foodwatch

THE DECEPTIVE HARMONISED RISK INDICATOR

ABSTRACT

The Harmonised Risk Indicator (HRI) is referred to 25 times in the new draft of the "Sustainable Pesticide Use Regulation".

A 'harmonised indicator' to assess risks sounds like a useful tool – but what is it exactly? Does it actually achieve what its name proposes and provide a way of measuring the risks of pesticides? Does it actually measure their exposure in the environment and their toxicity? If we are to have a tool that meets its purpose, the methodology of how the HRI is calculated is of utmost importance.

This article shows that the HRI, as it is designed, is a completely inappropriate tool to measure or evaluate progress in reducing pesticide exposure and toxicity. This insufficient design is not an accident or an oversight. The HRI as it is, allows Member States and the European Commission to communicate supposed improvements through calculation tricks and thus avoid conflicts with the pesticide and the agriculture industries.

foodwatch proposes alternative, suitable indicators to measure pesticide exposure and the associated toxic burden. foodwatch demands a change in the methodology to evaluate pesticide use and calls for full transparency on the use of each active ingredient.

WHY IS THIS IMPORTANT?

Indicators are needed to measure pesticide use and the associated risks to human health and the environment. The European Commission has been applying the Harmonized Risk Indicator (HRI) to observe trends. The HRI now plays a central role in the proposed "Sustainable Use Regulation" (June 2022) in order to set the targets and measure political success.

As the new "Sustainable Use Regulation" is a regulation, it is, once enforced, directly and immediately binding for all Member States. Therefore, the Harmonized Risk Indicator (HRI) directly determines, whether or not pesticide use will be reduced. It will also regulate what information governments, competent authorities and the European Commission will communicate.

This paper describes and evaluates the Harmonized Risk Indicator (HRI).

BACKGROUND

Pesticides differ greatly in their toxicity and environmental impact. There are some relatively harmless substances like "baking soda[1]", but also highly toxic and (via run-off, drift, leaching) highly mobile pesticides.

In order to evaluate and compare pesticides numerous scoring systems were developed over time (see Neumeister 2017[2]; JKI 2022[3]). All of these scoring systems are based on a set of indicators usually the toxicological properties and the environmental impact (e.g. leaching potential, persistence) of each particular pesticide.

These scoring systems can be used to evaluate pesticide sales and/or use.[4]

The legislative predecessor of the new proposal for a "Sustainable Use Regulation" is the "Sustainable Use Directive (SUD)" from 2009. The SUD demanded that a "Harmonised Risk Indicator" should be developed. This risk indicator, should be ***"the result of a method of calculation that is used to evaluate risks of pesticides on human health and/or the environment.[5]"***

It took the EU more than ten years to develop a common indicator to measure pesticide use in the European Union: the "Harmonised Risk Indicator (HRI)", published in 2019. But this HRI is not a result of science-based risk evaluation. In fact, it is a very simplified scoring system, based solely on the sales data of active substances and their respective authorization status:

- low-risk substances like "baking soda" as defined by law (n=37) have risk factor of 1;
- "Candidates for Substitution" as defined by law (n=54) – pesticides with a higher risk – have risk factor of 16;
- non-authorised pesticides a risk factor of 64;
- all others have a risk factor of 8 (n=360)[6].

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[1] Sodium hydrogen carbonate= baking soda, is authorized and used as low risk fungicide (see EU Reg 2020/1263).
[2] Neumeister L (2017): Toxic Load Indicator. A new tool for analyzing and evaluating pesticide use. Aid by Trade Foundation and the Better Cotton Initiative (BCI).
[3] Pesticide Trends Database Explorer: https://sf.julius-kuehn.de/pesticide-dbx/.
[4] The individual score for an active ingredient is usually multiplied by the volume (kg) of sales or use data.
[5] Article 3 of the SUD
[6] All numbers as of August 2022

It is certainly acceptable to give lower risk factors to low-risk substances, and higher scores to "Candidates for Substitution", but there are **three major problems** with the design of the HRI:

1. A CHANGE IN LEGAL STATUS ALTERS THE RISK FACTOR OF THE PESTICIDE

When the legal status of a substance changes, the respective risk factor for this substance changes. For example, "baking soda" loses its authorization, it suddenly has a risk factor of 64. A "Candidate for Substitution" which is re-classified as a "normal" pesticide (e.g. Flumioxazin) has then a new risk factor of 8. A non-authorized pesticide (e.g. Asulam) which receives approval becomes a risk factor of 8 instead of 64.

