



Double Standards and Hazardous Pesticides from Bayer and BASF

*A glimpse behind the scenes
of the international trade in pesticide active ingredients*

Authors

Peter Clausing (PAN Germany),
Lena Luig (INKOTA-netzwerk) and
Jan Urhahn (Rosa Luxemburg Stiftung)
with the assistance of Wiebke Beushausen (INKOTA-netzwerk)

Publishers



INKOTA-netzwerk e. V.

Chrysanthemenstrasse 1–3
10407 Berlin, Germany
Telephone: + 49 (0) 30 42 08 20 20
Email: inkota@inkota.de
Website: www.inkota.de



Pestizid Aktions-Netzwerk e. V. (PAN Germany)

Nernstweg 32
22765 Hamburg, Germany
Telephone: +49 (0) 40 39 91 91 00
Email: info@pan-germany.org
Website: www.pan-germany.org

ROSA LUXEMBURG STIFTUNG

Rosa Luxemburg Stiftung Southern Africa

237 Jan Smuts Avenue
2193 Johannesburg, South Africa
Telephone: +27 (0) 11 44 75 22 2
Email: info@rosalux.co.za
Website: www.rosalux.co.za

Imprint

Press date: February 2021

Editing of the German text: TEXT-ARBEIT, www.text-arbeit.net

Translation: Shane Anderson and Hunter Bolin for Gegensatz
Translation Collective, www.gegensatztranslationcollective.com

Layout and illustration: Marischka Lutz Grafikdesign,
www.marischkalutz.de

Typesetting and printing: MediaService GmbH Druck
und Kommunikation, www.mediaservice.de

Printed on Circle offset Premium White, 100% recycled paper

Berlin | Hamburg | Johannesburg, April 2021

Person responsible according to the German Press Law:
Jan Urhahn, Rosa Luxemburg Stiftung

This publication is distributed free of charge and may not be used for the purposes of election campaigns.

Produced with financial support from the German Federal Ministry for Economic Cooperation and Development (BMZ) and sponsored by Bread for the World with funds from the Church Development Service, from MISEREOR and the Regional Office for Developmental Cooperation of the State of Berlin. The publishers are solely responsible for the content of this publication; the positions presented here do not reflect the opinions of the funding agencies.



Bundesministerium für
wirtschaftliche Zusammenarbeit
und Entwicklung

<i>The Key Information at a Glance</i>	4
---	---

<i>Double Standards and Hazardous Pesticides from Bayer and BASF</i>	
A glimpse behind the scenes of the international trade in pesticide active ingredients	6

<i>Banned Active Ingredients</i>	
Available Bayer and BASF active ingredients	9

<i>South Africa</i>	
A significant hub and a wall of silence	15

<i>Brazil</i>	
Despite transparency, an El Dorado for highly hazardous pesticides	18

<i>Mexico</i>	
Sales opportunities created through trade agreements and the domestic market	21

<i>Conclusion</i>	24
--------------------------	----

Appendix	25
----------	----

Endnotes	26
----------	----

The Key Information at a Glance

In recent years, Bayer and BASF have been widely criticized for marketing pesticide products in the countries of the Global South that contain active ingredients banned in the European Union (EU) due to environmental or health concerns. Identifying these business practices is a difficult task to begin with, but it is even more challenging to unearth those active ingredients that Bayer and BASF manufacture but which are then marketed in products from other chemical companies.

The aim of this study is to examine the global trade in pesticide active ingredients that are banned in the EU by looking at the examples of the German manufacturers Bayer and BASF. First and foremost, the study provides an overview of the multitude of pesticide active ingredients that are developed and/or brought to market by Bayer or BASF and that are still traded across globe—even though they cannot be sold in the EU and are classified as being highly hazardous to the health of humans. This survey includes some active ingredients that have been included in the portfolios

Box 1: Glossary

CMR Active ingredients

The abbreviation **CMR** stands for **C**arcinogenic, **M**utagenic, **R**eprotoxic. These are substances that are likely to cause cancer in humans, that damage genetic material, fertility and/or harm the unborn child.

Formulation

The process of manufacturing a finished pesticide product. That is, the combination of active ingredients and other additives.

Highly Hazardous Pesticides, HHPs

According to the definition agreed upon by the Food and Agriculture Organization (FAO) and the World Health Organization (WHO), pesticides are considered to be highly hazardous if they have been shown to cause severe or irreversible damage to human health or to the environment.¹ These are pesticide active ingredients that—according to the internationally recognized systems of classification such as that of the WHO or the Globally Harmonized System of Classification and Labelling of Chemicals (GHS)—pose a particularly high risk to health or the environment or that are listed in international

conventions. Among the most important conventions are the Stockholm Convention² banning persistent organic pollutants and the Rotterdam Convention on Prior Informed Consent (PIC) for the trading of toxic chemicals.³

Pesticides

In common parlance, the term pesticide is used to refer to the active ingredient as well as to the pesticide product. The most conventional categories of pesticides are herbicides (weed killers), insecticides (to fight insects), and fungicides (to fight moulds and other fungi).

Pesticide product

A pesticide sold on the market which is applied by the user. It consists of the active ingredient and the additives that, for example, enable the active ingredients to be suspended in water (the manufacturing of a spray mixture) or to improve its adhesion to the plant.

Active ingredient

Chemical compound which, as a rule, is synthesized to have over 95 percent purity, and which is the active component of a pesticide product.

of Bayer or BASF through mergers and acquisitions of other companies. The second aim of this study is to examine how active ingredients manufactured by Bayer or BASF are sold in products from other pesticide manufacturers in countries of the Global South, something that remains hidden to the outside world. Thirdly, this study lists those Bayer and BASF products containing active ingredients that are banned in the EU, but which are nevertheless sold by these companies in other regions outside the EU. This study will look at three different countries as examples: South Africa, Brazil, and Mexico.

Summary of the findings

- **Bayer has developed and/or brought to market 22 extremely or highly toxic pesticide active ingredients in the past.** Seven of them fall into Class 1A of the World Health Organization (WHO) and 15 of them into Class 1B. **BASF has developed and/or brought to market three highly hazardous active ingredients (WHO Class 1B).**
- In addition, **there are four other active ingredients by each Bayer and BASF that can cause long-term damage to human health** and that are banned in the EU.
- In some cases, these active ingredients **continue to be marketed by the two companies in their own pesticide products in the Global South (verified in Brazil, South Africa, and Mexico).**
- In Brazil, it has been proven in one case that **Bayer manufactures the banned active ingredient but does not sell the final product formulated from it.** Due to a lack of transparency, the trade in these substances can only be proven in individual cases. Once other agrochemical companies process the active ingredients into finished pesticides, it is generally no longer possible to identify which company manufactured and supplied the active ingredient listed on the product's label.
- Now that the original patents have expired, some of the 33 active ingredients manufactured by Bayer and BASF are being produced and sold by **other agrochemical companies, in China for instance.**
- **The export of pesticide active ingredients that are banned in the EU to other regions of the world comes at the expense of humans and the environment.** There are many reasons why it is an illusion to refer to the "safe" use of highly hazardous pesticides in the Global South.
- **Bayer has repeatedly broken publicly made promises.** Despite Bayer committing to ceasing the sale of extremely or highly hazardous active ingredients in 2013, as of the beginning of 2021, the Leverkusen-based group's portfolio in various countries still lists pesticide products that contain the active ingredients (beta-)cyfluthrin and methiocarb. The same goes for products with the active ingredient carbendazim.
- **To protect humans and the environment from the consequences of the use of highly hazardous pesticide active ingredients, we need a global ban on the production, storage, and export of these active ingredients that is legally binding under international law. Germany and the EU should lead the way here.** Furthermore, there must be a much **higher level of transparency** around the global trade in pesticide active ingredients. In the future, detailed information should be made available regarding the origin, quantity, and destination for pesticide products and active ingredients that are exported by companies.

Double Standards and Hazardous Pesticides from Bayer and BASF

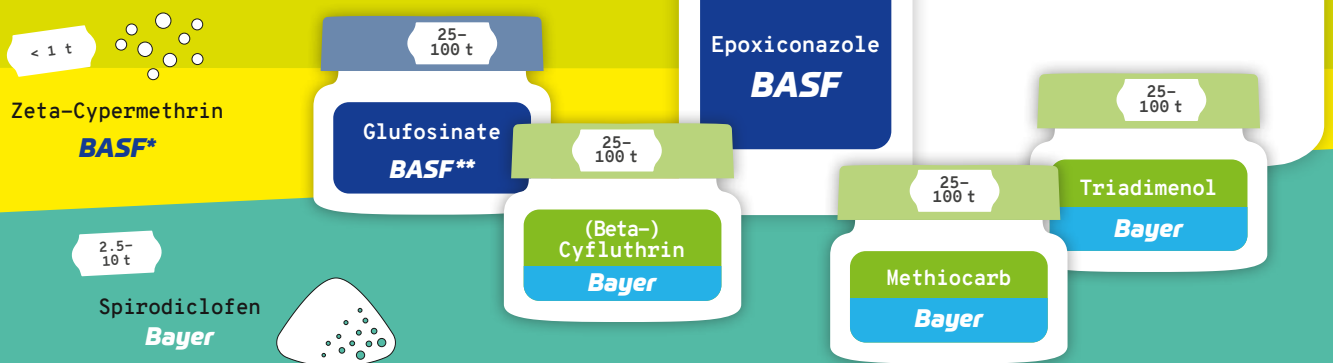
A glimpse behind the scenes of the international trade in pesticide active ingredients

The double standards that exist in the global trade in pesticides have received more and more public attention in recent years. The issue at hand regards pesticide products and active ingredients that are either banned or not approved in the EU due to health or environmen-

tal concerns but that are nevertheless exported out of the EU by agrochemical corporations and are then sold in other regions of the world. This also includes the trade of pesticides and active ingredients that might be developed by European corporations, but which these

Developed and/or brought to market by Bayer and BASF: exports of active ingredients from Germany in 2019 that are now banned in the EU

Note: The statistics of the German Federal Office of Consumer Protection and Food Safety (BVL) only include active ingredients that are contained in finished pesticide products. The trade of active ingredients themselves does not appear in the BVL's statistics. More precise information of the quantities of active ingredients and who manufactured them is not available.



* Zeta-Cypermethrin became a part of BASF's portfolio after the acquisition of Shell's pesticide branch.

** Originally Bayer, marketing rights transferred from Bayer to BASF via the acquisition of Monsanto.

Source: BVL, "Absatz an Pflanzenschutzmitteln in der Bundesrepublik Deutschland", 2020, http://www.bvl.bund.de/SharedDocs/Downloads/04_Pflanzenschutzmittel/meld_par_64_2019.pdf?__blob=publicationFile&v=3, (Last accessed 4 December 2020).

corporations then manufacture outside the EU and sell throughout the world. The current report looks at the active ingredients that have a particularly high degree of acute toxicity and so-called CMR active ingredients (see Box 1: Glossary).

Bayer and BASF have developed a multitude of highly hazardous active ingredients. Some of these are still contained in Bayer and BASF products. In most cases, the patents on these active ingredients have now expired, which means that other agrochemical companies are producing and trading these substances. The Indian pesticide company UPL estimates that “only” around 18 percent of all active ingredients are still protected by patents worldwide.⁴ In total, the criteria mentioned above (i. e. acute toxicity and CMR properties) apply to at least 33 active ingredients that were developed and/or brought to market by Bayer or BASF. The authors have included all active ingredients in their research that were listed in Römpp’s Online Chemistry Encyclopaedia as having been developed or introduced by Bayer or BASF.⁵ Some of these active ingredients became part of these companies’ portfolios after other companies that had developed these active ingredients were acquired or after these companies merged with their pesticide division.

