the European Commission, MS such as France, Poland and Denmark do not seem to report inert gases for European statistics. Differences in reporting practices combined with high sales volumes can lead to a significant bias for the calculation of the HRI1 at European level as well for the setting of national reduction targets under Article 5.

[23] The specificity of an active ingredient is understood to be the breadth of its spectrum of action. Thus, non-specific pesticides (i.e. effect is not limited to one or a few species) have a comparatively higher hazard potential for human health and the environment than specific active ingredients.

Adjusting the reference time period

In the current SUR draft, the reference time period 2015-2017 is defined as baseline for reduction targets, using the methodology in Annex I (i.e. HRI1). Due to the central importance for the SUR, it is important that the chosen reference time period is as representative as possible. It is known that extremes and increasing fluctuations in temperature and precipitation due to climate change have a significant impact on diseases and pests (e.g. extreme drought of 2018 and 2019). These changes, in turn, affect pesticide use. Thus, it is necessary to choose a reference baseline that is averaged over at least three years or even more, which describes the situation representatively and is close to the date of entry of the SUR.

The reference time period of 2015 – 2017 should be reviewed, if needed extended, and set to the time period directly before the SUR comes into force. For this purpose, the years 2018 to 2020 are suggested as baseline time period. In addition, key indicators should also be determined as a moving average for the following years, to also compensate for climatic extremes of individual years.

National reduction targets

Analogous to the changes proposed to HRI1 or Annex I methodology, the weighted pesticide intensity for the national target (Article 5(5) and (6)) needs to be adjusted, also. Sales volumes of pesticides must be standardized by the pesticide-specific application rates, to enable a risk calculation with group-specific risk factors as well as the agricultural area.

3 Provide sufficient financial resources

Recommendation for action

Reducing use and risk of pesticides and the systemic transformation towards a sustainable agricultural crop production will involve significant costs to MS and in particular to farmers. However, providing sufficient financing to support farmers with implementation of Integrated Pest Management measures and to compensate for economic disadvantages can help to increase acceptance of pesticide use reduction. Independent advisors are important to accompany farmers in the conversion of crop farming. Setting up a system of independent advisors in MS also involves costs. Since these costs may not sufficiently and sustainably be covered under the current Common European Agricultural Policy (CAP)[24], MS should be obliged to designate a sufficient financial budget within their annual budget planning. This could take the form of a state fund, for example. A possible component for refinancing these costs could be the introduction of an EU-wide pesticide tax or levy. As some MS have already introduced a pesticide tax, this measure would lead to a harmonization of the European internal market.

In the current SUR draft, article 39 refers to a possible financing of necessary measures by MS, only. Here, MS are encouraged to cover costs incurred by levying charges and fees. In addition, revenues from monetary penalties to infringements of SUR rules according to Article 38 are conceivable. To cope with the extent of necessary investments by MS and to secure them accordingly, an addition to Article 39 is necessary.

3.1 Costs for Member States

The obligatory reduction of both use and risk of pesticides and thus a systemic transformation of agricultural crop production will be associated with considerable costs and an administrative burden for MS. These may not sufficiently be covered within the current CAP in terms of the overall budget. Moreover, costs are not sustainably covered in terms of time. Although farmers can receive direct subsidies for certain measures through the ecological provisions of the first pillar of the CAP, only 8% of these funds are available for abandonment of pesticides within the framework of "ecological regulations", according to the German CAP Strategy Plan[25].

The funds from the so-called 2nd pillar of the CAP[24] for "sustainable management of natural resources and climate measures" are available only until 2027. In contrast to what is described in the draft regulation, they are probably not sufficient, as these funds must also be used to finance other measures (e.g. to improve animal welfare, for climate change adaptation or to promote local cooperation). Adjustments in the strategic plans would also take too much time to become sufficiently effective in terms of reaching SUR objectives by 2030.

Examples of needed investments by MS:

1. The use of non-chemical pest management measures is often more expensive for farmers than the use of synthetic chemical pesticides. In addition, higher yield risks are to be expected if pesticides are not used. It is therefore essential to cushion these economic disadvantages in a targeted and sufficient manner. Otherwise, it is to be expected that consistent implementation of Integrated Pest Management (IPM) strategy will fail in the

[24] CAP at a glance (europa.eu).

[25] BMEL - Gemeinsame Agrarpolitik (GAP) - GAP-Strategieplan für die Bundesrepublik Deutschland

face of economic reality. This could compromise the realisation of the European and national objectives 1 and 2 of the SUR according to Article 4 and Article 5.

2. The EU and its MS have to invest in research and development. Examples include research in the field of biological methods of plant protection like the use of beneficial insects, in the development of pesticides with low risk to human health and the environment, breeding of pest-resistant and climate-resilient plant varieties, the development of resilient cropping systems and of new technologies in early detection and treatment.

3. Another costly item for MS will be the development of an independent advisory system. The quantity and quality of advice must meet the requirements of the SUR. A large number of professional staff needs to be trained and paid. The content of training courses will have to be prepared and regularly adapted in accordance with the Regulation (Chapter 9).

3.2 Develop solutions for financing within the member states

Establish a sufficient financial budget in state budgets

MS should include a financial budget in their respective budgets that sufficiently covers cost items listed in chapter 3.1 of this document. It would be reasonable to link planned budgets to the generated value added in crop production by use of chemical pesticides. Within the framework of NAPs, detailed strategies for financing the implementation of all SUR measures should be elaborated and submitted to the European Commission. The proportionate use of funds from the CAP should be assessed in this context.

One possibility to ensure funding of all costs arising in MS would be to establish a state agricultural fund.

These funds can play a special role in financing and compensating economic disadvantages. Farmers could take on the role of insurance policyholders within the framework of these funds. They would pay a fixed amount of money per hectare of land into the fund and receive financial compensation in case of proven yield loss. As a precondition for receiving money from the fund, farmers need to demonstrate that all preventive and non-chemical measures to minimize the yield-reducing risk from harmful organisms have been conducted. This can be done by entering all measures as well as corresponding recommendations by an independent adviser into the electronic data register.

This principle has already been successfully applied in the two Italian maize-growing regions of Veneto and Fruili-Venezia Guilia, for example, where a private-sector fund has been set up for maize-growing farms (Furlan et al. 2018[26]).

However, in certain regions and in certain crops, e.g. orchards, larger yield losses are more likely than in arable crops such as maize, even if all integrated crop management measures have been correctly applied. Therefore, a private sector fund financed only by farm levies may not be sufficient.

[26] Furlan L, Pozzebon A, Duso C, Simon-Delso N, Sánchez-Bayo F, Bijleveld van Lexmond M, Bonmatin J.-M. (2018). An update of the Worldwide Integrated Assessment (WIA) on systemic insecticides. Part 3: Alternatives to systemic insecticides. Environ Sci Pollut Res. https://doi.org/10.1007/s11356-017-1052-5

Description of the fund principle: The farms paid three to a maximum of five euros per hectare into the fund. At the same time, they undertook to comply with the rules of good agricultural practice (GLP), to implement Directive 128/2009/EC and to adhere to the recommendations of the Annual Crops Bulletin. This was associated with a widespread avoidance of insecticides. It was found that the risk of crop losses varied greatly from region to region despite the abandonment, but was very low overall (less than 1%). The risk was borne by all participating farms, and the money from the fund only had to be paid out again on a pro rata basis. The farms also all benefited, as the original costs for insecticides of 30 to 40 euros per hectare were significantly higher than the contributions to the fund.