Every new risk-classification is valid retrospectively. This means that for all the previous years, the newest/latest HRI-value has to be applied for the amount of a substance sold and this will provide the figure at which it will be evaluated. This approach is not only unscientific, it makes the evaluation of trends impossible.

It is absolute unscientific to use an indicator based upon two changing variables (legal status and quantity). When a trend can be influenced by two variables, the observed trend is meaningless.

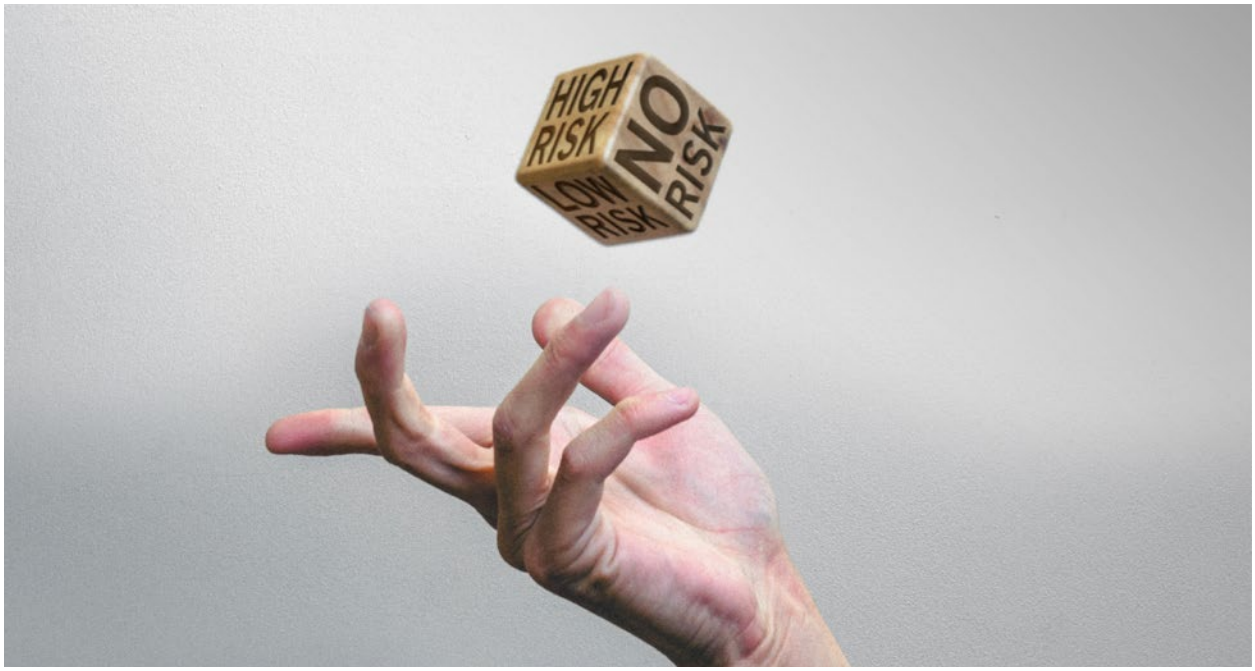
2. THE AMOUNTS OF A PESTICIDE SOLD DO NOT REFLECT THE EXPOSURE

The HRI is calculated by the amounts sold multiplied with the risk factors (1, 8, 16, 64). Amounts sold do not reflect exposure (see below). With 1kg of one pesticide, you may be able to spray one hectare[7], with 1 kg of another pesticide you may be able to spray 100 hectares. Application rates per hectare can vary between different active pesticide substances by a factor of 100 even 10,000. The amount sold alone is therefore no indicator for the exposure. However, **exposure must be measured to determine risks.**

3. THE MAJORITY OF THE PESTICIDES HAVE THE SAME RISK FACTOR OF EIGHT

The risk factor used is not nuanced enough. Although the toxicity among these 360 pesticides can vary by a factor of 1,000 (or more) depending on the observed effect, most pesticides are asssigned a risk factor of Eight ("8") and there is a maximum risk factor of 64.