It was shown in 2019 that eight of these active ingredients were exported from Germany as part of pesticide products to the rest of the world. Five of these chemical compounds are active ingredients from Bayer and three of them are from BASF. The marketing rights for Bayer’s active ingredient glufosinate were sold by Bayer to BASF as part of the Bayer-Monsanto deal in 2018. Bayer nevertheless continues to advertise the product Finale in Mexico, which contains glufosinate.⁶ However, the statistics of the German Federal Office of Consumer Protection and Food Safety (BVL) only record the active ingredients contained in exported pesticide products.⁷ The potential trade of the active ingredients themselves is not mentioned in these statistics at all

and it can therefore be assumed that there is trade that remains unreported.

Insufficient political regulation

A great number of pesticide active ingredients have gradually been banned in the EU since the EU Pesticide Regulation (1107/2009) came into force in 2009. The reasoning for this was that these substances are harmful to human health or the environment.⁸ The EU attaches particular value to protecting the population, biodiversity, and ecosystems. Thus, while humans and the environment are increasingly and rightly protected from highly hazardous pesticide active ingredients in the EU, the danger they pose is recklessly accepted with no regard for the countries importing them. According to a study in 2020, 385 million people worldwide suffer from acute pesticide poisoning every year, compared to an estimated 25 million cases in 1990. This means that approximately 44 percent of the people who work in agriculture worldwide—of 860 million farmers and farm workers—suffer from poisoning every year.⁹

To date, there are no binding regulations at the EU level that could prevent the export of active ingredients that are banned within the EU. With Regulation 649/2012 from 4 July 2012, the EU merely fulfilled its obligation to implement the Rotterdam Convention that had been in effect since February 2004.¹⁰ This means that the pesticide active ingredients listed in the annex to the convention—and which are thereby recognized as being particularly hazardous—may only be exported from the EU if the importing countries are informed in advance and agree to import them. Within the EU, France has passed a law that totally forbids the manufacture, storage and export of pesticide products should they contain active ingredients that are not approved in the EU due to health or environmental concerns. It comes into force in 2022. In Germany, the

Plant Protection Act (section 25, paragraph 3) already provides the Federal Ministry of Food and Agriculture (BMEL) the option of prohibiting the export of pesticides to countries outside the EU if this serves to protect humans or nature.¹¹ In the draft of its Chemicals Strategy for a toxic-free environment that was published on 14 October 2020, the European Commission announced that the production of hazardous chemicals that are prohibited within the EU will also be banned for export in the future.¹² It remains unclear which pesticides this pertains to and to what extent the strategy will be implemented.

German companies—especially Bayer and BASF—are major players on the global pesticide market. It is a lucrative business for international agrochemical groups to trade active ingredients that are forbidden in the EU. It is estimated that in 2018, Bayer, BASF, Corteva, FMC, and Syngenta—the five corporations that make up CropLife, the largest international agrochemical lobby group—made 35 percent of their pesticide sales from highly hazardous pesticides. According to Public Eye and Unerthed, about 60 percent of the sales of highly hazardous pesticides were to so-called emerging and developing countries.¹³ As further studies have shown, EU countries approved the export of more than 81,000 tonnes of pesticides in 2018 that included active ingredients whose use is banned in the EU. No less than 41 chemicals that are banned in the EU received export licenses in the same year. Most of the exports went to countries in the Global South, including Brazil and South Africa.¹⁴

According to the study “Hazardous Pesticides from Bayer and BASF—a global trade with double standards” released by INKOTA, MISEREOR, the Rosa Luxemburg Stiftung, and two other organizations from Brazil and South Africa in April 2020, Bayer and BASF sell at least 28 active ingredients that are not approved in the EU in their own products within Brazil and South Africa alone.¹⁵ Furthermore, in a study published in the summer of 2020, Greenpeace identified additional active ingredi-

ents in Brazil produced by Bayer and by BASF (five from each company) that are not approved in the EU.¹⁶

The companies maintain that their products are safe if they are properly applied. This statement however is very far from the reality in the countries of the Global South. In many cases, the necessary protective equipment is either unavailable, too expensive, or impractical due to the climatic conditions. Furthermore, some farmers are unable to understand the information listed on the packaging regarding the application of the products. The pesticide manufacturers are well aware of all this. Ultimately, they take advantage of the weaker regulations in the countries of the Global South in order to make profits with highly hazardous pesticides at the expense of humans and the environment.

Transparency in the global trade of pesticide active ingredients is insufficient

There is a lack of transparency in the global pesticide market. It is already difficult to track which company supplies what pesticide product to what country. Even less transparent is the trade of pesticide active ingredients. The pesticide manufacturers generally do not disclose whether they sell their active ingredients to third parties, let alone who these third parties are. Neither the buyers of the chemicals in the target countries nor the authorities provide any information on this. Many countries do not produce any pesticide active ingredients at all, meaning that they import 100 percent of the active ingredients required to formulate pesticide products. This is the case, for example, in South Africa. As a rule, the product label does not indicate which company produced the active ingredients. The authors of this study were met with a wall of silence when they asked major pesticide companies in Mexico and South Africa about the origins of their active ingredients. If at all, they received information about the country of origin but not about the companies that produced them.

The failure to provide such information by invoking the notion of trade secrets is a major problem, as such a lack of transparency makes it very difficult to trace supply chains.

The duty of disclosure in the EU and Germany is also inadequate. In its annual report, the BVL only publishes the rough quantities of active ingredients exported from Germany. The names of the exporting companies, the recipients (both countries and companies), and precise data about quantities are not listed. The situation is even less clear when German agrochemical companies such as Bayer and BASF produce active ingredients outside of Germany and export them to other countries. The only trade routes between exporting and importing countries that can be readily traced are those

of the components listed in the annex to the Rotterdam Convention, but the manufacturer is not made clear here either.¹⁷

One exception to this is Brazil. The Brazilian pesticide legislation is comparatively transparent. There is a publicly accessible database of all the pesticides and active ingredients that are registered in the country. Pesticide labels have to indicate the company and factories that produced the active ingredients they contain. Such information should no longer be veiled by trade secrecy within the EU so that the critical public can trace the trade of these active ingredients. Transparent supply chains are necessary so that the companies in question can be required to fulfil their due diligence obligations in terms of human rights and the environment.

Banned Active Ingredients ***Available Bayer and BASF active ingredients***

The current study began by identifying the relevant pesticide active ingredients, which serves as a basis for investigating the three example countries included in this study. The following list provides an overview of the highly hazardous pesticide active ingredients that were developed and/or brought to market by Bayer and BASF. In some cases, the active ingredients became part of the Bayer or BASF portfolio as the result of an acquisition or merger. These are active ingredients that have a particularly high degree of acute toxicity as well as so-called CMR active ingredients (see Box 1: Glossary).

The active ingredients were identified using the following sources of information:

- websites and databases of the EU;
- the database of the Mexican Health Authority (Confederación Federal para la Protección contra Riesgos Sanitarios, COFEPRIS);
- the HHP list from the Pesticide Action Network (PAN) International (2019 version);
- the Pesticide Properties Database from the University of Hertfordshire (PPDB);
- the website RÖMMP Online; and
- the company websites of Bayer and BASF.

Active ingredients developed and/or brought to market by Bayer and BASF that are considered extremely hazardous (1A) or highly hazardous (1B) according to the WHO classifications

The year of origin is according to data from RÖMPP Online. The addition of "now" means that the active ingredient entered the respective company through acquisition or merger. Aside from formetanate, none of the active ingredients are currently approved to be sold in the EU. Rodenticides (pesticide products used to kill rodents) have not been listed.

Active ingredients with an acute toxic effect

The selection of pesticide active ingredients with an acute toxicity derives from classifications made by the WHO.¹⁸ The WHO differentiates between extremely hazardous active ingredients (WHO Class 1A) and highly hazardous active ingredients (WHO Class 1B). Active ingredients in Class 1A have a lethal effect if less than five milligrams per kilogram of body weight are ingested. Active ingredients in Class 1B have a lethal effect at a dosage ranging between five and 50 milligrams per kilogram of body weight. In total, the WHO lists 29 active ingredients as extremely hazardous (1A) and 59 as highly hazardous (1B). Bayer and BASF have developed and/or brought to market a number of these active ingredients or still have them in their product portfolios. Seven of Bayer's active ingredients are included in the WHO Class 1A. WHO Class 1B includes 15 active ingredients from Bayer and three from BASF.

On 19 June 2013, the two German companies, alongside Syngenta, publicly committed to cease the sale of active ingredients in the WHO Classes 1A and 1B from 2014 on.¹⁹ A review of this voluntary commitment that was conducted by PAN Germany in 2015 revealed that Bayer continued to have products containing at least two WHO Class 1B active ingredients in their portfolio: (beta-)cyfluthrin and methiocarb.²⁰ As of early 2021, Bayer was still offering pesticide products that contain (beta-)cyfluthrin in Brazil, South Africa, and other countries. The same applies to Bayer pesticides in New Zealand that contain methiocarb.²¹ As such, Bayer has not fully honoured its publicly

1A	Aldicarb	now Bayer	1962	Insecticide
1B	Azinphos-ethyl	Bayer	1955	Insecticide
1B	Azinphos-methyl	Bayer	1955	Insecticide
1B	(Beta-)Cyfluthrin	Bayer	ca. 1993	Insecticide
1B	Chlorfenvinphos	now BASF	ca. 1962	Insecticide
1A	Chlormephos	now Bayer	ca. 1973	Insecticide
1B	Demeton-S-methyl	Bayer	1957	Insecticide
1A	Disulfoton	Bayer	1956	Insecticide
1B	Edifenphos	Bayer	1966	Insecticide
1B	Ethiofencarb	Bayer	1975	Insecticide
1A	Ethoprophos	now Bayer	ca. 1966	Insecticide
1B	Fenamiphos	Bayer	1970	Nematicide
1B	Flucythrinate	now BASF	ca. 1992	Insecticide
1B	Formetanate	now Bayer	1969	Insecticide
1B	Heptenophos	now Bayer	not listed	Insecticide
1B	Methamidophos	Bayer	1969	Insecticide
1B	Methiocarb	Bayer	1962	Insecticide
1B	Omethoate	Bayer	1965	Insecticide
1B	Oxydemeton-methyl	Bayer	1960	Insecticide
1A	Parathion	Bayer	1948	Insecticide
1A	Parathion-methyl	Bayer	1949	Insecticide
1A	Sulfotep	Bayer	1950	Insecticide
1B	Triazofos	now Bayer	1970	Insecticide
1B	Vamidothion	now Bayer	1961	Insecticide
1B	Zeta-Cypermethrin	now BASF	1975	Insecticide

made promise, even now, some seven years after the fact. Bayer's announcement in the spring of 2020 that it would remove the active ingredient carbendazim from the market was likewise not implemented.²² In January 2021, the pesticide Derosal Plus, which contains carbendazim, was still being advertised on Bayer's Brazilian corporate website.²³ Bayer also lists Derosal in its portfolio in Venezuela.²⁴