A state fund to finance the implementation of all measures according to the SUR could be more robust and sustainable. In addition to per hectare levies of farms, following sources of revenue would be possible: Financial resources from the second pillar of the CAP, revenues from pesticide levy (surcharges or tax), revenue from penalties under Article 38, further European or national subsidies, donations from e.g. retail chains. Moreover, a state fund could also be used to cover costs of independent advisory service for farmers and necessary investments in research and development.

When developing detailed financing concepts, care should be taken to ensure that all existing and planned subsidies complement each other as far as possible. For example, the planned subsidies for the Regulation on Nature Restoration[27] should also be used in the sense of the SUR objectives if they also serve the objectives of the Regulation on Nature Restoration. For funding research projects, MS should also consider the use of funds from EU research programmes such as Horizon Europe[28].

Introduce a pesticide tax or surcharges

Approaches to compensate environmental damage, e.g. by creating compensation and refugial areas within agricultural areas, are cost-intensive and associated with yield losses. The use of sustainable alternatives to synthetic chemical pesticides is often expensive and time-consuming. Funding of these measures is envisaged in Article 8 of the SUR draft. These and other costs, e.g. those mentioned in chapter 3.1, could be at least partly refinanced by a pesticide levy. Furthermore, a suitable risk-based levy on pesticides should promote the use of non-chemical pesticides and pesticides with a low-risk profile. If a state agricultural fund is established by MS, the revenue from pesticides could be returned to famers.

Pesticides used in agricultural areas cause significant harm to human health and the environment. These harms cause economic costs that have previously been paid for by society. A pesticide levy would therefore correct the added economic value in plant production by these previously externalised costs. Moreover, pesticide levies achieve a steering effect that serves the objectives of the SUR.

Legal basis of a tax or levy

According to the analysis of Möckel et al. 2021[29], EU can either impose its own levy or determine MS to implement a corresponding tax (cf. also Directive 92/12 EEC[30] and Directive 2008/118 EEC[31]).

The levying of a pesticide tax is justified under both European law and under constitutional law by important public interest of environmental and health protection (Art. 168(4)(b) TFEU (effects on human health) or Art. 192(2)(a) TFEU32 (effects on the environment). In this context, guiding effect- and risk-related differentiations are also permissible. This is shown, for

[27] Nature restoration law (europa.eu)

[28] Horizont Europa | EU-Kommission

[29] Möckel, S., Gawel, E., Liess, M., Neumeister, L. (2021), Pesticide tax in the EU – Various levy con-cepts and their impact on pesticide reduction, 112 pp., www.ufz.de/ex-port/data/global/257265_Study Pesticide-Taxes (2021).pdf

[30] Council Directive 92/12/EEC of 25 February 1992 on the general arrangements for products subject to excise duty and on the holding, movement and monitoring of such products EUR-Lex - 31992L0012 - EN - EUR-Lex (europa.eu)

[31] Council Directive 2008/118/EC of 16 December 2008 concerning the general arrangements for excise duty and repealing Directive 92/12/EEC EUR-Lex - 32008L0118 - EN - EUR-Lex (europa.eu)

[32] Treaty on the Functioning of the EU: EUR-Lex - 12016ME/TXT - EN - EUR-Lex (europa.eu): https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A12016ME%2FTXT

example, by the judgement of the Federal Constitutional Court in Germany in 2004 on electricity and mineral oil taxes in Germany.[33].

Several MS have already introduced a levy on pesticides. To avoid distortion of the internal market and unfair competitive advantages according to Art. 113 TFEU, a levy should be introduced in all MS of the EU. In this context, the above-quoted judgement of the German Federal Constitutional Court also states that "locational advantages based on an ecologically questionable handling of goods of general interest do not have to be maintained in the long term". Environmental costs are already partly internalized in some MS in the form of pesticide levies, but not in others. Pesticides are cheaper in MS without pesticide levies. This is therefore a locational advantage at the expense of the environment (public goods), which an EU-wide levy on pesticides would eliminate. A pesticide tax should be imposed on wholesalers and retailers to avoid border controls that are illegal under European law. In this case, taxation of direct imports by users would be necessary and permissible.

[33] BVerfG, Urteil des Ersten Senats vom 20. April 2004
- 1 BvR 1748/99 -, Rn. 1-87,http://www.bverfg.de/e/rs20040420_1bvr174899.html

4 Increase the share of pesticide-free areas – to protect vulnerable species on agricultural land

Recommendation for action

Animal and plant species, for example field birds, insects, or wild herbs, which are adapted to agricultural land, are particularly affected by pesticide application. A reduction in pesticide use by 50% on every single field would not be sufficient for the protection and conservation of these species, as many pesticides have negative effects on animal and plant species even at very low concentrations. Therefore, the implementation and maintenance of pesticide-free areas are particularly important. We propose to increase the share of pesticide-free areas on agricultural land or temporarily set-aside land to at least 10 % of the total agricultural area (excluding grassland) at the regional level by 2030. The inclusion of this target in the SUR does not result in any additional requirement for the reduction of pesticide use. To monitor the success of the area target, MS should regularly record and report on these areas as part of the national action plans.

The mode of life of several animal and plant species is adapted to agriculturally used areas (e.g. open or wooded arable landscape, viticultural or orchard landscape[34]). These include, for example farmland birds (e.g. partridge, red kite or skylark), small mammals (e.g. European hamster, brown hare), insects (e.g. bees, butterflies) and field wild herbs. As these species live wholly or partly on agricultural land, they are particularly exposed to used pesticides and their toxic effects of pesticides. These effects can be direct (i.e. poisoning) or indirect (e.g. reduced food supply due to the decline of insects or wild plants). For example, populations of the relatively well-studied species partridge and skylark decline as a result of exposure to pesticides in agriculturally used fields (Hötker et al. 2013)[35]. It can be assumed that this is a Europe-wide trend for field species.

The significant reduction in pesticide use and risk targeted under the current SUR draft may support the stabilisation of populations of these species. However, the effect would be insufficient if decreasing pesticide use is linked to amounts reduced to the amount of pesticides applied to agricultural areas, but at the same time did not reduce the size of land treated with pesticides did not decrease. Even in low concentrations, pesticides used at very low concentrations have been shown to negatively affect mammals, birds, insects, and field companion plants depending on their ecotoxicological profile (Wood and Goulson 2017[36], Stanton et al. 2018[37], Russo et al. 2020[38]). Decreasing pesticide use by 50% is not automatically linked to restoration of habitats for animal and plant species. Promotion of additional pesticide-free cropland is necessary to create refugia for farmland species and to significantly reduce negative pesticide effects at population and ecosystem level.