[7] Hectare = 10.0000 square meters



WHAT ARE THE CONSEQUENCES OF THE CURRENT HRI DESIGN?

The "Harmonised Risk Indicator (HRI)" plays a prominent role. It is the centrepiece[8] for pretending/ claiming political success, and the baseline for action requested from Member States. Article 36 of the SUR proposal demands from each Member State specific reduction plans for the Top Five pesticides contributing most to the annual Harmonised Risk Indicator (HRI). The national annual HRI is calculated by the volume sold multiplied with the "risk" factors. Large volume pesticides therefore contribute most to the HRI – while - as absurd as it may sound - the most toxic pesticides contribute less.

In **Germany** the number 1 pesticide contributing to the HRI is carbon dioxide – a pesticide[9] used in storage places. It is followed by the controversial weed killer glyphosate, and then sulphur, a naturally occurring fungicide, that is also used in organic farming.

In **France**, glyphosate, sulphur and paraffin oils belonged to the top five pesticides in 2019 contributing to the national HRI.

In **Spain**, again sulphur and paraffin oils belonged to the top five pesticides in 2020 contributing to the HRI.

Sulphur and paraffin oils are both authorized in organic agriculture. If the SUR proposal is implemented, as it is currently proposed by the European Commission, several Member States (see also Figure 4 in "Locked-in pesticides") will be required to develop reduction plans for high volume, organically approved substances, but not for highly toxic, high exposure pesticides. Below are some illustrations of the problem. In Germany (2021), about 40 tonnes of lambda-cyhalothrin, a highly hazardous, non-selective insecticide and Candidate for Substitution, and about 2,000 tonnes of sulphur were sold. With 2,000 tonnes of sulphur an area of 190,000-584,000 hectares can be treated, while with 40 tonnes lambda-cyhalothrin an area 2.5-4.5 million hectares can be sprayed. On these 2.5-4.5 million hectares almost every exposed arthropod (insects and mites), beneficial or not would be killed. Nevertheless, the current HRI calculation would put lambda-cyhalothrin in 60th place in the ranking and sulphur in 3rd place.

In **the Netherlands**, the highly hazardous mancozeb contributed in 2019[10] to 25% to the HRI based on the current calculation method. Mancozeb was de-authorized in the EU and the period of grace expired in January 2022[11]. With the change of the legal status mancozeb suddenly "becomes eight time more toxic", which means in the future mancozeb will have a "risk" factor of 64 instead of 8. This is great for The Netherlands, because the share of Mancozeb on the HRI will - retrospectively - raise to over 60% (see Figure 1). This means, just by the ban of mancozeb, the Netherlands already will have achieved the Farm to Fork goal of a 50% pesticide reduction by the end of 2022, and no additional reduction effort is required, **if the HRI methodology is not changed.**

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[8] It is mentioned 25 times in the SUR proposal.

[9] Carbon dioxide (CO2) is used in grain storages to reduce oxygen levels. The absence of oxygen as well as high CO2 levels supress pests and diseases. The chemical alternative (e.g. phosphine, organophosphates) are of much higher toxicity. There is incoherence among MS in the reporting of CO2 as storage pesticide, only Germany and Austria seem to report this use, although it is probably a common application in most MS.

[10] Mancozeb contributed in all years since 2015 to over 20% of the NL HRI.

[11] All national HRI of DE, ES, NL, FR were calculated by Lars Neumeister using national sales data by active ingredient and the Eurostat HRI methodology (2011-2020) https://ec.europa.eu/eurostat/web/agriculture/agri-environmental-indicators/information