Active ingredients with long-term effects

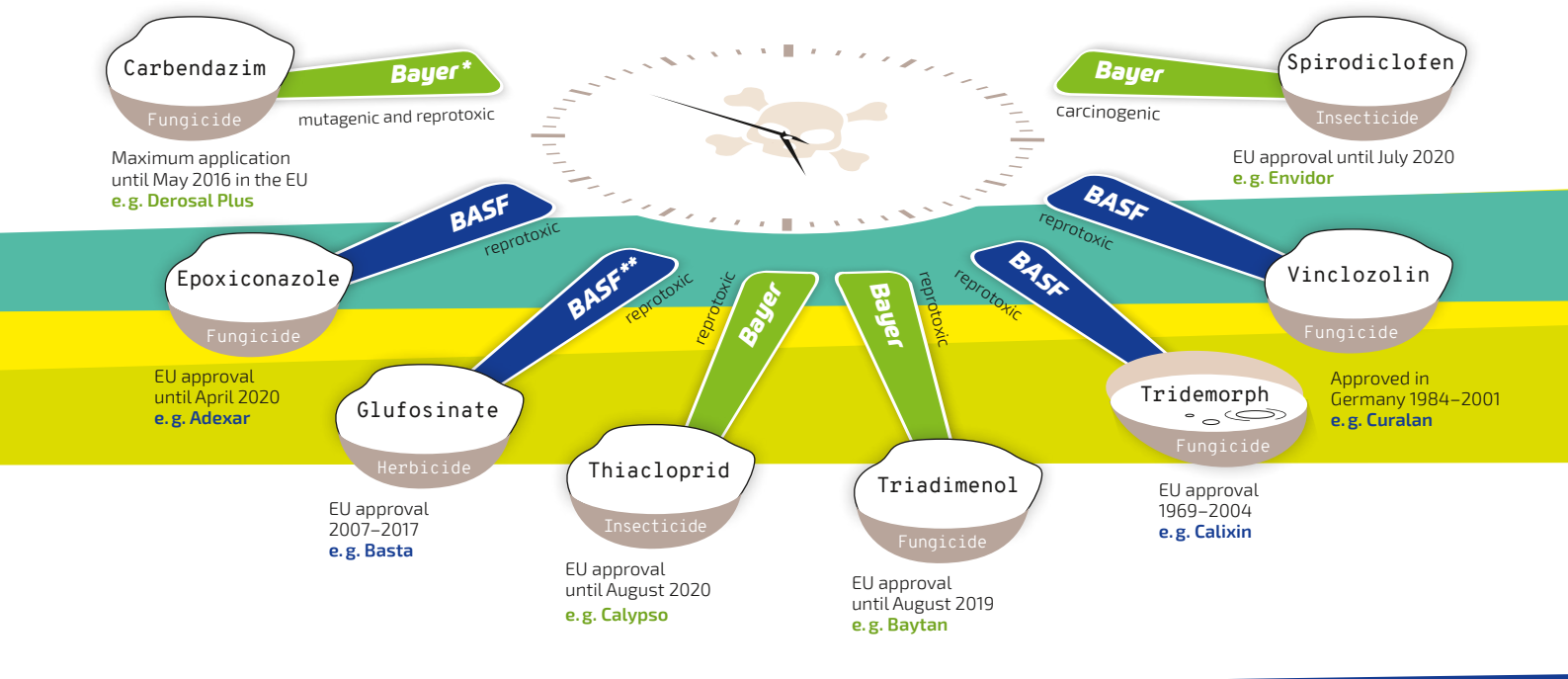
In view of long-term effects (CMR active ingredients, see Box 1: Glossary) the substances are identified according to their classification in the EU Pesticides Database.²⁵ The European Chemicals Agency (ECHA) is responsible for classifying the hazardousness of chemicals. In principle, no pesticide products are allowed to be sold in the EU that contain carcinogenic, mutagenic,

or reprotoxic active ingredients that belong to either category 1A (proven to be harmful to humans) or category 1B (likely to be harmful to humans), whereby there are some specially defined exceptions for category 1B.

As of January 2021, the EU Pesticides Database lists 652 fungicides, herbicides, and insecticides that are not approved, 23 of which are classified as category 1B due to their long-term effects. Of these 23 active ingredients, four come from Bayer (two insecticides and two fungicides), and four from BASF (three fungicides and one herbicide).

Hazard Category 1B CMR active ingredients from Bayer and BASF that are not approved in the EU with product examples

CMR active ingredients in hazard category 1B are substances that are probably carcinogenic (C), mutagenic (M), or damaging to the reproductive process (R – reprotoxic).



* Carbendazim was originally developed by HOECHST and BASF. HOECHST is now part of Bayer, and Bayer probably markets more carbendazim products today than BASF. Which is why carbendazim is ascribed to Bayer in this study.
 ** Originally from Bayer, marketing rights transferred from Bayer to BASF as a result of the Monsanto acquisition.
 Source: The classifications proposed in the assessment reports of the EFSA or ECHA and found in the EU Pesticides Database. Details of EU approval can also be found at https://ec.europa.eu/food/plant/pesticides/eu-pesticides-db_en, (Last accessed 4 February 2021).

Characterization of relevant active ingredients

The extremely or highly hazardous active ingredients (WHO Classes 1A and 1B) that form the focus of the current study are characterized by their immediate lethal effect at very low doses. They pose a high and direct danger to human life—such that no further explanation is necessary. The properties and possible effects of active ingredients with long-term effects are more complex, which is why some of them are discussed in more detail below.

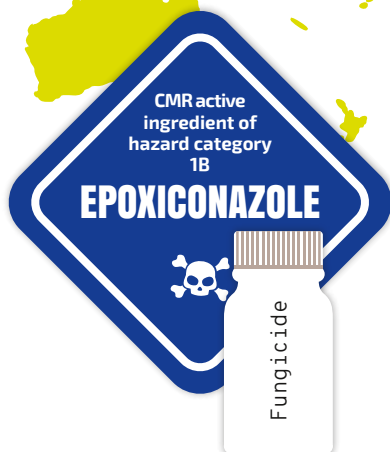
Carbendazim

Carbendazim is a fungicide that is used for a wide array of crops. In 2010, the active ingredient was characterized by the European Food Safety Authority (EFSA) as being mutagenic and reprotoxic (EU category 1B). This assessment is based on findings from animal studies and experiments with cell cultures. These included damage to chromosomes, fertility disorders as well as malformations in foetuses after carbendazim was administered to pregnant rats and rabbits.²⁶ But it wasn't until October 2014—some four years later—that the substance was banned in the EU.²⁷ Carbendazim products are still sold globally by Bayer as well as by other companies. Carbendazim was developed by HOECHST and BASF. HOECHST is now owned by Bayer and today Bayer probably markets more carbendazim products than BASF. This is why carbendazim is ascribed to Bayer in this study.

Epoxiconazole

The fungicide epoxiconazole was released in 1992 by BASF.²⁸ Products that contain epoxiconazole are marketed by BASF and by the Israeli chemical enterprise Adama, which is now part of Syngenta. These products are used on a variety of crops. Epoxiconazole is one example of how both the authorities and the companies tactically approach substances whose potential danger has been known for some time but where the process of banning them is delayed for years.

In March 2010, the ECHA classified epoxiconazole as reprotoxic (EU category 1B) after dead and malformed embryos were found in tests with rats. By submitting further studies, BASF tried in vain to have the category 1B assessment overturned, and in doing so they prevented the early withdrawal of the granted approval, which allowed them to continue selling the substance for another two years. In defiance of the principle of precaution and despite the fact that the authorities can revoke the approval of a pesticide in the event of new findings (Article 21 of Regulation 1107/2009), the approval of epoxiconazole remained unchallenged for years.²⁹ Given the classification by the ECHA, it is clear that the hazardous nature of the active ingredient has been known since 2010. But banning the fungicide would



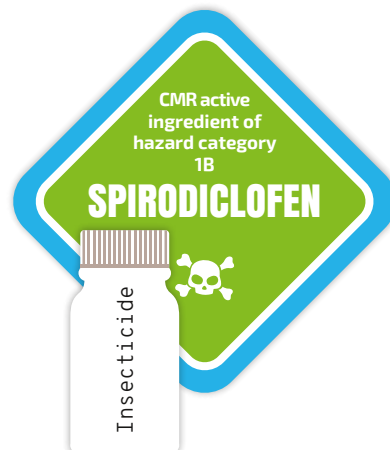
have required a formal decision by the responsible EU committee. Due to the lack of resources (Article 17 of Regulation 1107/2009), the approval that would have expired in April 2019 was extended for another year (until 30 April 2020). A ban was expected in May 2020, but then the industry withdrew its application, thereby eluding a ban due to environmental or health concerns. This allowed Article 46 of the Regulation 1107/2009—which governs the sell-off period and the period of permitted use after the end of approval—to be fully utilized.³⁰ This article grants a sell-off period of up to six months after the end of the approval and then a year-long period of permitted use if the reasons for “withdrawal, amendment or non-renewal of the authorization are not related to the protection of human and animal health or the environment.”³¹ In Germany, products that contain epoxiconazole are subject to a sell-by deadline of 30 October 2020 and a permitted use deadline of 30 October 2021.³² The sale of (BASF) products containing epoxiconazole in Africa, Asia, and Latin America continues unabated.

Glufosinate

The sale of the herbicide glufosinate (the full name of the active ingredient is glufosinate-ammonium) was permitted in the EU until 31 July 2018. On 20 December 2017, Bayer (who was then still the owner and manufacturer of the active ingredient) withdrew its application for renewal of approval.³³ The global marketing rights were transferred from Bayer to BASF as a condition of approval for the Monsanto acquisition. Even before that, approval in the EU was limited to use on orchards due to unresolved issues of ensuring safety for users and residents. In contrast, glufosinate-resistant genetically modified crops continue to be widely used in countries in the Global South. The reprotoxic classification (EU category 1B) was due to still births, miscarriages, and premature births that were found in the animal studies that are legally required.³⁴

Spirodiclofen

Spirodiclofen is an insecticide marketed by Bayer that has been in use for grape and fruit production since 2000.³⁵ Spirodiclofen products are on the market in Brazil, Mexico, and South Africa, amongst other countries. Spirodiclofen was classified as carcinogenic by the ECHA in 2016 for causing liver tumours in a cancer study on mice as well as testicular tumours (Leydig cell tumours) and carcinoma of the uterus in a study on rats.³⁶ It also took several years for spirodiclofen to be classified as an EU category 1B substance and lose its sales approval. Spirodiclofen has been banned since 1 August 2020. Like with epoxiconazole, the manufacturer (in this case Bayer) waited until the end of the approval period was approaching and then applied to withdraw the approval.³⁷





Thiacloprid

Thiacloprid is an insecticide from the neonicotinoid group that was first used in Brazil in 1999. Products that contain thiacloprid are used in crop farming as well as in fruit and vegetable cultivation. Long-term experiments with thiacloprid on rats have revealed embryotoxic effects and a reduced neonatal survival rate, prompting the ECHA to categorize the substance as reprotoxic (EU category 1B) on 12 March 2015.³⁸ This insecticide that was developed and brought to market by Bayer disappeared from the European market much like epoxiconazole did. After being categorized as EU category 1B, thiacloprid was placed on the so-called substitution list, which lists pesticides that could lose their approval in the future. Ideally, authorities would make assessing such substances a top priority. But it took the EFSA almost four more years (until January 2019) to conclude that the conditions for approval had not been met.³⁹ Since the deciding committee is a committee of the European Commission—the Standing Committee on Plants Animals Food and Feed (SCOPAFF)—and not the EFSA, it took a further year for thiacloprid to lose its approval in February 2020.⁴⁰ In other words, an active ingredient that was officially certified as being “probably reprotoxic for humans” (EU category 1B) in 2015 continued to be used in the EU for five more years.

Triadimenol

The fungicide triadimenol from Bayer was approved in the EU between 2009 and 2019.⁴¹ The ECHA classified triadimenol as reprotoxic in the EU category 1B in December 2015.⁴² This assessment was based on the results from experiments with rats where malformations and reduced neonatal survival rates were observed. Based on these findings, Bayer refrained from applying for renewal and thereby avoided an explicit ban. Like with epoxiconazole and thiacloprid, the European Commission failed to issue an early ban on the substance (Article 21 of Regulation 1107/2009).⁴³ Products containing triadimenol continue to be marketed by Bayer in Brazil and South Africa.