To transparently record the proportion of pesticide-free cultivation areas, the SUR should envisage an obligatory documentation of pesticides-free cultivation areas. This should include

[34] https://www.bfn.de/landschaftstypen

[35] Hötker, H., Oppermann, R., Jahn, T., & Bleil, R. (2013). Protection of biodiversity of free living birds and mammals in respect of the effects of pesticides. Julius-Kühn-Archiv, (442), 91-92.

[36] Wood, T. J., & Goulson, D. (2017). The environmental risks of neonicotinoid pesticides: a review of the evidence post 2013. Environmental Science and Pollution Research, 24(21), 17285-17325.

[37] Stanton, R. L., Morrissey, C. A., & Clark, R. G. (2018). Analysis of trends and agricultural drivers of farmland bird declines in North America: A review. Agriculture, Ecosystems & Environment, 254, 244-254.

[38] Russo, L., Buckley, Y. M., Hamilton, H., Kavanagh, M., & Stout, J. C. (2020). Low concentrations of fertilizer and herbicide alter plant growth and interactions with flower-visiting insects. Agriculture, Ecosystems & Environment, 304, 107141.

both the proportion of suitable extensively managed, pesticide-free areas with production-integrated measures (e.g. with cultivation of rare crop varieties, meadow, fields with increased seed row spacing and less seeds per area, lich fields, orchard meadows) and the proportion of areas temporarily taken out of production (e.g. flower strips or fallow land in arable land or special crops) in relation to the respective type of agricultural use. By 2030, this proportion of land should increase to at least 10 % of the total arable land (excluding grassland) at local or at least regional level. This share of 10 % of the cultivated area is the minimum value needed to be able to significantly reduce the negative impacts of pesticide use on animal and plant communities (Hötker et al. 2018[39]). The establishment of pesticide-free areas is to be understood as a contribution to the achievement of the 50% reduction target Thus, including the described area target in the SUR does not create an additional requirement for the reduction of pesticide use.

In the draft Regulation on Nature Restoration prepared in parallel to the SUR, it is envisaged that the proportion of landscape elements with high biodiversity should be documented and increased to 10% of agricultural land (Regulation on nature restoration, Art. 9 and 14). At first glance, the target area proposed here and the one proposed in the Regulation on nature restoration are similar. Both regulations aim to achieve pesticide-free areas in agricultural ecosystems and define landscape elements that can be recognised for this purpose. Some landscape elements can be considered as overlapping (e.g. fallows or flower strips) and could in principle be attributed to both objectives. However, the respective landscape elements have different objectives, which are reflected both in the spatial allocation of the areas and in the way additional area types are considered. As a result, one area objective cannot replace the other. While the proposed target area within SUR primarily aims to reduce negative pesticide effects on cropland itself, the landscape elements in the Regulation on nature restoration aim to restore biodiversity throughout the agroecosystem, including habitats outside cultivated areas, e.g. ecotones or small water bodies. Thus, the focus here is the protection of adjacent habitats and thus largely different animal and plant species. As described above, species most affected by pesticide applications are those that live or forage directly on cropland. Promoting off-field structures alone (e.g. hedgerows or riparian strips) would not be sufficient to protect species adapted to cropland.

[39] Hötker, H., Brühl, C., Buhk, C., & Oppermann, R. (2018). Biodiversitätsflächen zur Minderung der Umweltauswirkungen von Pflanzenschutzmitteln. Anforderungen an Kompensationsmaßnahmen im Risikomanagement. UBA53, Dessau-Roßlau.

5 Protect sensitive areas and waters in a more focused and realistic way

Recommendation for action

The extensive pesticide restriction in many protected areas (e.g.; IUCN category I- IV areas, FFH areas and core and maintenance zones of biosphere reserves) is necessary from a scientific point of view. However, a successful transformation needs a transition period. Exceptions, in which a more environmentally compatible use of these areas is possible using pesticides with low-risk profile[40] and pesticides permitted in organic farming[41], are reasonable for certain types of areas when the conservation objectives are considered. In landscape conservation areas (IUCN V areas), the conversion to organic farming should be particularly encouraged. Areas directly adjacent to protected areas (excluding IUCN V areas) should be farmed in an environmentally compatible way, only. Pesticides can be introduced directly into protected areas from surrounding agricultural land. In addition, animals from protected areas may temporarily migrate into adjacent areas, (e.g. when foraging) and may be harmed or even killed by contact with pesticides used in cropland. Therefore, adequate buffer zones to intensively managed areas are needed. For effective protection of surface waters, permanently vegetated watercourse margins of at least 5 m width must be created.

5.1 Plant protection in protected areas

No pesticides in protected areas if conservation objectives are endangered

The task and function of protected areas of the stricter IUCN I-IV[42] categories (e.g. national parks, national nature monuments, nature reserves), FFH areas[43] as well as core and maintenance zones of biosphere reserves[44] is to protect rare and endangered species and their communities from harmful influences outside the protected areas.

However, many scientific studies show a rapid decline of species even in protected areas. For example, measurements demonstrated a 76% decline in the biomass of flying insects in a long-term study of over 27 years, including Natura 2000 areas (Hallmann et al. 2017)[45]. These findings clearly underline the urgency of action for protected areas. At the same time, populations of valuable species in protected areas are often in an unfavourable conservation status and thus highly vulnerable to additional anthropogenic stress. Therefore, it is necessary to protect these populations from further damage through the use of pesticides. The entry of pesticide into these areas should be avoided as far as possible. According to the IPBES report "Assessments of Pollination, Pollinators and Food Production" (2016)[6], direct acute and sublethal effects as well as indirect effects of pesticides are, along with landscape fragmentation,

[40] category: "low-risk active substances" according to Regulation (EC) No. 1107/2009

[41] according to Regulation (EC) No. 2021/1165

[42] European Environment Agency, Reker, J., Jones-Walters, L., Richard, D., et al., Protected areas in Europe: an overview, Publications Office, 2012, https://data.europa.eu/doi/10.2800/55955

[43] Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora, EUR-Lex - 31992L0043 - EN - EUR-Lex (europa.eu)

[44] What are Biosphere Reserves? (unesco.org): https://en.unesco.org/biosphere/about

[45] Hallmann CA, Sorg M, Jongejans E, Siepel H, Hofland N, Schwan H, et al. (2017) More than 75 percent decline over 27 years in total flying insect biomass in protected areas. PLoS ONE 12(10): e0185809. https://doi.org/10.1371/journal.pone.0185809

the main causes of the observed general decline in insect diversity and numbers. However, protected areas are often fragmented and frequently adjacent to intensively farmed agricultural areas (Tscharntke et al. 2016)[46].This fragmentation and, thus, the close distance to agricultural areas increase the entry of pesticides into protected areas. Therefore, when considering the reduction of pesticide exposure, not only the actual protected area but also peripheral areas in terms of buffer zones must be taken into account.

The SUR draft envisages a general pesticide ban for all protected areas as listed in the CDDA database[47]. Accordingly, agricultural land in protected areas may only be farmed without pesticides. This step is urgently needed for many protected areas.