Figure 1:
DUTCH HRI 2019 CALCULATED WITH CURRENT METHODOLOGY

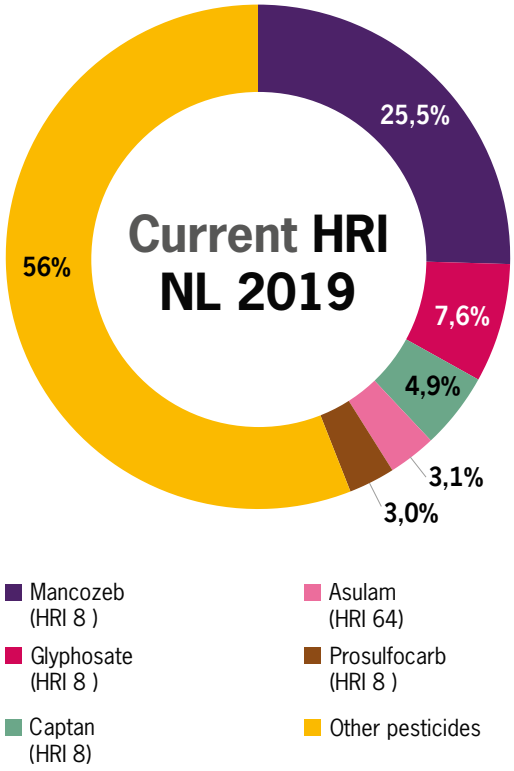
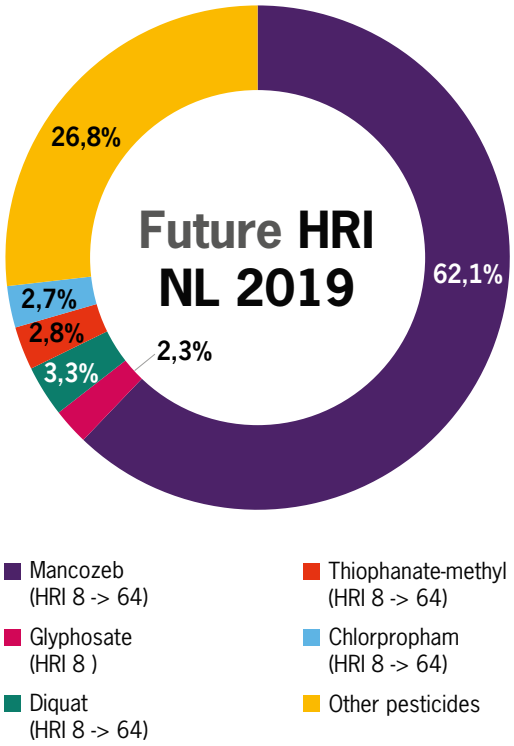


Figure 2:
HOW THE DUTCH HRI 2019 LOOKS LIKE WHEN CALCULATED WITH THE FUTURE METHODOLOGY



Because the "Harmonised Risk Indicator (HRI)" is mostly based on a changing legal status of a pesticide, it does not reflect science based toxicological risks. According to the European Commission, garlic pulp is eight times more "toxic" than garlic extract and one specific strain of the biological control agent ***Bacillus amyloliquefaciens*** is even sixty-four times more "toxic" than another strain of ***Bacillus amyloliquefaciens***.

Asulam is a herbicide awaiting authorisation since 2014 (Status "pending"). Meanwhile it is being used in several Member States (e.g. BE, DE, DK, NL), but, as it is not officially authorized, it is calculated as 8 times more risky than any other herbicide which is not a Candidate for Substitution. Once it will be authorized, the risk will be 8times lower – retrospectively for all past years of usage.

In Spain, the government already "tricked" the European Commission. Year for year farmers in Spain were allowed to use a mixture of 1,3-Dichloropropene & Chloropicrin via an "emergency authorisation" for use in disease prone continuous monocultures. Large amounts were used[12] and because both chemicals have the risk factor of 64 they influence the Spanish "Harmonised Risk" unfavourably. This year (2022), the government allowed the use of metam-sodium for the anticipated annual "emergency" instead of 1,3-Dichloropropene & Chloropicrin. Metam-sodium is about 100 times more toxic than 1,3-Dichloropropene to users and bystanders[13] and the USA EPA labels it as ***"Likely to be carcinogenic"***. Its use was prohibited after an intoxication of numerous people in France post-application.[14] However, the change from 1,3-Dichloropropene & Chloropicrin (risk factor 64) to the more toxic Metam-sodium (risk factor 16) will improve "the look" of the Spanish data.

[12] 6.5 million kg of 1,3-Dichlorpropene in 2020
[13] Indicated by the AOEL (the acceptable operator exposure level)
[14] https://newsbeezer.com/franceeng/metam-sodium-pesticides-are-definitely-banned-in-france/

The legal status makes the difference regardless of the toxicity. Garlic pulp is not registered as pesticide, therefore it has the same risk as Fipronil, one of the most eco-toxic pesticides ever registered.