South Africa

A significant hub and a wall of silence

South Africa is one of the most important markets and hubs on the African continent for international agribusiness. According to the South African National Institute for Occupational Health (NIOH), 9,000 different pesticide products are registered in the country.⁴⁴ In recent years, the number of pesticide products and active ingredients that were imported to South Africa as well as the number exported from South Africa to neighbouring countries dramatically increased. Between 2008 and 2018, the value of imports has nearly doubled from approximately 239 million USD to more than 465 million USD. The annual volume of pesticides imported to South Africa grew from approximately 37,900 tonnes to 74,800 tonnes. Over the same period, the value of pesticide exports from South Africa grew from 122 million USD to 266 million, which indicates an increase from nearly 23,400 tonnes to 45,400 tonnes.⁴⁵

There is an extreme lack of transparency when it comes to the South African pesticide market. For example, there is no public register that lists information on all the pesticide products and active ingredients that are registered in South Africa. Employees of the South African Department of Agriculture direct enquiries to the database Agri-Intel, which is operated by CropLife. The lobby group decides by itself who is granted access to the information. The authors of this study made repeated requests to CropLife for access to this data, all of which went unanswered. Nor were the authors' questions addressed to South African pesticide companies answered. These companies justified this refusal by citing their right to protect trade secrets. A wall of silence protects the South African pesticide sector. Individual pieces of information on the nature of the South African pesticide market were only uncovered through investigative work.

A large part of pesticide imports arriving in the country are active ingredients that South African pesti-

cide companies process into their own pesticide products. All active ingredients need to be imported by these companies since none are produced in South Africa itself. Between January and September 2020, most of the products and substances were imported from China, followed by imports from the USA, Germany, Belgium, Spain, France, and India. Imports from these seven countries account for more than 80 percent of total imports. Imports from Germany account for around 12 percent of this market.⁴⁶

Banned active ingredients from Bayer and BASF on the South African market

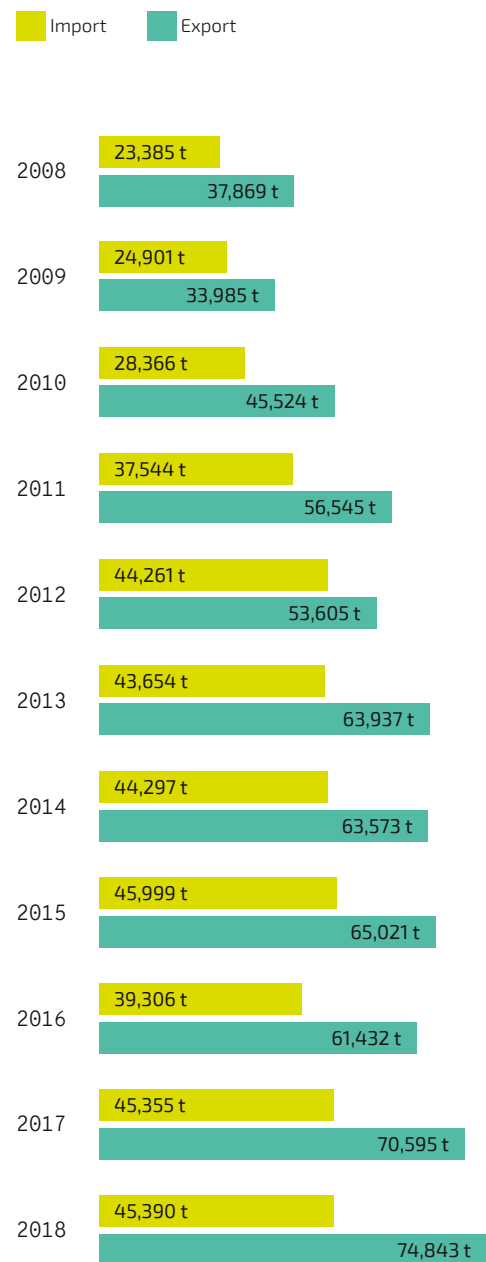
The agrochemical companies profit from the relatively lax approval process in South Africa. Many of the approved pesticide products have not been re-examined for years, and if subjected to today's stricter risk assessment standards would likely be banned. This has fatal consequences for the region, since numerous neighbouring countries take their cues from the approval decisions made in South Africa.⁴⁷ A major South African pesticide company, for instance, sources **epoxiconazole**, **ethoprophos**, **glufosinate**, and **thiacloprid** from China, and **fenamiphos** from the United States. A South African agrochemical lobby group indicates that a high percentage of active ingredients that are then processed into products by European pesticide companies also originally come from manufacturers in China and India. According to statements made by South African pesticide companies, Bayer and BASF also source some of their active ingredients from these countries.⁴⁸ It is unclear whether these substances are being sourced from the factories of the German companies in these countries or from local enterprises.

At least two substances classified by the WHO as extremely hazardous (Class 1A) are traded on the South African market. **Parathion** was introduced by Bayer and American Cyanamid. **Ethoprophos** is from the company Rhône-Poulenc, which was acquired by Bayer. Parathion can be found in one pesticide product and ethoprophos can be found in at least four pesticide products from Villa Crop Protection, a major South African pesticide company that claims to have around 20 percent of the market share in the South African pesticide market. One of these products is Mocap 200 EC, an insecticide used primarily in vegetable crops, including potatoes, pumpkins, and zucchini. According to the manufacturer, the product is considered highly toxic to fish and wildlife or if inhaled by humans. For two days after application, protective clothing must be worn when accessing the fields.⁴⁹ Until a few years ago, a predecessor to Villa Crop Protection belonged to Bayer.⁵⁰ At least eight of the 18 substances developed and/or brought to market by Bayer and BASF that are considered highly hazardous (Class 1B) are registered in South Africa. Seven of these are from Bayer, including the active ingredients **demeton-S-methyl**, **formetanate**, **methamidophos** and **omethoate**. **Zeta-Cypermethrin**, an active ingredient from a company acquired by BASF, is also for sale on the market.

In 2018 and 2019, at least 17 active ingredients that are listed in the annex to the Rotterdam Convention and that are banned in the EU were exported from the EU to South Africa. This includes three Bayer active ingredients. The highly hazardous active ingredient **carbendazim**, for instance, was shipped from Belgium to South Africa, **azinphos-methyl** from Spain, and **cyfluthrin** was even exported to South Africa by Bayer directly.⁵¹

Of the eight active ingredients offered by Bayer or BASF on the global market that have been deemed reprotoxic, mutagenic, or carcinogenic by the EU (EU category 1B), at least six can be found on the South African

Volume of pesticide imports and exports to/from South Africa between 2008 and 2018



Source: FAOSTAT, "Pesticides Trade. Export Quantity", www.fao.org/faostat/en/#data/RT, (Last accessed 5 December 2020).

agrochemicals market, four from Bayer and two from BASF. This includes the active ingredient **carbendazim**, which is sold in South Africa in products by the companies Meridian Agritech, Bitrad, and Villa Crop Protection, amongst others. Villa Crop Protection alone has seven pesticides in its portfolio that contain carbendazim. Bitrad uses the substance in its fungicide Rambo SC, which is primarily used in oat and wheat crops but also in the cultivation of bell peppers and mangos. The fungicide is harmful to human health when it comes into contact with the skin, is ingested, or inhaled. Work clothes that come into contact with Rambo SC must be washed daily.⁵² The work clothes supplied to workers on many farms in South Africa consist of just one set of overalls, which can only be washed on the weekend, if at all.⁵³

Bayer sells 54 of its own products on the South African market. These include products that contain the active ingredients **(beta-)cyfluthrin** (one product, WHO Class 1B), **spirodiclofen** (one product, carcinogenic, EU category 1B), **triadimenol** (two products, reprotoxic, EU category 1B), and **thiacloprid** (one product, reprotoxic, EU category 1B), which are banned in the EU.⁵⁴ As mentioned above, the agrochemicals company had already committed to removing active ingredients in WHO Classes 1A and 1B from its portfolio back in 2013.

Bayer's pesticide Envidor contains **spirodiclofen** and is primarily used for growing citrus. This product is so hazardous that Bayer's package insert for the pesticide expressly states that residues on the fruit might be so high that they cannot be exported to certain countries.⁵⁵

(Beta-)Cyfluthrin is the active ingredient in Bayer's insecticide Tempo SC. According to South African trade union representatives, its use is widespread in the wine-growing regions of the Western Cape province. This Bayer product is harmful to health when inhaled and can cause irritation of the skin, eyes, and mucous membranes. While mixing and spraying the product, it is necessary to wear protective equipment consisting of overalls, gloves, and a face shield.⁵⁶ The

way the pesticides are handled on many wineries, however, is abysmal. Female seasonal workers are sent to the vineyards while pesticides are still being sprayed. Farm workers describe their protective clothing as being mere "decoration". Although available at most farms, these clothes are only handed out to farm workers a day before inspection and have to be returned immediately afterwards. The mixing of pesticides at many farms takes place without any protective equipment, and the pesticides often spill and are not disposed of properly. The authors of this study were told that some farmers force the workers to remove the labels from the packaging. This then makes it difficult for the inspectors to establish misuse of pesticides when they come. The farm workers also complain of coughs, itchy skin, and rashes.⁵⁷

In a campaign to improve its public image in 2019, Bayer announced that it would set higher standards for sustainability and transparency in communication with civil society. As of the end of 2020, there is little evidence that progress has been made on this front.⁵⁸ A number of inquiries the authors made to Bayer about its use of highly hazardous active ingredients in South Africa went unanswered.

As for BASF, they sell 48 products in South Africa.⁵⁹ Four products contain **epoxiconazole** and one product contains **glufosinate**. In the EU, both active ingredients have been assessed as reprotoxic and have been banned. Glufosinate is a component of BASF's pesticide BASTA SL 200.⁶⁰ The product is used on citrus farms in the Eastern Cape Province's Gamtoos Valley and Sundays River Valley. This is a major citrus-growing region and numerous farms also produce fruit for the European market. The workers on the farms complain of headaches, sore throats, and other ailments related to the application of pesticides.⁶¹

The active ingredient **epoxiconazole** is found in the BASF products Abacus Advance and Opera, among others. Abacus Advance is a fungicide primarily used on barley, corn, soy, sugarcane, and wheat crops. Amongst other things, it is considered harmful to reproductive

processes and is toxic for fish.⁶² When the product is sprayed from crop dusters, all inhabitants living near the field need to be warned in advance. The package insert states that contaminating areas that are not to be treated with Abacus Advance should be avoided at all costs. Such an undertaking is virtually impossible, especially when the product is sprayed from helicopters, aeroplanes, or drones. The use of helicopters is particularly common in the citrus-growing region of the Eastern Cape Province. One major problem is that pesticides end up drifting into other areas. On a large number of plantations, there is rarely more than three to ten metres distance between the fields and the lodgings of the farm workers. As such, there is always the danger that the workers' vegetable gardens and livestock or their clothes that have been hung out to dry could be contaminated by the toxic pesticides. In addition, if the windows are kept open, the pesticides can get into the farm workers' housing.⁶³

To summarize: all pesticide companies in South Africa import 100 percent of their active ingredients from abroad. The majority of them come from China, India, and the USA. According to statements made by South African pesticide companies, Bayer and BASF also source some of their active ingredients from China and India, but it was not possible to clarify the extent to which these supplies come from their own subsidiaries. Altogether there are at least 13 active ingredients developed and/or brought to market by Bayer and three by BASF that are on the South African pesticide market, despite the fact that these active ingredients are not allowed to be sold on the EU market. Bayer also has at least four active ingredients in its own products that can be found in its South African product portfolio—including one with the highly hazardous active ingredient (beta-)cyfluthrin. As for BASF, it has two active ingredients, epoxiconazole and glufosinate, in its own products on the South African market that are banned in the EU.