As it is already possible for farms with organic farming to completely avoid the use of pesticides on most arable crops and grassland. This proposal also supports the target of the Farm-to-Fork strategy[14] to establish organic farming on 25 % of the total arable land.

Transitional periods and exceptions for environment-friendly cultivation

However, some protected areas require agricultural land use to achieve the specific conservation objective. Especially in orchards, vineyards and hop farms, as well as in the cultivation areas of certain arable crops such as potatoes, completely pesticide-free cultivation is not economically attractive, even in organic farming. In bird sanctuaries[48], for example, where the conservation objective is the preservation of the ground-nesting ortolan, extensive cultivation of cereals and root crops is essential for achieving this goal. In addition to bird sanctuaries, agricultural land use could also be necessary for certain FFH areas and other nature reserves of the IUCN IV category. To maintain agricultural use, the use of pesticides with a low-risk profile (category: "low-risk active substances" according to Regulation (EC) No. 1107/2009)[8] as well as the use of pesticides that are approved in organic farming (according to Regulation (EC) No. 2021/1165)[49] in certain crops should generally remain allowed in protected areas. While pesticides are not used in organic grassland management and in most crops in organic arable farming by now, a general ban on pesticide use is still difficult or impossible for special crops (e.g. in orchards and vineyards) as well as for some arable crops (e.g. potatoes, vegetables). Accordingly, exceptions to a strict pesticide ban should be limited to those crops with continued dependency on pesticides.

In protected landscape areas (IUCN category V), the primary conservation objective is precisely to preserve a mosaic of certain agriculturally used and semi-natural areas. The preservation of certain animal or plant species, in contrast, is usually not the intention here. Consequently, a restriction to the use of pesticides with a low-risk profile (category: "low-risk active substances" according to Regulation (EC) No. 1107/2009) and pesticides approved for organic farming (according to Regulation (EC) No. 2021/1165) in these areas cannot be justified directly from the conservation objective. Nevertheless, MS should be encouraged to promote organic farming in landscape protection areas.

Furthermore, exceptions from a general ban on pesticide application cannot apply to protected areas with conservation objectives that are principally incompatible with pesticide applications.

[46] Tscharntke, T.; Karp, D.S., Chaplin-Kramer, R.; Batáry, P.; DeClerck, F.; Gratton, C.; Hunt, L.; Ives, A.; Jonsson, M.; Larsen, A.; Martin, E.A.; Martínez-Salinas, A.; Meehan, T.D.; O'Rourke, M.; Poveda, K.; Rosenheim, J.A.; Rusch, A.; Schellhorn, N.; Wanger, T.C.; Wratten, S.; Zhang, W. (2016): When natural habitat fails to enhance biological pest control - Five hypotheses. Biological Conservation, 2016, S. 449–458

[47] Nationally designated areas (CDDA) — European Environment Agency (europa.eu)

[48] Richtlinie 2009/147/EC (Vogelschutzrichtlinie, VSch-RL)), EUR-Lex - 32009L0147 - EN - EUR-Lex (europa.eu)

[49] Commission Implementing Regulation (EU) 2021/1165 of 15 July 2021 authorising certain products and substances for use in organic production and establishing their lists (Text with EEA relevance) EUR-Lex - 32021R1165 - EN - EUR-Lex (europa.eu)

These are areas of the categories IUCN I to III, as well as core and maintenance zones of biosphere reserves[44]. Also, areas of category IUCN IV (nature reserves), bird sanctuaries and FFH areas should be excluded from this exception if their conservation objective does not depend on still pesticide-dependent agricultural crops and the respective conservation objectives are fundamentally incompatible with pesticide applications. This decision should be made at MS level for the areas concerned. Furthermore, the SUR should allow MS to establish bans or restrictions on pesticide use for national protected areas that are not listed in the CDDA database. Additionally, it should be possible to exclude the use of certain pesticides under Regulation (EC) No 2021/1165 at national level if such uses would compromise the conservation objectives of the respective protected area.

A sufficient transition period is important for the complete conversion to environment friendly farming. Depending on the requirements for respective protected areas, it will be necessary for farms to convert to organic farming or to sell or lease these areas to organic farms. Exchange of farmland within the protected areas with areas outside protected areas might also be an option.

Conversion to organic farming requires deep knowledge in the field of preventive non-chemical plant protection, such as the use of biological control strategies as well as in minimising the risk of infestation through plant cultivation measures. Farms need time to acquire this knowledge and gain practical experience. In addition, the conversion period for obtaining the European Organic Label is 2 to 3 years, depending on the crop.

The intensive independent advice that is envisaged in the SUR draft is particularly important for farmers converting their land in protected areas to organic cultivation. Thus, sufficient staff for advising services are indispensable in these regions.

During the transition period, MS should generally support necessary investments by farms. Possible yield losses should also be financially buffered during this time. If necessary, MS should also be allowed to appreciate farms that use only few or no pesticides in protected areas through long-term financial support.

Buffer zones around protected areas need to be extended

Habitats with high value and a high need for protection must be protected adequately from negative effects of pesticides by buffer zones. For this purpose, the suggested three-meter-wide distance from protected areas that is currently proposed in the SUR draft (Article 18) is not sufficient. The proposed distances are even too small to prevent pesticides from entering protected areas via spray drift during their application. New evidence also suggests that effective buffer zones need to be several hundred meters wide to prevent pesticide inputs (Brühl, Bakanov et al. 2021)[50]. This required distance is not due to the direct entry of pesticides into protected areas, but due to the contact of animals (e.g. flying insects) with pesticides when these animals temporarily leave the protected area to forage and migrate into fields and field margins. Sensitive or valuable areas should therefore have a defined minimum distance to areas that are intensively treated with pesticides. Therefore, fields directly bordering on protected areas of the categories IUCN I-IV (e.g. national parks, national nature monuments, nature reserves), FFH areas and biosphere reserves (maintenance zones) should only be cultivated organically or treated with low-risk pesticides.

[50] Brühl, C. A., et al. (2021). "Direct pesticide exposure of insects in nature conservation areas in Germany." Sci Rep **11**(1): 24144.

5.2 Implement at least 5 m wide and permanently vegetated buffer zones for effective protection of surface water bodies

The mandatory ban of pesticide use along surface waters is strongly appreciated. Exceptions should still not be allowed. However, the suggested width (3 m) and design (no requirement for permanent vegetation) of buffer zones is not sufficient to achieve the objectives of the SUR and the Water Framework Directive[51].

Surface waters are at risk due to the use of pesticides. This particularly applies to small water bodies in vicinity of agricultural areas. They represent the major part of total flow length and are of particular importance for the natural balance. Pesticides enter natural water bodies mainly intermittently in a dissolved or by a sediment-bound form from adjacent fields through surface runoff after rain events (Neumann 2002[52], Moschet 2014[53]). According to estimations by Röttele (2013)[54], 35 % of pesticides enter water bodies diffusely via surface runoff and only 5% via drift. A recently published Germany-wide study (Liess et al., 2021[55]) shows that the concentrations of pesticides are beyond ecologically acceptable thresholds in more than 80 % of the small water bodies within agricultural landscapes after rain events. Similarly, more than 80 % of the investigated water bodies show a reduced proportion of sensitive aquatic organisms such as dragonflies and caddisflies. Thus, pesticides are a crucial stress factor for insects in small water bodies in agricultural landscapes.