- According to the HRI-concept 80%[15] of the all approved pesticides (except "Candidates for Substitution[16]" and "low risk pesticides[17]") – pose the same risk. The risk factors do not reflect the toxicity.
- According to the European Commission the selective Bacillus thuringiensis, which only affects certain stages of lepidoptera larvae poses half the risk as gamma-cyhalothrin, a non-selective insecticide so toxic to honeybees that 1kg would be - mathematically[18] - enough to kill several billions of bees.
- For the European Commission, carbon dioxide, a gas humans' breath in and out – is as toxic as aluminium phosphide – a chemical which kills humans almost instantly when inhaled.
- Pheromones are mostly used in dispensers to prevent mating of a specific pest such the codling moth. According to the European Commission, this highly selective, low-risk method poses the same risk as any non-selective, highly toxic insecticide.
- Cooking oil (canola/rape[19] seed oil) can be used to control aphids, it rather works via physical effect than a poisoning effect. However, rape seed oil is not listed as low-risk pesticide, but as a regular pesticide (Part A of Annex I of Regulation 540/2011). For the European Commission it poses the same risk as any other highly toxic insecticide.

WHY WAS THE HRI SO BADLY DESIGNED?

To be clear, a deceptive indicator as the HRI is not created by accident. The HRI methodology as it is right now, can be used to present "progress"[20] without any change in pesticide use. This enables - after decades of failure - the authorities to publish graphs showing pesticide use reduction to pacify naive citizens and non-expert media.
The HRI also avoids conflicts with the almighty agri-business – which fights[21] any measures, that could potentially affect their current business model. Furthermore, this HRI does not only prevent reducing highly toxic pesticides, it forces Member States to reduce organically approved pesticides, which are, in most cases toxicologically of lesser concern.

Last but not least, this HRI methodology creates outrage among environmental NGOs, and binds valuable resources within the NGO community.

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[15] not counting "basic substances" like beer, cow mother-milk, whey etc.

[16] Part E of Annex I of regulation 540/2011 list 13 pesticides (plus several copper salts) as "Candidates for Substitution" (consolidated regulation as of 1.7.2022) and Regulation 2015/408 (consolidated regulation as of 1.3.2022) 37 more (without non-approved pesticides)

[17] PartD of Annex I of regulation 540/2011 li 37 pesticides as "low-risk substance " (consolidated regulation as of 1.7.2022)

[18] The amount to kill 50% of a honey bee population by contact is 0,005 gamma-cyhalothrin microgram/bee.

[19] Oil of Brassica napus or B. campestris seeds.

[20] See: graph 1 at https://food.ec.europa.eu/plants/pesticides/sustainable-use-pesticides/harmonised-risk-indicators/trends-eu_en

[21] See https://corporateeurope.org/en/2022/03/loud-lobby-silent-spring

IS THERE A WAY TO SAVE THE CREDIBILITY OF THE FARM TO FORK STRATEGY

Thanks to the intervention of NGOs, the draft of the SUR foresees a re-evaluation and potentially a re-design of the Harmonised Risk Indicator. However, the outcome is open, because the HRI is a political instrument and serves certain powerful interest groups.

In our opinion, the HRI - as it is - must be replaced. The authorities have enough scientific resources to come up with a meaningful set of indicators.

There are two important and well-known variables to assess pesticide use:

1. a meaningful pesticide **use** indicator
2. meaningful **risk/hazard** indicators.

It is of utmost importance, that a use indicator is based on the number of treatments and / or treated hectares. **The volume sold is an unsuitable indicator. It does not reflect potential exposure.**