Brazil

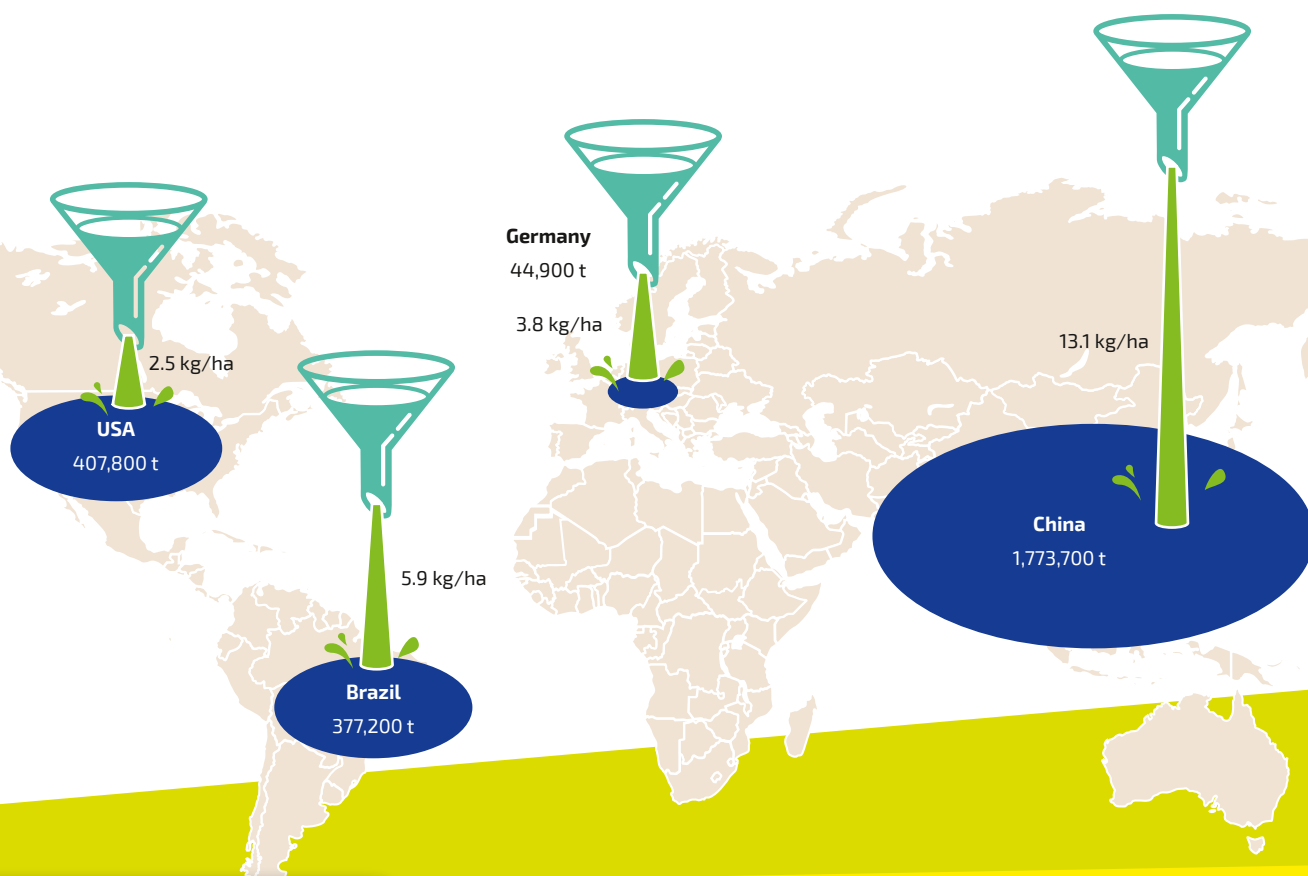
Despite transparency, an El Dorado for highly hazardous pesticides

In the aforementioned study "Hazardous Pesticides from Bayer and BASF" conducted by INKOTA, MISEREOR, and the Rosa Luxemburg Stiftung, the authors, together with the Brazilian coalition "Campaign against Pesticides and for Life" (Campanha Permanente contra os Agrotóxicos e Pela Vida), outlined the pesticide products—some of which contain highly hazardous active ingredients—Bayer and BASF offer on the Brazilian market. The study goes on to document how indigenous communities and other vulnerable groups are affected by the use of these pesticides. The authors cite an example from 2020, when residents of the Tey Jusu

indigenous community in the state of Mato Grosso do Sul suffered symptoms such as headaches, sore throats, diarrhoea, and fever after Bayer's fungicide Nativo (containing the active ingredients tebuconazole and trifloxystrobin) was applied by crop dusters less than 30 metres from the homes of the inhabitants of the village. Between 2009 and 2019, a total of 48,150 pesticide poisonings were officially registered in Brazil, which averages out to 4,377 cases per year. Given that many cases go unreported, the actual number is estimated to be about 50 times higher.⁶⁴

A large proportion of the active ingredients used to produce the pesticide products sold in Brazil—not only by Bayer and BASF, but also by other manufacturers—have to be imported. In 2019, just 69,511 tonnes of pesticide active ingredients were produced in Brazil, whereas 275,551 tonnes were imported from other countries during the same period of time. These active ingredients were used to produce a total of 494,092 tonnes of pesticide products in Brazil. An additional 171,931 tonnes of pesticide products were imported from other countries.⁶⁵ Greenpeace Germany documented the export of certain particularly hazardous pesticide active ingredients from the EU to Brazil in 2018, which included

939 tonnes of **glufosinate** shipped by BASF from the Netherlands and Belgium to Brazil.⁶⁶ With a total of 377,200 tonnes in the year 2018, Brazil ranks third globally in terms of pesticide use, after the United States (approximately 407,800 tonnes) and China (approximately 1.77 million tonnes).⁶⁷ The free trade agreement currently being negotiated between the EU and the countries of the Southern Common Market (Mercado Común del Sur, MERCOSUR)—which includes Brazil—could lead to an increase in the volume of pesticides exported to Brazil in the future, since the agreement would reduce the tariffs on pesticides from 14 percent to zero.⁶⁸



Pesticide use in China, the USA, Brazil, and Germany in the year 2018

Total quantity in tonnes and kilograms per hectare of agricultural land

Source: FAOSTAT, "Pesticide Use and Cropland Area", 2021, www.fao.org/faostat/en/#data/RP, (Last accessed 5 February 2021).

Banned active ingredients from Bayer and BASF on the Brazilian market

Unlike in most other countries, all pesticide products registered in Brazil contain a package insert which can be used to determine who manufactured each individual product component at which production facility. The following findings are derived from an analysis of information made available to the public by agrofit, the website of the Brazilian Ministry of Agriculture.⁶⁹

Of the active ingredients identified in this study, the following six are found in numerous registered products on the Brazilian market: **carbendazim** (37 products), **epoxiconazole** (23 products), **spiroadiclofen** (3 products), **fenamiphos** (two products), **glufosinate** (17 products), and **zeta-cypermethrin** (five products) (as of November 2020). Bayer itself sells one product containing **carbendazim** (Derosal Plus), at least one component of which is manufactured in Germany and exported to Brazil for further processing. In spring 2020, Bayer announced that it would withdraw carbendazim from the market in response to the study "Hazardous Pesticides from Bayer and BASF".⁷⁰ Yet as of early 2021, the company is still selling Derosal plus on the Brazilian market,⁷¹ and Derosal in Venezuela.⁷² Meaning Bayer has failed to come good on its promise. The majority of carbendazim used in other Brazilian products is manufactured by producers in China, followed by companies in Taiwan.⁷³

There are 23 products registered in Brazil that list **epoxiconazole** as the main ingredient, 14 of which are sold by BASF itself. Epoxiconazole, the active ingredient in these pesticides, is produced at BASF's Schwarzheide factory in Brandenburg, Germany. These compounds are formulated partly in Brazil and partly in Europe. There are three pesticide products on the Brazilian market containing the active ingredient **spiroadiclofen**, one of which is Bayer's product Envidor,

which is also sold in South Africa. The active ingredient is manufactured in Bayer's CHEMPARK production site in Dormagen, North Rhine-Westphalia, Germany and then exported to Brazil to be formulated. Other manufacturers that sell pesticide products containing spiroadiclofen source the active ingredient from China.

The active ingredient **fenamiphos** is a particularly interesting case regarding the extent to which Bayer and BASF also produce and export active ingredients that are subsequently formulated locally and sold by other companies: the two registered products containing fenamiphos, NEMACUR and NEMACUR EC, are both sold in Brazil by a subsidiary of the US company American Vanguard Corporation (AMVAC do Brasil). The fenamiphos used for this purpose is manufactured by Bayer in Japan and then formulated at the Belford Roxo Industrial Park in the Brazilian state of Rio de Janeiro. AMVAC acquired the NEMACUR product line from Bayer at the end of 2010.⁷⁴ However, Bayer is still responsible for manufacturing the active ingredient. NEMACUR is a nematicide (to fight nematodes) used in the cultivation of cotton, bananas, coffee, cocoa, potatoes, and tomatoes. As far back as the early 2000s, the Filipino physician and pharmacologist Dr Romeo Quijano, active in PAN Asia Pacific, had pointed out that NEMACUR was responsible for a large number of the cases of poisoning in banana cultivation in the Philippines.⁷⁵

There are more than 17 different pesticide products containing BASF's active ingredient **glufosinate** on the Brazilian market. Three of them are BASF products, for which the active ingredient is either produced in Germany or in the USA. Most of the glufosinate contained in the products of other agrochemical companies is produced in China.⁷⁶

As far as the authors of this study could ascertain, neither Bayer nor BASF produce and sell **zeta-cypermethrin**. This active ingredient, found in

five registered products, is supplied in equal parts by factories in China, the United States, and India. The US FMC Corporation is the sole distributor of the pesticide products in Brazil which contain zeta-cypermethrin.

In addition to the six aforementioned active ingredients, Bayer is the only company that offers the following three active ingredients on the Brazilian market, which are banned in the EU: **(beta-)cyfluthrin** (in five different Bayer products), **thiacloprid**, and **triadimenol** (each in one Bayer product).

In summary, the findings of the research into Brazil carried out for this study show that there are at least nine pesticide active ingredients developed and/or brought to market by Bayer and BASF in Brazil which are classified by the WHO either as highly hazardous (WHO Class 1B) or by the EU as reprotoxic, mutagenic, or carcinogenic (all EU category 1B). Bayer and BASF are directly involved in the sale of eight of these nine active ingredients (all except zeta-cypermethrin), both by inclusion in their own products, and by supplying the active ingredient to other companies (as in the case of NEMACUR, which contains fenamiphos). At the same time, in looking at the manufacturers of these active ingredients, the central role played by China becomes clear.