The risk management measures currently applied within agricultural practice - like vegetated buffer zones at field edges or vegetated soil cover - do not sufficiently prevent the release of pesticides via surface runoff. Analyses by Reichenberger et al. (2007)[56] principally confirmed the suitability of such buffer strips for reducing surface runoff. However, a high variability of the effectiveness of such measures was observed that cannot be explained by the width of the buffer strip alone.

Vegetation along watercourses as an additional measure is of high importance for the protection of surface waters. If landscaped appropriately, vegetated buffer zones not only support bank protection, but (i) reduce entries of pesticides, nutrients and fine sediments from adjacent agricultural areas (barrier and buffer function) and (ii) offer migration corridors and refuges for several animal and plant species (biotope network).

The effectiveness of such riparian strips depends on site characteristics and climatic conditions. Soil cover (e.g., no erosion rills), width and quality (plant community in the vegetation buffer), buffer area relative to connected cropland, crop-specific pesticides application patterns and

[51] RICHTLINIE 2000/60/EG DES EUROPÄISCHEN PARLAMENTS UND DES RATES vom 23. Oktober 2000 zur Schaffung eines Ordnungsrahmens für Maßnahmen der Gemeinschaft im Bereich der Wasserpolitik

[52] M. Neumann, R. Schulz, K. Schäfer, W. Müller, W. Mannheller, M. Liess, 2002: The significance of entry routes as point and non-point sources of pesticides in small streams. Water Research 36 (2002), Pages 835-842

[53] C. Moschet, I. Wittmer, J. Simovic, M. Junghans, A. Piazzoli, H. Singer, C. Stamm, C. Leu, J. Hollender: How a complete pesticide screening changes the assessment of surface water quality. Environmental Science & Technology 2014, 48, 5423–5432

[54] Röttele, M. (2013). Verminderung von Pflanzenschutzmittel-Einträgen in Oberflächengewässer durch Runoff. Empfehlungen aus den TOPPS Projekt. Präsentation im Rahmen der Informationsveranstaltung Landwirtschaftskammer Niedersachsen. PSM Rückstände in Grund- und Oberflächengewässer, September 2013. http://www.topps-life.org/de---documents.html.

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cropping strategy play important roles (Arora, 2010) [57]. Accordingly, various study reviews showed that the necessary widths of riparian strips for adequate retention of substances vary. A recently published meta-study (Kail et al. 2022)[58] showed that riparian stripes of at least 5 – 10 m width are sufficient for effective pesticide retention (approx. 80%).

Simply maintaining a distance from the water body when applying pesticides cannot provide a sufficient barrier function. The retention of pesticides transported via surface runoff from adjacent agricultural areas is considerably improved by permanent vegetation in buffer zones. The width of the vegetated buffer zones adjacent to water bodies should be at least 5 m. In particular, small water bodies closely intertwined with agricultural land should not be exempt from such protective measures.

5.3 Clarify the contradiction regarding the use of pesticides in settlements

According to the definition in Article 3 (16), human settlements also belong to 'sensitive areas'. Explicitly excluded are "level 2-1.2: industrial, commercial and traffic areas as well as level 2-1.3: mining areas, landfills and construction sites". This description and the ban of pesticides in sensitive areas according to Article 18 show that use of pesticides is no longer permitted in public areas (e.g. public squares, parks) and in house and allotment gardens. Such a requirement at European Union level is generally supported, since the use of pesticides cannot be justified with any existential necessity. However, this is in contradiction to Chapter V, Article 22 (3). Here, MS should only set a maximum permissible package size for non-professional users (i.e. largely for use in private gardens) or restrict the use of pesticides to low-risk substances. This contradiction should be resolved by deleting the regulatory proposals for MS and replacing them with an EU-wide regulation. With regard to objectives of the draft SUR, both a total ban and a restriction to low-risk pesticides are possible.

[57] https://doi.org/10.1111/j.1752-1688.2010.00438.x

[58] Kail, J., Palt, M., Hund, K., Olberg, S., Jünger, W., Hering, D., 2022: Ökologische Funktionen von Gewässerrandstreifen für die Wasserrahmenrichtlinie. Schriftenreihe, Heft 12/2022, Sächsisches Landesamt für Umwelt, Landwirtschaft und Geologie (LfULG), ISSN 1867-2868

6 Adapt the specifications for the electronic data register for transparent data collection and use

Recommendation for action

The planned electronic data register for recording field-related crop protection measures (chemical and non-chemical) is central to monitor the implementation of the SUR[9] and evaluate pesticide reduction targets. However, the current SUR draft needs to be tightened - data needs to be documented in a transparent and meaningful way. Above all, it is essential that data is collected on an area-specific basis, allowing to evaluate relationships between plant protection measures, biodiversity and other site characteristics. To support an area-wide data evaluation, data on pesticide use must be actively available to responsible authorities and not only on request.

Beyond the SUR, information of a data register is of great societal and scientific interest and is also important for other European strategies (e.g. biodiversity strategy, EU soil strategy). Data on pesticide use represents an important key stone for a transformation towards a more sustainable plant protection as well as protection of biodiversity. Currently, only authorities in charge of the implementation of Directives 2000/60/EC and (EU) 2020/2184 and national statistical authorities are explicitly named to get access to the data register (Article 15). However, the data register should be available to all thematically competent authorities and, upon request, also to the scientific community as well as the public. Storage of data should not be limited to 3 years, as proposed in the current SUR draft. Data should be available for an unlimited period of time to allow long-term evaluations and trend analyses.

Data collection

The introduction of an electronic register for plant protection measures is an important step towards a more sustainable and transparent plant protection. This information is essential for recording how and to what extent chemical pesticides as well as principles of Integrated Pest Management (IPM) are used in agricultural practice. This is indispensable for monitoring the success of targeted objectives and measures of the SUR.

The main question is how the implementation of the IPS is progressing in the individual crops and regions and where improvements are needed. For data collection on pesticide applications, information as required by Article 67 of EU Regulation (EC) 1107/2009[8] needs to be recorded (see Articles 14 and 16 of the current draft of the SUR).

According to Article 16(1) of the current SUR draft, it is foreseen that data collection includes all plant protection measures, i.e. also preventive measures. Preventive measures can be for example the creation of ecological infrastructure on agricultural areas to promote beneficial insects and to protect biodiversity (e.g. flower strips, fallow land). The current draft must be amended to ensure the reporting of geo-referenced data on chemical and non-chemical plant protection measures. Geo-referenced data is fundamental for scientific analysis regarding environment, nature conservation. For example, correlations between pesticide use and biodiversity loss can also be studied over a longer period of time. Among others, the recording of this data is in line with the objectives of the Farm-to-Fork Strategy[14] or the Biodiversity Strategy 2030[59] (SUR, Chapter 1).