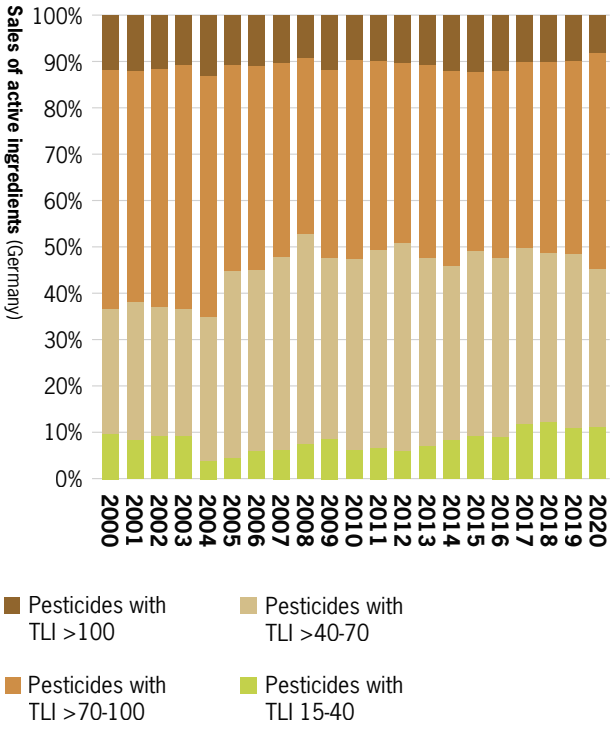
The importance of this distinction becomes clear, when data of pesticides with a lower toxicity are compared with data of highly toxic pesticides.

Ranking the sales volumes of pesticides according to their toxicity

The following graph shows the distribution of pesticide sales in Germany 2000-2020. It shows aggregated pesticide sales by grouped Toxic Load Indicator (TLI) scores. The TLI is a scoring system for pesticide active substances based upon 15 parameters evaluating the toxicity and environmental impact. The higher the score, the higher the potential risk. Pesticides with a TLI score of over 100 have the highest risk potential. Pesticides with a score under 40 have a lower risk potential: many pesticides allowed in organic agriculture belong to this group, but also a few synthetic chemicals like Fosetyl-Al.

Although both groups have a share of about 10% on the sold volume (see Figure 3) – the potential area exposure is very different (see Figure 4).

Figure 3:
VOLUMES OF SOLD PESTICIDES BY TLI GROUP



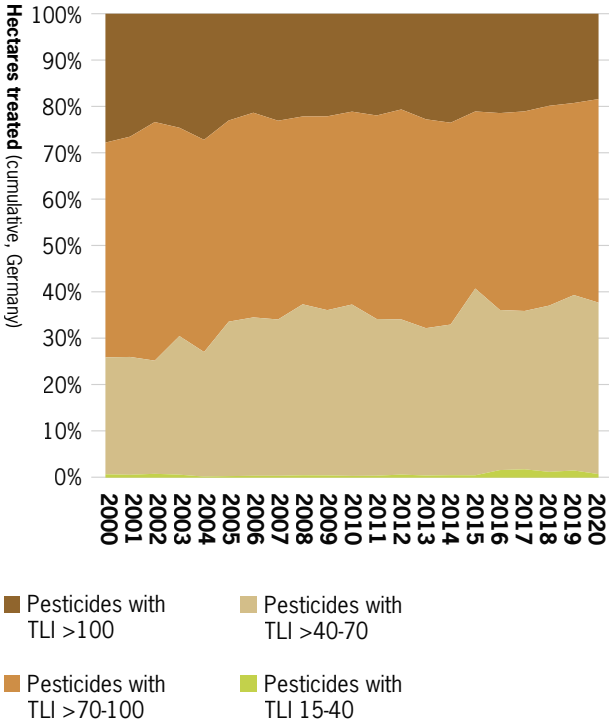
TLI = Toxic Load Indicator - pesticide with higher scores have a higher risk potential.

The highest score among all pesticides used in Germany (2000-2020) has phosphamidon (TLI = 140) follwed by chlorpyrifos (TLI = 136).

Please note: a lower total score does not necessarily indicate a low risk for all 15 parameters reflected in the TLI.

Pesticides with a TLI score of over 100 presented about 20%–30% of the cumulative treated area, while pesticides with a score of under 40 remain below 3% of the cumulative treated area.

Figure 4:
AREA TREATED WITH PESTICIDES BY TLI GROUP



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Please note: a lower total score does not necessarily indicate a low risk for all 15 parameters reflected in the TLI.

The reason is simple: highly toxic pesticides usually (not always) have a much lower application rate than pesticides with lower toxicity. Therefore, the area potentially treated (exposure) differs considerably.

The data displayed in Figure 3 and Figure 4 clearly demonstrate that the quantity sold is not a suitable indicator for pesticide use/exposure. The hectares treated or doses/treatments sold (NODU) are a more suitable **indicator to reflect exposure** than the amount sold.