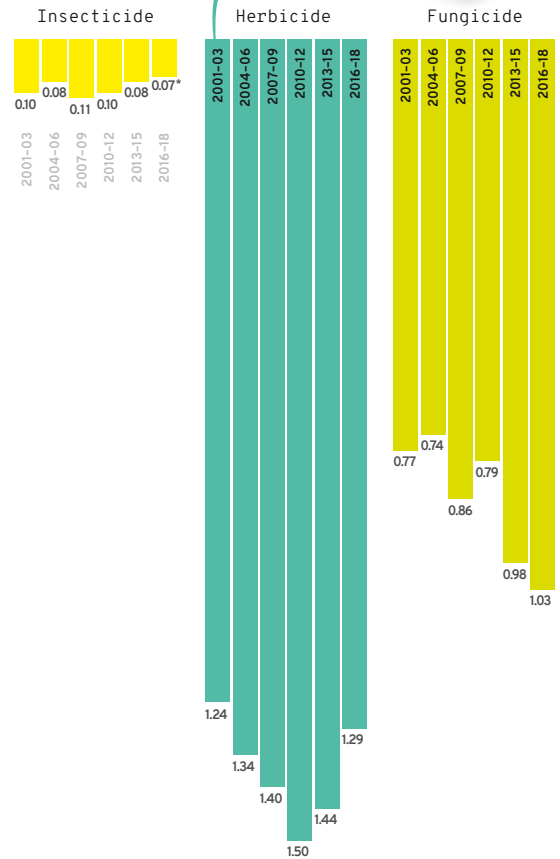
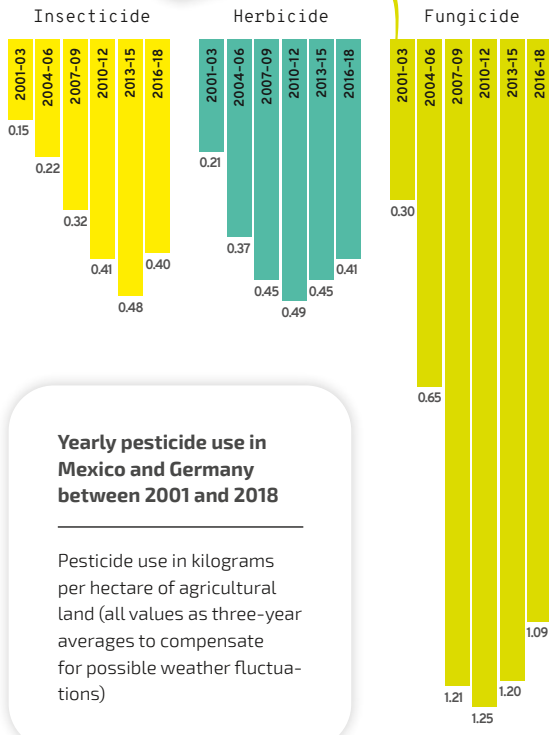
Mexico

Sales opportunities created through trade agreements and the domestic market

As the second largest economy in Latin America, Mexico is an important market for agrochemical companies. It also serves as a gateway for international companies to Latin America, since Mexico is considered to be one of the “world champions” of establishing bilateral and multilateral trade agreements. The free trade agreement sealed in 1994 with Canada and the USA (originally called the North American Free Trade Agreement, NAFTA, but since its renewal in 2020 known as the United States–Mexico–Canada Agreement, USMCA)⁷⁷ and the free trade agreement sealed in 2000 with the EU (which is about to be renewed) are particularly noteworthy.⁷⁸

These and other agreements have ensured the free circulation of goods between the EU and Mexico, which Bayer and BASF profit from through their Mexican subsidiaries. This free circulation extends from Mexico to 23 different Latin American countries with which Mexico has bilateral agreements.⁷⁹

Many people working in agriculture in Mexico face extremely precarious working conditions. About three million migrant workers from poor states such as Guerrero and Oaxaca, as well as from Chiapas, Veracruz, Puebla, and Michoacán are employed as day labourers to work in fields owned by large landowners.



Yearly pesticide use in Mexico and Germany between 2001 and 2018

Pesticide use in kilograms per hectare of agricultural land (all values as three-year averages to compensate for possible weather fluctuations)

* According to BMEL data available online at: www.bmel-statistik.de/fileadmin/daten/SJT-3060720-0000.xlsx, (Last accessed 18 December 2020).
 Source: FAOSTAT, "Data", www.fao.org/faostat/en/#data, (Last accessed 18 December 2020).

The Mexican states of Sinaloa, Sonora, Baja California, Baja California Sur, Chihuahua, and Durango are major destinations for labour migration since they are also the regions where most day labourers are employed. The work that attracts this internal migration often involves entire families. Mothers carry their babies while they work. Small children are left at the edge of the fields, and from the age of seven, children begin to contribute to the family income.⁸⁰ The Tlachinollan Human Rights Centre in Tlapa, Guerrero, has been documenting the situation for years, demonstrating that the FAO and

WHO "International Code of Conduct for Pesticide Management" is not being applied in practice. This code, which is not even binding, is aimed at both governments and companies, and recommends measures to reduce the risks posed by pesticides.⁸¹ These measures include the provision of suitable protective clothing, training in the handling of pesticides, and the proper disposal of pesticide waste and containers.

According to FAO figures, the number of pesticides used per hectare in Mexico has tripled over the past

20 years.⁸² As in Brazil and South Africa, the pesticides that Bayer and BASF sell in Mexico include active ingredients that are not approved in the EU for health or environmental reasons.⁸³

Banned active ingredients from Bayer and BASF on the Mexican market

Bayer has been operating in Mexico since the 1950s and has nine production sites in the country, if Monsanto sites are included. Its main office is in Mexico City. However, according to the company's website, Bayer does not have a synthetic pesticide production facility in Mexico.⁸⁴ Bayer itself offers 22 pesticide products in Mexico, containing a total of 27 different active ingredients.⁸⁵ Three of these are banned in the EU for health or environmental reasons. These include (as in Brazil and South Africa) the carcinogenic insecticide **spirodiclofen** (EU category 1B) and the active ingredients **(beta-)cyfluthrin** (highly hazardous WHO Class 1B) and **glufosinate** (reprotoxic according to EU category 1B). Bayer sells the product Envidor, which contains the active ingredient **spirodiclofen** and is used in fruit and vegetable cultivation to repel mites and whiteflies. The herbicide **glufosinate**, for which BASF was granted the marketing rights (together with glufosinate-resistant seed) as part of the Bayer-Monsanto deal, continues to be offered by Bayer in Mexico in the weedkiller Finale. Bayer's Murala Max product, which contains the active ingredient **(beta-)cyfluthrin**, is used as a spray to kill larvae and adult insects on vegetable crops as well as in the production of rice, cotton, and cereals.

BASF's main Mexican office is also located in Mexico City, and it has five production sites in different parts of the country, none of which directly produce pesticides. The website of BASF's office in San José, Costa Rica, offers products for the Mexico, Central America, and Caribbean region. Not all products are sold in each of the countries. According to the relevant Mexican authorities, BASF currently has valid regis-

trations for 218 different products, many of which are apparently not currently on the market.⁸⁶ BASF products include at least five active ingredients (carbendazim, epoxiconazole, glufosinate, methamidophos, and tridemorph) that are not allowed to be sold in the EU and are classified as category 1B substances because of their high degree of acute toxicity (WHO) or because of their long-term effects (EU). In some cases, BASF also holds registrations for active ingredients that are no longer protected by patents and were developed and/or brought to market by Bayer. However, BASF's website lists only 40 products. The product Calixin, for example, which is used in banana cultivation, contains the active ingredient **tridemorph**. BASF's products Juwel and Opera, which are used widely in a broad range of agricultural applications, contain **epoxiconazole**.

Like in South Africa, in Mexico there is no transparency regarding where local pesticide producers obtain the active ingredients that they use but do not synthesize themselves. In the course of this study, six companies were selected and asked for information by email and subsequently by telephone. Without exception, these requests were refused. However, a document made available to the authors shows that these companies are required to report the source of the active ingredients they use to the authorities as a part of the registration of each product. Therefore, it would be easy to generate transparency around this issue.

Bayer and BASF also offer active ingredients on the Mexican market that are classified as highly hazardous in the EU, where they are no longer allowed to be sold (Bayer three and BASF two). These are mostly the same ones offered in Brazil and in South Africa: (beta-)cyfluthrin, epoxiconazole, glufosinate, spirodiclofen, and tridemorph. Bayer is still the main supplier of products containing glufosinate on the Mexican market. The marketing licenses for eleven other active ingredients developed and/or brought to market by Bayer and BASF in Mexico today are held exclusively by other companies.

Conclusion

Numerous studies have already demonstrated that highly hazardous pesticides have caused a global health and environmental crisis.⁸⁷ Therefore, a global ban on the production, storage, and export of highly hazardous active ingredients is a matter of great urgency. To achieve tangible results as soon as possible, there ought to be a step-by-step approach that begins with national bans on active ingredients. As the cases of

this study show once again, companies such as Bayer do not fully comply with their voluntary commitments. Even if companies fulfil their promises to withdraw certain pesticide products from the global market, this does not mean that the same or other companies will stop distributing the various active ingredients. Given the current situation, the publishers of this study propose the following steps:

Step 1: Create transparency

Transparency surrounding the global trade in pesticide active ingredients is insufficient and must be improved. All too often, corporations hide behind the notion of trade secrecy. This is merely a pretext to prevent transparency, as evidenced by the situation in Brazil, where labels on pesticide products must list which company manufactured the active ingredients used and where they sourced their materials. This shows that transparent regulations are generally possible.

In the future, the BVL should make available to the public not only the general information on the quantities of active ingredients exported from Germany around the world via pesticide products, but also provide information on the export of active ingredients that are processed in other countries. This requires detailed information on the quantity of the active ingredient, the company exporting it, the country of destination, and the company there that processes the component.

Agrochemical companies should also be required by law to provide information on any trade in active ingredients by their subsidiaries outside Germany. This includes all active ingredients produced by the companies in another EU country or outside the EU.

Step 2: Ban the export of highly hazardous pesticide active ingredients from Germany and the EU

Whether in their pure form or as a component of pesticide products, active ingredients which are either banned in the EU or classified as highly hazardous by the WHO and/or EU categories should not be allowed to be traded by companies operating in Germany and the EU.⁸⁸ The European Commission's draft Chemicals Strategy for a toxic-free environment, published in October 2020, offers a starting point for this approach. It is important that the strategy includes a production ban on the export of as many highly hazardous pesticide active ingredients as possible and that this is implemented promptly, with care taken to close any loopholes for agrochemical corporations.

Step 3: Global ban on the production, storage, and trade of highly hazardous pesticide active ingredients

International regulation of global trade in pesticide products and active ingredients should be tightened. The FAO and WHO should publish a list of highly hazardous pesticide active ingredients, to be drawn up on the basis of their own criteria and regularly updated.⁸⁹ This would form the basis for a global ban—binding under international law—on the production, storage, and trade of the active ingredients listed there.

Appendix

List of the 33 Bayer and BASF pesticide active ingredients categorized as WHO 1A, WHO 1B, or CMR active ingredients which are banned in the EU

The table shows which active ingredients Bayer and BASF bring to market themselves in South Africa, Brazil, and Mexico, and which active ingredients are either brought to market by other companies and/or are registered in these countries.

Active Ingredient	Categorization	Developed/ brought to market by	South Africa		Brazil		Mexico	
			Brought to market by Bayer/BASF	Brought to market by other companies and/or registration available	Brought to market by Bayer/BASF	Brought to market by other companies and/or registration available	Brought to market by Bayer/BASF	Brought to market by other companies and/or registration available
Aldicarb	WHO 1A	Bayer*						
Azinphos-ethyl	WHO 1B	Bayer						
Azinphos-methyl	WHO 1B	Bayer		x				
(Beta-)Cyfluthrin	WHO 1B	Bayer	Bayer		Bayer		Bayer	
Carbendazim	mutagenic 1B and reprotoxic 1B	Bayer*		x	Bayer	x		x
Chlorfenvinphos	WHO 1B	BASF*						x
Chlormephos	WHO 1A	Bayer*						
Demeton-S-methyl	WHO 1B	Bayer		x				
Disulfoton	WHO 1A	Bayer						
Edifenphos	WHO 1B	Bayer						
Epoxiconazole	reprotoxic 1B	BASF	BASF	x	BASF	x	BASF	x
Ethiofencarb	WHO 1B	Bayer						
Ethoprophos	WHO 1A	Bayer*		x				
Fenamiphos	WHO 1B	Bayer		x	Bayer produces the active ingredient	x		x
Flucythrinate	WHO 1B	BASF*						
Formetanate	WHO 1B	Bayer*		x				x
Glufosinate	reprotoxic 1B	BASF*	BASF	x	BASF	x	Bayer	x
Heptenophos	WHO 1B	Bayer*						
Methamidophos	WHO 1B	Bayer		x				x
Methiocarb	WHO 1B	Bayer						
Omethoate	WHO 1B	Bayer		x				x
Oxydemeton-methyl	WHO 1B	Bayer						x
Parathion	WHO 1A	Bayer		x				
Parathion-methyl	WHO 1A	Bayer						x
Spirodiclofen	carcinogenic 1B	Bayer	Bayer	x	Bayer	x	Bayer	x
Sulfotep	WHO 1A	Bayer						
Thiacloprid	reprotoxic 1B	Bayer	Bayer	x	Bayer			x
Triadimenol	reprotoxic 1B	Bayer	Bayer	x	Bayer			
Triazofos	WHO 1B	Bayer*						x
Tridemorph	reprotoxic 1B	BASF					BASF	
Vamidothion	WHO 1B	Bayer*						
Vinclozolin	reprotoxic 1B	BASF						
Zeta-Cypermethrin	WHO 1B	BASF*		x		x		x

* The active ingredient was brought into the respective company's portfolio through acquisition or merger.