[59] Biodiversity strategy for 2030 (europa.eu)

Data availability and responsibility

According to article 16 (5) and (6) of the current SUR draft, direct access to the data register is foreseen only for the national competent authorities in charge of the implementation of Directives 2000/60/EC and (EU) 2020/2184 and national statistical authorities. However, due to the great societal interest and the central importance of pesticide use data for the implementation of the SUR as well as other European legislations or EU strategies (e.g. biodiversity strategy, EU soil strategy), it is essential that thematically related authorities (e.g. the authorities involved in the registration of pesticides or environmental monitoring, see also chapter 7) also have access to the electronic data register.

In addition, data should be made available to third parties and the public upon request. Against this background, the annual evaluation of the data should also be published on the websites of responsible authorities.

With regard to disclosure of the recorded data, Article 16(5) states that data shall be available in anonymised form. It is understandable that personal data should not be provided. However, data availability on an area-specific basis has to be guaranteed to allow evaluations at the regional or field level, as described above.

The implementation of the SUR objectives is to reduce negative effects and risks of pesticides for human health and the environment. Thus, the effective reduction of negative effects and risks of pesticides for human health and the environment is the core purpose of all intended measures of the SUR. As the objectives of the SUR are strongly related to the reduction of environmental risks authorities competent to environmental assessment of pesticides (e.g. National Environmental Agencies) should also be responsible the analysis of all entered use data.

Furthermore, the current draft SUR (Article 16 (1)) foresees availability of data for at least three years. To allow long term as well as trend analyses on plant protection measures, accessibility to data in the electronic data register should not be limited in time. Finally, the available data can also help farmers themselves to better assess or sustainably change their pesticide applications, and they can support advisors to improve their recommendations.

7 Introduce an area-wide pesticide monitoring for air

Recommendation for action

The introduction of an area-wide national pesticide monitoring in the environmental medium air is necessary to assess the risks from the use of pesticides. Therefore, MS should be obliged to carry out an area-wide national pesticide monitoring in the environmental medium air within the framework of the national action plans.

The monitoring of air for pesticides residues is not addressed in the current draft, in contrast to the monitoring of surface and groundwater. MS should be required to implement monitoring or surveillance programs for air in accordance with Commission Notice SANTE 11326/2017-EN CIS (C(2017) 6766 final)[60].

Transport of pesticides via air is an issue of increasing concern (Woodrow et al., 2018; Langenbach and Caldas, 2021; Galon et al., 2021; Seiber and Cahill, 2022)[61]. Advances in analytical techniques, and in particular multiresidue methods allow a simultaneous determination of hundreds of pesticides in a single sample. This led to the implementation of numerous monitoring studies around the world (Kruse-Plaß et al., 2021; López et al., 2021; Figueiredo et al., 2021; Yera and Vasconcellos, 2021; Degrendele et al., 2022)[62]. Residues in different environmental matrices show that transport of pesticides to non-target areas of pesticides is ubiquitous. Pesticides have been found in insects from nature reserves (Brühl et al., 2021[63]), dust samples from indoor and outdoor environments (Figueiredo et al., 2022[64]), rainwater samples (Décuq et al., 2022[65]), and organic food (EFSA, 2018[66]). For organic farms, this can pose an existential problem as airborne transport and deposition of pesticides and their degradation products on harvested crops can cause exceedances of maximum residue levels for organic products. As a result, affected products can't be marketed under the organic label (Kruse-Plaß et al., 2021**Fehler! Textmarke nicht definiert.**). Comparable problems can occur in the marketing of harvested crops for the production of infant nutrition. To avert a threat to the coexistence of conventional and organic farming and to achieve the expansion of organic farming areas, it is necessary to identify airborne pollution and to reduce it through improved

[60] SANTE11326/2017-EN CIS (europa.eu)

[61] Woodrow, J. E., Gibson, K. A. and Seiber, J. N. (2019). "Pesticides and Related Toxicants in the Atmosphere." Rev Environ Contam Toxicol 247: 147-196.; Langenbach, T., M.P. de Campos, T. and Querino Caldas, L. (2021). Why Airborne Pesticides Are So Dangerous. Environmental Sustainability - Preparing for Tomorrow.; Galon, L., Bragagnolo, L., Korf, E. P., Dos Santos, J. B., Barroso, G. M. and Ribeiro, V. H. V. (2021). "Mobility and environmental monitoring of pesticides in the atmosphere - a review." Environ Sci Pollut Res Int.; Seiber, J. N. and Cahill, T. A. (2021). Pesticides, Organic Contaminants, and Pathogens in Air, CRC Press.

[62] Kruse-Plaß, M., Hofmann, F., Wosniok, W., Schlechtriemen, U. and Kohlschütter, N. (2021). "Pesticides and pesticide-related products in ambient air in Germany." Environmental Sciences Europe 33(1).; López, A., Ruiz, P., Yusà, V. and Coscollà, C. (2021). "Methodological Aspects for the Implementation of the Air Pesticide Control and Surveillance Network (PESTNet) of the Valencian Region (Spain)." Atmosphere 12(5).; Figueiredo, D. M., Duyzer, J., Huss, A., Krop, E. J. M., Gerritsen-Ebben, M. G., Gooijer, Y. and Vermeulen, R. C. H. (2021). "Spatio-temporal variation of outdoor and indoor pesticide air concentrations in homes near agricultural fields." Atmospheric Environment 262.; Yera, A. M. B. and Vasconcellos, P. C. (2021). "Pesticides in the atmosphere of urban sites with different characteristics." Process Safety and Environmental Protection 156: 559-567.; Yera, A. M. B. and Vasconcellos, P. C. (2021). "Pesticides in the atmosphere of urban sites with different characteristics." Process Safety and Environmental Protection 156: 559-567.

[63] Bruhl, C. A., et al. (2021). "Direct pesticide exposure of insects in nature conservation areas in Germany." Sci Rep **11**(1): 24144.

[64] Figueiredo, D. M., Nijssen, R., E, J. M. K., Buijtenhuijs, D., Gooijer, Y., Lageschaar, L., Duyzer, J., Huss, A., Mol, H. and R, C. H. V. (2022). "Pesticides in doormat and floor dust from homes close to treated fields: Spatio-temporal variance and determinants of occurrence and concentrations." Environ Pollut 301: 119024.

[65] Decuq, C., Bourdat-Deschamps, M., Benoit, P., Bertrand, C., Benabdallah, R., Esnault, B., Durand, B., Loubet, B., Fritsch, C., Pelosi, C., Gaba, S., Bretagnolle, V. and Bedos, C. (2022). "A multiresidue analytical method on air and rainwater for assessing pesticide atmospheric contamination in untreated areas." Sci Total Environ 823: 153582.

[66] EFSA (2018). "Monitoring data on pesticide residues in food: results on organic versus conventionally produced food." EFSA Supporting Publications 15(4)

risk management. To obtain quantitative data, air monitoring programs should be mentioned in the SUR in addition to established groundwater and water quality monitoring programs. In France and Sweden, such public air monitoring programs have been established for years.