Calculating the number of hectares treated or doses sold is not complicated. The Member States simply need to divide the amount of each active ingredient sold by the average hectare dose for the (representative crop) for the specific pesticides (active ingredients). **The representative crop for an active ingredient could be the crop for which most indications are approved, or the representative use as listed in the review reports by the EFSA (European Food Safety Authority).**

The national authorities already have access to all relevant data:

- permissible application rates for each indication[22]/ use (from product authorization[23]),
- quantities sold per active ingredient and/ or product

[22] excluding ornamental and potted plants

[23] See article 31 (a) in EU-Regulation 1107/2009

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DEMANDS BY FOODWATCH

1. **THE HARMONISED RISK INDICATOR (HRI) AS DEFINED IN THE PROPOSED SUR HAS TO BE REPLACED.** The variable scoring based upon the legal status is not acceptable.

2. **MEMBER STATES MUST BE OBLIGED TO CALCULATE A PESTICIDE USE INDICATOR**
Member States must be required by the SUR to calculate the area treated/doses sold for each pesticide based upon volume sold and the average dose across all indications (or for the representative crop). This would be the use indicator reflecting the exposure.

3. **DEVELOP MEANINGFUL PESTICIDE RISK INDICATORS**
The European Commission must further assign the Joint Research Centre (JRC[24]) to develop over the next months, meaningful **pesticide risk indicators** reflecting the potential risk/ damage for each pesticide active ingredient.

   These risk indicators must be based upon the use type, selectivity[25], the toxicological and chemical properties. These properties are known, because they are determined during the official risk assessment. It would be recommendable to create four hazard groups for the assessment of pesticide use:

   1. human health
   2. eco-toxicity
   3. ecological effects
   4. ground water leaching potential.

   There are already numerous scoring systems to evaluate the risk potential of every pesticide active ingredient. The German Julius Kühn Institut (JKI) for example applies several of these scoring systems to the German sales data[26].

4. **SCIENCE BASED TOXICOLOGICAL SCORES**
Scores for each pesticide must remain the same over the observed time period, unless new data on toxicological and chemical properties of a pesticide require a change of scores.

5. **TRANSPARENCY REQUIREMENTS**
A The European Commission must annually publish a list of all active ingredients with the individual scoring for each pesticide in each hazard group.

   B The Member States must be required to publish (at least) the volumes sold, the hectare treated aggregated by each hazard group.

6. For pesticides usage via MS derogation (authorisations acc. to §53 1107/2009), the indicators should be the same (area treated by hazard group). The trend over time can then be displayed separately for these pesticides.

7. The baseline for the national pesticide reduction targets must be the years 2019-2021 (the three years before the SUR was proposed). The proposed baseline of 2015-2017 is not acceptable, because pesticide authorization has changed significantly[27] since 2017.

In our view, it is not enough that Member States publish aggregated results. **All authorities must be required to publish all data in a manner that civil society and the scientific community can understand and re-calculate the official results.**

Sales data by active ingredients and the representative application rates must be published. Pesticide's sales are emissions and sales data by active ingredient fall under the right of information (Bundesverwaltungsgericht 2019[28]). Member States cannot longer pretend that sales data by active ingredients are confidential "trade secrets". The EU countries with highest pesticide use in Europe (DE, ES[29], FR, NL) do not treat the data as confidential.

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[24] The Joint Research Centre is the Commission's science and knowledge service. The JRC employs scientists to carry out research in order to provide independent scientific advice and support to EU policy: https://ec.europa.eu/info/departments/joint-research-centre_en

[25] Use type and selectivity could be utilized as parameter for ecological effects.

[26] Pesticide Trends Database Explorer: https://sf.julius-kuehn.de/pesticide-dbx/.

[27] Many high-use pesticides lost authorization since 2015, therefore an early baseline distorts trends substantially.

[28] Bundesverwaltungsgericht (2019): Neumeister versus Bundesrepublik Deutschland. Aktenzzeichen 9 A 541/17

[29] The Spanish government publishes data for about 90% of the volume sold by active ingredient.

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The foodwatch report ,,Locked-in pesticides'' provides comprehensive information on pesticide use in the EU, its economic causes and impacts. It presents a crop-by-crop plan how to create a pesticide free European Union by 2035.

DOWNLOAD HERE:

https://www.foodwatch.org/en/news/2022/europes-fatal-dependency-on-pesticides/

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