** BASF: active ingredients registered in Mexico and also included in products offered on BASF's Mexico/Central America/Caribbean website.

Source: Compiled by the authors based on portfolio analysis of Bayer and BASF pesticide products in South Africa, Brazil, and Mexico/Central America/Caribbean (as of January 2021), portfolio analysis of Adama, Avima, Bitrad, FMC, Meridian Agritech, Novon Crop Protection, Rolfes Agri and Villa Crop Protection in South Africa (as of December 2020), the Brazilian Ministry of Agriculture agrofite website (as of January 2021), and the Mexican government's Commission for Protection against Health Risks (COFEPRIS) website (as of January 2021).

Endnotes

- 1 FAO/WHO, "International Code of Conduct on Pesticide Management. Guidelines on Highly Hazardous Pesticides", 2016, https://apps.who.int/iris/bitstream/handle/10665/205561/9789241510417_eng.pdf?sequence=1&isAllowed=y, (Last accessed 11 January 2021).
- 2 UNEP, "Stockholm Convention on persistent organic pollutants (POPs): Text and Annexes", 2017, <http://chm.pops.int/Portals/0/download.aspx?d=UNEP-POPS-COP-CONVTEXT-2017.English.pdf>, (Last accessed 14 January 2021).
- 3 Rotterdam Convention/FAO/UNEP, "Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade. Text and Annexes", 2019, www.pic.int/TheConvention/Overview/TextoftheConvention/tabid/1048/language/en-US/Default.aspx, (Last accessed 19 January 2021).
- 4 UPL, Investor Presentation, August 2018.
- 5 RÖMPP Online, <https://roempp.thieme.de/home>, (Last accessed 26 February 2021).
- 6 Bayer Crop Science, "Al servicio de la agricultura", www.bayer.com/es/mx/productos/mexico-agricultura, (Last accessed 18 January 2021).
- 7 BVL, "Absatz an Pflanzenschutzmitteln in der Bundesrepublik Deutschland", 2020, http://www.bvl.bund.de/SharedDocs/Downloads/04_Pflanzenschutzmittel/meld_par_64_2019.pdf?__blob=publicationFile&v=3, (Last accessed 4 December 2020).
- 8 EU Parliament, "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", 2009, <http://eur-lex.europa.eu/legal-content/DE/TXT/PDF/?uri=CELEX:32009R1107&from=HU>, (Last accessed 18 January 2021).
- 9 W. Boedeker, M. Watts, P. Clausung, E. Marquez, "The global distribution of acute unintentional pesticide poisoning: estimations based on a systematic review", *BMC Public Health*, Vol. 20, 2020, <https://bmcpubhealth.biomedcentral.com/track/pdf/10.1186/s12889-020-09939-0.pdf>, (Last accessed 19 January 2021).
- 10 EU Parliament, "Regulation (EU) No 649/2012 of the European Parliament and of the Council of 4 July 2012 concerning the export and import of hazardous chemicals", 2012, <https://eur-lex.europa.eu/legal-content/DE/ALL/?uri=CELEX%3A32012R0649>, (Last accessed 19 January 2021).
- 11 Wissenschaftlicher Dienst des Deutschen Bundestages, "Export nicht zugelassener Pflanzenschutzmittel: Rechtliche Regelungen in Frankreich und Deutschland", WD-3000-015/20, 2020, <https://www.bundestag.de/resource/blob/689790/5d86d62bff8866ba-e6864f2d8e-a2b977/WD-5-015-20-pdf-data.pdf>, (Last accessed 22 February 2021).
- 12 European Commission, "Chemicals Strategy for Sustainability: Towards a Toxic-Free Environment", 2020, <https://ec.europa.eu/environment/pdf/chemicals/2020/10/Strategy.pdf>, (Last accessed 18 January 2021).
- 13 Public Eye/Unearthed, "Milliarden-Umsätze mit Pestiziden, die krebserregend sind oder Bienen vergiften", 2020, www.publiceye.ch/de/themen/pestizide/agrochemiekonzerne-machen-milliarden-mit-krebserregenden-pestiziden-oder-bienen-killern, (Last accessed 18 January 2021).
- 14 Public Eye/Unearthed, "Verbotene Pestizide: Die giftige Doppelmoral der Europäischen Union", 2020, www.publiceye.ch/de/themen/pestizide/verbotene-pestizide-eu, (Last accessed 18 January 2021).
- 15 INKOTA, MISERERE, Rosa-Luxemburg-Stiftung (eds.), "Hazardous Pesticides from Bayer und BASF—a global trade with double standards", https://www.rosalux.de/fileadmin/rls_uploads/pdfs/Studien/Hazardous_20pesticides_ENG_final_20200422.pdf, (Last accessed 18 January 2021).
- 16 Greenpeace, "EU-Mercosur: Double Standards", 2020, https://www.greenpeace.de/sites/www.greenpeace.de/files/publications/eu_mercosur_double_standards_concerning_agrotoxics_2020.pdf, (Last accessed 11 December 2020).
- 17 PAN Germany, "Giftige Exporte: Ausfuhr hochgefährlicher Pestizide von Deutschland in die Welt", 2019, <https://pan-germany.org/download/giftige-exporte-ausfuhr-hochgefahrllicher-pestizide-von-deutschland-in-die-welt/>, (Last accessed 29 January 2021).
- 18 WHO, "The WHO Recommended Classification of Pesticides by Hazard and Guidelines to Classification", 2019, <https://apps.who.int/iris/rest/bitstreams/1278712/retrieve>, (Last accessed 26 December 2020).
- 19 PAN Germany, "Niederschrift zum Gespräch über die schrittweise Beendigung der Vermarktung hochgefährlicher Pestizide", 2013, www.welt-ernaehrung.de/wp-content/uploads/2020/06/Selbstverpflichtung-BAYER_BASF_SYNGENTA-1.pdf, (Last accessed 26 December 2020).
- 20 PAN Germany, "Überprüfung der Einhaltung der Selbstverpflichtung von BASF, Bayer und Syngenta von 2013 bezüglich des Verzichts auf die Vermarktung von Pestiziden der WHO-Klasse 1A und 1B", 2015, www.welt-ernaehrung.de/wp-content/uploads/2020/06/PANGE_1507_HHP_Big3-Nachrecherche_150716_F.pdf, (Last accessed 26 December 2020).
- 21 Bayer Australia/New Zealand, "Mesuro 200 SC", <http://www.bayer.co.nz/en/nz-products>, (Last accessed 19 January 2021).
- 22 Bayer Deutschland, Twitter post, 23 April 2020, https://twitter.com/BayerPresse_DE/status/1253248955615502337/photo/1, (Last accessed 11 December 2020).
- 23 Agro Bayer Brasil, "Derosal Plus", www.agro.bayer.com.br/essenci-ais-do-campo/produtos/derosal-plus, (Last accessed 6 January 2021).
- 24 Bayer Crop Science Venezuela, "Derosal", <https://www.cropscience.bayer.co.ve/es-VE/Productos-e-innovacion/Productos/Fungicidas/Derosal.aspx>, (Last accessed 28 February 2021).
- 25 European Commission, "EU Pesticides Database", <https://ec.europa.eu/food/plant/pesticides/eu-pesticides-database/active-substances/?event=search.as>, (Last accessed 19 January 2021).
- 26 EFSA, "Conclusion on the peer review of the pesticide risk assessment of the active substance carbendazim", 2010, <http://bit.ly/3aPFnSR>, (Last accessed 26 December 2020).
- 27 PAN Europe, "Farewell present of Health Commissioner Borg: endocrine disrupting pesticide Carbendazim banned", 2014, <https://www.pan-europe.info/old/News/PR/141022.html>, (Last accessed 26 December 2020).
- 28 RÖMPP Online, "Expoxiconazole", <https://roempp.thieme.de/lexicon/RD-05-01417>, (Last accessed 25 February 2021).
- 29 EU Parliament, "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", 2009, <http://eur-lex.europa.eu/legal-content/DE/TXT/PDF/?uri=CELEX:32009R1107&from=HU>, (Last accessed 18 January 2021).
- 30 Ibid.
- 31 Ibid.
- 32 BVL, "Widerruf der Zulassung von Pflanzenschutzmitteln mit dem Wirkstoff Epoxiconazol zum 30. April 2020", 2014, www.bvl.bund.de/SharedDocs/Fachmeldungen/04_pflanzenschutzmittel/2020/2020_04_20_Fa_Widerruf_Epoxiconazol.html, (Last accessed 10 December 2020).
- 33 Informationsdienst Gentechnik, "EU-Aus für Glufosinat bis 2019?", 2018, www.keine-gentechnik.de/nachricht/33024/, (Last accessed 26 December 2020).
- 34 Rapporteur Member State Sweden, "Draft Assessment Report: Glufosinat Ammonium", *Toxicology and Metabolism*, Vol. 3, 2002, Annex B.6a.
- 35 University of Hertfordshire, "Pesticide Properties Database: Spirodiclofen", <https://sitem.herts.ac.uk/aeru/ppdb/en/Reports/597.htm>, (Last accessed 16 January 2021).
- 36 ECHA, "Opinion proposing harmonised classification and labelling at EU level of Spirodiclofen: Adopted 9 December 2016", <https://echa.europa.eu/documents/10162/c7ef3111-dc3d-fe8e-e753-5e93234ee847>, 2016, (Last accessed 26 February 2021).
- 37 BVL, "Widerruf des Pflanzenschutzmittels Envidor", 2020, www.bvl.bund.de/SharedDocs/Fachmeldungen/04_pflanzenschutzmittel/2020/2020_06_05_Fa_Widerruf_Envidor.html, (Last accessed 19 January 2021).
- 38 ECHA, "Committee for Risk Assessment: Opinion proposing harmonised classification and labelling at EU level of Thiacloprid", 2015, <https://echa.europa.eu/documents/10162/52bd518e-4cda-0115-cb-bc-038f1e462d5c>, (Last accessed 26 December 2020).
- 39 EFSA, "Peer review of the pesticide risk assessment of the active substance thiacloprid", *EFSA Journal* 2/2019, <http://bit.ly/3utt4Dl>, (Last accessed 8 January 2021).
- 40 European Commission "Durchführungsverordnung (EU) 2020/23 der Kommission vom 13. Januar 2020 zur Nichterneuerung der Genehmigung für den Wirkstoff Thiacloprid", <https://eur-lex.europa.eu/legal-content/DE/TXT/PDF/?uri=CELEX:32020R0023&from=EN>, (Last accessed 26 December 2020).
- 41 European Commission, "Richtlinie 2008/125/EG der Kommission vom 19. Dezember 2008 zur Änderung der Richtlinie 91/414/EWG des Rates zwecks Aufnahme von Aluminiumphosphid, Calciumphosphid, Magnesiumphosphid, Cymoxanil, Dodemorph, 2,5-Dichlorbenzoesäuremethylester, Metamitron, Sulcotrion, Tebuconazol und Triadimenol als Wirkstoffe", 2008, https://eur-lex.europa.eu/legal-content/DE/TXT/PDF/?uri=uriserv:OJ.L_.2008.344.01.0078.01.DEU, (Last accessed 13 December 2020).
- 42 ECHA, "Committee for Risk Assessment RAC", <https://echa.europa.eu/documents/10162/4d4ccd44-ab22-7205-2946-af34c34d5118>, 2015, (Last accessed 13 December 2020).
- 43 EU Parliament, "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", 2009, <http://eur-lex.europa.eu/legal-content/DE/TXT/PDF/?uri=CELEX:32009R1107&from=HU>, (Last accessed 18 January 2021).
- 44 NIOH, "Are pesticides used by farms in the Port Elizabeth area acceptable in terms of government regulations or fit for contact with