According to the SUR draft, information collected in the electronic data register (see chapter 6) should be proactively shared by the competent authorities with authorities involved in implementation of the Water Framework Directive. These anonymised data should be linked with monitoring data on ground- and surface water to allow correlations between measurements and data on pesticide applications. However, as data from the electronic register is also important for authorities responsible for the implementation of other directives and regulations, such as 2008/50/EC, 2009/147/EC, 1107/2009/EC, Regulation on nature restoration[27], the information should also be shared proactively with these authorities. Accordingly, data from the register should also be evaluated in combination with residue data from monitoring in soil and air and with ecological indicators for agroecosystems envisaged in the Regulation on nature restoration. In this way, comprehensive conclusions can be drawn from pesticides applications to measured residues and certain ecological indicators.

A Europe-wide monitoring of soils will be developed based on the EU Soil Strategy in the EU Soil Health Law. However, comprehensive air monitoring should be made mandatory for all MS within the framework of the national action plans.

8 National action plans: Name acceptable reasons for deviations from the recommendations of the European Commission

Recommendation for action

Concrete and binding national action plans are of enormous importance for a successful implementation of the SUR. According to the SUR draft, MS may refuse recommendations of the European Commission to be adapted in their national action plans. To ensure a uniform approach, the SUR should list reasons for deviating from recommendations of the European Commission.

Compared to the previous Directive 2009/128/EC[8], the current SUR draft provides much more concrete and binding requirements for national action plans. Therefore, measures to achieve targets can be implemented in a harmonized manner in all MS.

In addition to agricultural concerns, the public consultation as well as the annual revision by MS foreseen in the SUR draft is important to give a greater weight to aspects of nature conservation and environmental protection more strongly.

Accordingly, the European Commission should regularly review all national action plans. If adjustments to national action plans are deemed to be necessary, the European Commission should submit adjustment proposals for MS. MS must implement these or justify why they continue to deviate from adaptation recommendations. This procedure described in the SUR draft is necessary for the success of national action plans in all MS. However, it is still unclear which reasons MS can invoke to deviate from the recommendations of the European Commission or which reasons do not justify a deviation. Thus, a list of permissible justifications should be included in the regulation to ensure a uniform approach concerning the recommendations of the European Commission.

Furthermore, the necessary measures to be included in the national action plans according to Article 8 of the draft SUR can only be implemented if they are adequately and permanently financed. This applies in particular to preventive measures taken by farms to minimise the risk of infestation of crops by plant diseases and harmful organisms. Only in this way, the use of pesticides can be reduced in line with the objectives of the SUR (see also Chapter 3).

9 Co-development of training contents in cooperation with environmental authorities

Recommendation for action

The SUR draft envisages training and independent consultation that is essential for the implementation of stipulated pesticide reduction targets. However, to reduce the use and environmental risk of pesticides, training content should be co-developed with authorities engaged in the environmental risk assessment of pesticides at MS level. The length of time for training and advice should be appropriate- the learned knowledge should be tested. MS should launch training and education initiatives as soon as possible to provide sufficient available staff for advisory services. Funding for training and payment of independent advisors must be ensured.

According to the SUR draft, information on risks of pesticides should be summarised on public available websites. Again, authorities engaged in environmental risk assessment of pesticides should be involved in the website creation.

Training and independent advisory system

According to the current SUR draft, the introduction of a compulsory annual advisory service is planned, as well as an intensive training of agricultural pesticide users by independent advisors every 10 years. This advisory system is essential to provide farmers with needed knowledge to effectively reduce the use of chemical pesticides and employ alternative strategies. However, it must be ensured that the duration of consultations and trainings are appropriate to imparted knowledge. After training, pesticide users should pass an exam to demonstrate their knowledge.

Currently, many MS occupy far too little staff for envisaged, intensive advisory services. Demands on independent advisors are also high. Advisors have to prove a certificate of training (Art. 25 para. 3) and are checked for their independence by competent authorities. Their training must be repeated every 5 years. As the requirements for the management of agricultural land in protected areas are high (see also chapter 5.1), advisors must provide even more in-depth and frequent advice to the respective farmers.

To meet requirements of the advisory system in general, MS must launch training and further education initiatives as soon as possible. Training of experts and regular payment of independent advisors will be cost-intensive for MS. These costs may not be covered by financial resources of the Common Agricultural Policy (CAP)[24] alone to the necessary extent and with necessary continuity as funding from the second pillar is limited by the strategic plan and must serve other priorities beyond the necessary measures (see Chapter 3).

The content of training and advisory services must focus on preventing the build-up of pest populations and reducing environmental risk associated with the use of synthetic chemical pesticides. Therefore, it is necessary that environmental authorities or authorities competent for environmental risk assessment of pesticides participate in developing training contents.

Information and awareness raising

According to the SUR draft, each MS must designate an authority to provide comprehensive public information on risks associated with the use of pesticides. Environmental authorities or authorities competent for environmental risk assessment of pesticides should be involved in preparation of relevant information.

Appendix: Proposal for an adapted Annex I[67]

ANNEX I
referred to in Article 4

METHODOLOGY FOR CALCULATING PROGRESS TOWARDS ACHIEVING THE TWO UNION AND TWO NATIONAL 2030 REDUCTION TARGETS

This Regulation is the instrument used to achieve the pesticide reduction targets contained in the Farm to Fork Strategy by requiring each Member State to contribute to achieving by 2030 a 50 % Union-wide reduction of both the use and risk of chemical plant protection products ('Union 2030 reduction target 1') and the use of more hazardous plant protection products ('Union 2030 reduction target 2'). This Regulation also regulates the contribution of each Member State to these Union targets. Each Member State contribution, set in the form of a national target, to Union 2030 reduction target 1 is referred to as a 'national 2030 reduction target 1', while a Member State contribution to Union 2030 reduction target 2 is referred to as a 'national 2030 reduction target 2'. The methodology for calculating progress towards achieving these targets is set out below:

SECTION 1

National 2030 reduction target 1: methodology for estimating progress towards the reduction in use and risk of chemical plant protection products

1. The methodology shall be based on statistics on the **quantities** of chemical active substances[68] placed on the market in plant protection products under Regulation (EC) No 1107/2009, provided to the Commission (Eurostat) under Annex I to Regulation (EC) No 1185/2009 of the European Parliament and of the Council[69] ***in combination with the mean application rates of chemical active substances based on their representative uses, which have been evaluated under Regulation (EC) No 1107/2009[70]. All active substances that are used outdoors, including also active substances used for seed coating and selected non-chemical active substances[71], do fall under reduction target 1.***

2. The following general rules shall apply for the calculation of progress towards achieving reduction target 1:

[67] ***It should be noted that all proposed changes in Annex I also apply to Annex VI of the draft SUR for the calculation of indicators HRI1, HRI2 and HRI2a, where applicable.***
[68] ***The methodology for estimating progress towards the reduction in use and risk of chemical plant protection products shall also extend to selected non-chemical plant protections products (see definition Article 3(1)) of comparatively high concern.***
[69] Regulation (EC) No 1185/2009 of the European Parliament and of the Council of 25 November 2009 concerning statistics on pesticides (OJ L 324, 10.12.2009, p. 1).
[70] ***Published by the European Commission as Final Review Reports for the active substances in the EU Pesticide Database (https://food.ec.europa.eu/plants/pesticides/eu-pesticides-database_en).***
[71] ***Non-chemical active substances according to the definition in Article 3(1) of this regulation shall be included that cannot be classified as low-risk due to their environmental risk or existing mitigation measures regarding their use.***

(a) progress shall be calculated on the basis of the categorisation of chemical active substances into the 4 groups set out in the Table in this Annex;

(b) the chemical active substances in group 1 shall be those listed in Part D of the Annex to Commission Regulation (EU) No 540/2011[72];

(c) the chemical active substances in group 2 shall be those listed in Parts A and B of the Annex to Implementing Regulation (EU) No 540/2011;

(d) the chemical active substances in group 3 shall be chemical active substances that are approved as candidates for substitution in accordance with Article 24 of Regulation (EC) No 1107/2009 and are listed in Part E of the Annex to Implementing Regulation (EU) No 540/2011, or that are listed in the Annex to Implementing Regulation (EU) 2015/408, *or that are identified by the Member States as giving rise to particular concern[73];*

(e) the chemical active substances in group 4 shall be those not approved under Regulation (EC) No 1107/2009, and therefore not listed in the Annex to Implementing Regulation (EU) No 540/2011;

(f) the weightings in row (iii) in the Table in this Annex shall apply,

(g) selected non-chemical active substances[71] according to the definition in Article 3(1) shall be included in the methodology for calculating the progress towards the reduction in use and risk of chemical plant protection products.

3. Progress towards achieving reduction target 1 shall be calculated by dividing the annual quantities of active substances in plant protection products placed on the market by the mean application rate per hectare of its representative uses and multiplying the results for each group in the Table in this Annex by the relevant hazard weighting set out in row (iii), followed by the aggregation of the results of these calculations.

Table 1 Categorisation of active substances and hazard weightings for the purpose of calculating progress towards national 2030 reduction target 1

Row	Groups			
	1	**2**	**3**	**4**
(i)	Low-risk chemical active substances which are approved or deemed to be approved under Article 22 of Regulation (EC) No 1107/2009, and	Chemical active substances approved or deemed to be approved under Regulation (EC) No 1107/2009, and not falling in other categories, and which	Chemical-active substances that are approved as candidates for substitution in accordance with Article 24 of Regulation (EC) No 1107/2009 and listed in Part E of the Annex to Implementing Regulation	Chemical active substances which are not approved under Regulation (EC) No

[72] Commission Implementing Regulation (EU) No 540/2011 of 25 May 2011 implementing Regulation (EC) No 1107/2009 of the European Parliament and of the Council as regards the list of approved active substances (OJ L 153, 11.6.2011, p. 1).

[73] ***Member States have the possibility to propose 5 chemical active substances of group 1 or 2 as substances of very high concern to the European Commission each year. From the Member State proposals, the 5 substances with the highest number of nominations are identified and assigned to Group 3 for the calculation of reduction target 1. This selection procedure by the Member States allows for timely (i) consideration of current developments in science and technology and (ii) rewarding national efforts to reduce the use of substances of very high concern. The criteria and/or methods for the selection of the 5 substances are left to the Member States, but a transparent and comprehensible description is required.***

	which are listed in Part D of the Annex to Implementing Regulation (EU) No 540/2011	are listed in Parts A and B of the Annex to Implementing Regulation (EU) No 540/2011	(EU) No 540/2011, or that are listed in the Annex to Implementing Regulation (EU) 2015/408.	1107/2009, and therefore which are not listed in the Annex to Implementing Regulation (EU) No 540/2011.
(ii)	Hazard Weightings applicable to quantities of chemical active substances placed on the market in products authorised under Regulation (EC) No 1107/2009 and ***standardized by the mean application rate per hectare of its representative uses evaluated in the approval procedure under Regulation (EC) No 1107/2009.***			
(iii)	**1**	**8**	**16**	***16***

4. The baseline for reduction target 1 shall be set at 100, and is equal to the average result of the above calculation for the period *2018-2020.*

5. The actual progress towards achieving reduction target 1 shall be expressed by reference to the baseline.

6. The Commission shall calculate the progress towards achieving reduction target 1 in accordance with Article 34(2) of this Regulation for each calendar year and at the latest 20 months after the end of the year for which progress towards the reduction target 1 is being calculated.

SECTION 2

National reduction target 2: methodology for estimating progress towards reduction in the use and risk of the more hazardous plant protection products

1. The methodology shall be based on statistics on the quantities of active substances placed on the market in plant protection products under Regulation (EC) No 1107/2009, provided to the Commission under Annex I to Regulation (EC) No 1185/2009 ***in combination with the mean application rates of chemical active substances based on their representative uses, which have been evaluated under Regulation (EC) No 1107/2009[70]. All chemical active substances that are used outdoors, including also active substances used for seed coating, do fall under reduction target 2.***

2. Progress towards achieving target 2, at both Union and national levels, shall be calculated ***by dividing the annual quantities of active substances contained in more hazardous plant protection products placed on the market each year by the mean application rate per hectare of its representative uses, followed by the aggregation of the results of these calculations.***
.

3. The baseline for reduction target 2, at both Union and national levels shall be set at 100, and is equal to the average result of the above calculation for the period *2018-2020.*

4. Progress towards achieving reduction target 2, at both Union and national levels,

shall be expressed by reference to the baseline.

5. The Commission shall calculate progress towards achieving reduction target 2, at both Union and national levels, in accordance with Article 34(2) of this Regulation for each calendar year and at the latest 20 months after the end of the year for which progress towards reduction target 2 is being calculated.

SECTION 3

Union Reduction Targets

1. The methodology for calculating trends towards the two Union 2030 reductions targets shall be the same as the methodology for calculating trends at national level as set out in Sections 1 and 2.

2. The trend at national level will be calculated using national statistics on the quantities of chemical active substances as defined in point 5 of Article 2 placed on the market in plant protection products under Regulation (EC) No 1107/2009, provided to the Commission under Annex I (Statistics on the placing on the market of pesticides) to Regulation (EC) No 1185/2009 ***in combination with the mean application rates of chemical active substances based on their representative uses, which have been evaluated under Regulation (EC) No 1107/200970. All chemical active substances that are used outdoors, including also active substances used for seed coating and selected non-chemical active substance as listed under section 2 and 3 are to be included***.

3. The trend at Union level will be calculated using Union statistics on the quantities of chemical active substances as defined in point 5 of Article 2 placed on the market in plant protection products under Regulation (EC) No 1107/2009, provided to the Commission under Annex I (Statistics on the placing on the market of pesticides) to Regulation (EC) No 1185/2009 ***in combination with the mean application rates of chemical active substances based on their representative uses, which have been evaluated under Regulation (EC) No 1107/2009[70]. All chemical active substances that are used outdoors, including also active substances used for seed coating and selected non-chemical active substance are to be included***.