- human beings?" Unpublished study commissioned by the Khanyisa Educational and Development Trust, South Africa, 2020.
- 45 FAOSTAT, "Pesticides Trade", www.fao.org/faostat/en/#data/RT, (Last accessed 29 November 2020).
 - 46 The figures on imports into South Africa were provided to the authors by the South African Revenue Service (SARS) upon request.
 - 47 NIOH, "Are pesticides used by farms in the Port Elizabeth area acceptable in terms of government regulations or fit for contact with human beings?" Unpublished study commissioned by the Khanyisa Educational and Development Trust, South Africa, 2020.
 - 48 This information is based on investigative research undertaken by the authors. Therefore, the names of the South African companies and the lobbying association interviewed cannot be made public.
 - 49 Villa Crop Protection, "Mocap 200 EC", www.villacrop.co.za/wp-content/uploads/2019/08/Mocap-200-EC_June2019_Villa.pdf, (Last accessed 29 November 2020).
 - 50 Villa Crop Protection, "History", www.villacrop.co.za/about/, (Last accessed 29 November 2020).
 - 51 Authors' own analysis based on 2020 research by Public Eye and Unearthed. Citing the Public Information Act, both organizations have filed applications with the European Chemicals Agency (ECHA) and with national authorities to obtain export notifications that companies must fill out if they want to export products that contain chemicals banned in the EU to one or more countries, www.publiceye.ch/de/themen/pestizide/verbotene-pestizide-eu, (Last accessed 4 December 2020).
 - 52 Bitrad, "Rambo SC", www.bitrad.co.za/Portals/0/products/Rambo/Rambo_LABEL.pdf, (Last accessed 30 November 2020).
 - 53 This information is based on interviews conducted in December 2020 via Whatsapp with farm workers and union representatives in the South African provinces of Western Cape and Eastern Cape.
 - 54 Bayer Crop Science South Africa, "Products", www.cropsience.bayer.co.za/en-za/products.html, (Last accessed 29 November 2020).
 - 55 Bayer Crop Science South Africa, "Envidor 240 SC", www.cropsience.bayer.co.za/en-za/products/product-detail-page.html/insecticides/envidor_240_sc.html, (Last accessed 19 January 2021).
 - 56 Bayer Crop Science South Africa, "Tempo SC", www.environmentalscience.bayer.co.za/-/media/prfsouthafrica/product-labels-pdf/tempo_sc_label.ashx, (Last accessed 5 January 2021).
 - 57 This information is based on interviews conducted in December 2020 via Whatsapp with farm workers and union representatives in the South African provinces of Western Cape and Eastern Cape.
 - 58 Bayer, "Bayer setzt höhere Maßstäbe für Transparenz, Nachhaltigkeit und den Umgang mit allen Interessengruppen", 2019, <https://media.bayer.de/baynews/baynews.nsf/id/Bayer-setzt-hoehere-Masstaebe-Transparenz-Nachhaltigkeit-Umgang-allen-Interessengruppen>, (Last accessed 5 January 2021).
 - 59 BASF South Africa, "Product Search", www.agro.basf.co.za/en/Products/Overview/, (Last accessed 29 November 2020).
 - 60 BASF South Africa, "Basta", www.agro.basf.co.za/en/Products/Overview/Herbicide/Basta.html, (Last accessed 18 December 2020).
 - 61 This information is based on interviews conducted in December 2020 via Whatsapp with farm workers and union representatives in the South African provinces of Western Cape and Eastern Cape. For more, see NIOH, "Are pesticides used by farms in the Port Elizabeth area acceptable in terms of government regulations or fit for contact with human beings?" Unpublished study commissioned by the Khanyisa Educational and Development Trust, South Africa, 2020.
 - 62 BASF South Africa, "Abacus Advance", www.agro.basf.co.za/Documents/products_files/swamodders_files/abacusadvancelabeleng.pdf, (Last accessed 29 November 2020).
 - 63 This information is based on interviews conducted in December 2020 via Whatsapp with farm workers and union representatives in the South African provinces of Western Cape and Eastern Cape.
 - 64 L. Bombardi, "The use of pesticides in Brazil: environment and childhood under attack." Presentation on 29 September 2020, data based on information from the Brazilian Ministry of Health, https://www.pan-europe.info/sites/pan-europe.info/files/Larissa_Bombardi_Presentation_29-09-20.pdf, (Last accessed 11 December 2020).
 - 65 Ibama, "Boletim 2019: Químicos e Bioquímicos: Produção, Importação, Exportação e Vendas de Ingredientes Ativos 2019", 2020, www.ibama.gov.br/agrotoxicos/relatorios-de-comercializacao-de-agrotoxicos#boletinsanuais, (Last accessed 11 December 2020).
 - 66 Greenpeace, "EU-Mercosur: Double Standards", 2020, https://www.greenpeace.de/sites/www.greenpeace.de/files/publications/eu_mercosur_double_standards_concerning_agrotoxics_2020.pdf, (Last accessed 11 December 2020).
 - 67 FAOSTAT, "Pesticide Use. Agricultural Use", www.fao.org/faostat/en/#data/RP, (Last accessed 2 January 2021).
 - 68 Greenpeace, "EU-Mercosur: Double Standards", 2020, https://www.greenpeace.de/sites/www.greenpeace.de/files/publications/eu_mercosur_double_standards_concerning_agrotoxics_2020.pdf, (Last accessed 11 December 2020).
 - 69 Mapa, "Consulta de Ingrediente Ativo", http://agrofit.agricultura.gov.br/agrofit_cons/principal_agrofit_cons, (Last accessed 16 November 2020).
 - 70 Bayer Deutschland, Twitter post, 23 April 2020, https://twitter.com/BayerPresse_DE/status/1253248955615502337/photo/1, (Last accessed 11 December 2020).
 - 71 Agro Bayer Brasil, "Derosal Plus", www.agro.bayer.com.br/essenci-ais-do-campo/produtos/derosal-plus, (Last accessed 6 January 2021).
 - 72 Bayer Crop Science Venezuela, "Derosal", <https://www.cropsience.bayer.co.ve/es-VE/Productos-e-innovacion/Productos/Fungicidas/Derosal.aspx>, (Last accessed 28 February 2021).
 - 73 Counting all active ingredient manufacturers or factories, around 79 percent are Chinese factories. However, some products have different manufacturers listed for the same active ingredient, though the factories are sometimes the same for different products. According to this method of calculation, there is a total of 85 manufacturers of the active ingredient carbendazim, 67 of which are Chinese manufacturers.
 - 74 American Vanguard Corporation, "For immediate release: American Vanguard Announces Acquisition of Major Insecticides from Bayer CropScience", 2010, www.sec.gov/Archives/edgar/data/5981/000119312510279475/dex991.htm, (Last accessed 11 December 2020).
 - 75 Coordination gegen BAYER-Gefahren "Kamukhaan: das Dorf, die Pestizide und der Tod", 2010, www.cbgnetwork.org/3618.html, (Last accessed 1 December 2020).
 - 76 Counting all active ingredient manufacturers or factories, 60 percent are Chinese factories. However, some products have different manufacturers listed for the same active ingredient, though the factories are sometimes the same for different products. According to this method of calculation, there is a total of 30 manufacturers of the active ingredient glusofinate, 18 of which are Chinese manufacturers.
 - 77 Office of the United States Trade Representative, "Agreement between the United States of America, the United Mexican States, and Canada 7/1/20 Text", 2020, <https://ustr.gov/Trade-agreements/free-trade-agreements/united-states-mexico-canada-agreement/agreement-between>, (Last accessed 26 December 2020).
 - 78 European Commission, "EU and Mexico conclude negotiations for new trade agreement. Press Release", 2020, https://ec.europa.eu/commission/presscorner/detail/en/ip_20_756, (Last accessed 26 December 2020).
 - 79 Opportimes, "The 26 WTO members with the most regional trade agreements", 2020, www.opportimes.com/the-26-wto-members-regional-trade-agreements/, (Last accessed 14 December 2020).
 - 80 Tlachinollan, "OPINIÓN | Por las familias jornaleras: Alianza Campo Justo", 2020, www.tlachinollan.org/opinion-por-las-familias-jornaleras-alianza-campo-justo/, (Last accessed 4 January 2021).
 - 81 FAO/WHO, "International Code of Conduct on Pesticide Management", 2014, www.fao.org/fileadmin/templates/agphome/documents/Pests_Pesticides/Code/CODE_2014Sep_ENG.pdf, (Last accessed 4 January 2021).
 - 82 FAOSTAT, "Data", www.fao.org/faostat/en/#data/RP, (Last accessed 14 December 2020).
 - 83 BASF, "Productos Protección de los cultivos", <https://agricultura.basf.com/mx/es/proteccion-de-cultivos-y-semillas/productos.html#%7B%7D>; CropScience, "Al servicio de la agricultura", www.bayer.com/es/mx/productos/mexico-agricultura, (Last accessed 15 December 2020).
 - 84 Bayer México, "Sedes y Plantas Productivas en México", www.bayer.mx/es/bayer-en-mexico/sedes/, (Last accessed 26 December 2020).
 - 85 Bayer México, "Productos", www.bayer.com/es/mx/productos/mexico-productos-de-la-a-a-la-z, (Last accessed 10 January 2021).
 - 86 Gobierno de México, "Consulta de Registros Sanitarios de Plaguicidas, Nutrientes Vegetales y LMR", <http://siipris03.cofepris.gob.mx/Resoluciones/Consultas/ConWebRegPlaguicida.asp>, (Last accessed 18 January 2021).
 - 87 Important studies on this topic include: UN, "Report of the Special Rapporteur on the right to food", 2017, <https://undocs.org/A/HRC/34/48>; D. Faber, "Poisoning the world for profit: Petro-chemical capital and the global pesticide crisis", *Capitalism Nature Socialism*, April 2020, pp. 1–17, <https://doi.org/10.1080/10455752.2020.1829794>, (Both studies last accessed 3 February 2021); or S. Patel, S. Sangeeta, "Pesticides as the drivers of neuropsychotic diseases, cancers, and teratogenicity among agro-workers as well as general public", *Environmental Science and Pollution Research*, January 2019, pp. 91–100.
 - 88 These include classification as extremely or highly toxic (WHO Class 1A, 1B), as mutagenic, as carcinogenic, or as reprotoxic "in humans" (EU category 1A, 1B), as endocrine disruptors or as banned for environmental reasons.
 - 89 FAO/WHO, "International Code of Conduct on Pesticide Management Guidelines on Highly Hazardous Pesticides", 2016 https://apps.who.int/iris/bitstream/handle/10665/205561/9789241510417_eng.pdf?sequence=1&isAllowed=y, (Last accessed 19 January 2021).

INKOTA

The INKOTA-netzwerk is a development NGO that has been fighting hunger and poverty for 50 years. Through political campaigns and the collaborations with partner organizations in the Global South, INKOTA advocates for a just form of globalization. With projects in Central America, Africa and Asia, INKOTA empowers people and amplifies their voices in the fight against hunger and poverty.



The Pesticide Action Network (PAN Germany) is an NGO that provides information about the negative consequences of pesticide use and works—together with its network of partner organizations around the world—to protect people and their environment from pesticides and to promote environmentally friendly, socially just alternatives.

ROSA LUXEMBURG STIFTUNG

The Rosa Luxemburg Stiftung is a political foundation associated with, but independent from, DIE LINKE, the German Left Party. Active internationally, the Rosa Luxemburg Stiftung is tasked primarily with carrying out political education work and sees itself as a discussion forum for fostering critical thinking and elaborating political alternatives. The Rosa Luxemburg Stiftung deals with topics such as food sovereignty, climate justice, and democratic participation.

www.inkota.de

www.pan-germany.org

www.rosalux.de