THE GLOBAL THREAT FROM HIGHLY HAZARDOUS PESTICIDES

IPEN'S CONTRIBUTION TO THE MOVEMENT TO ELIMINATE HHPs AND PROMOTE SAFER FOOD AND FARMING

February 2024

IPEN
for a toxics-free future

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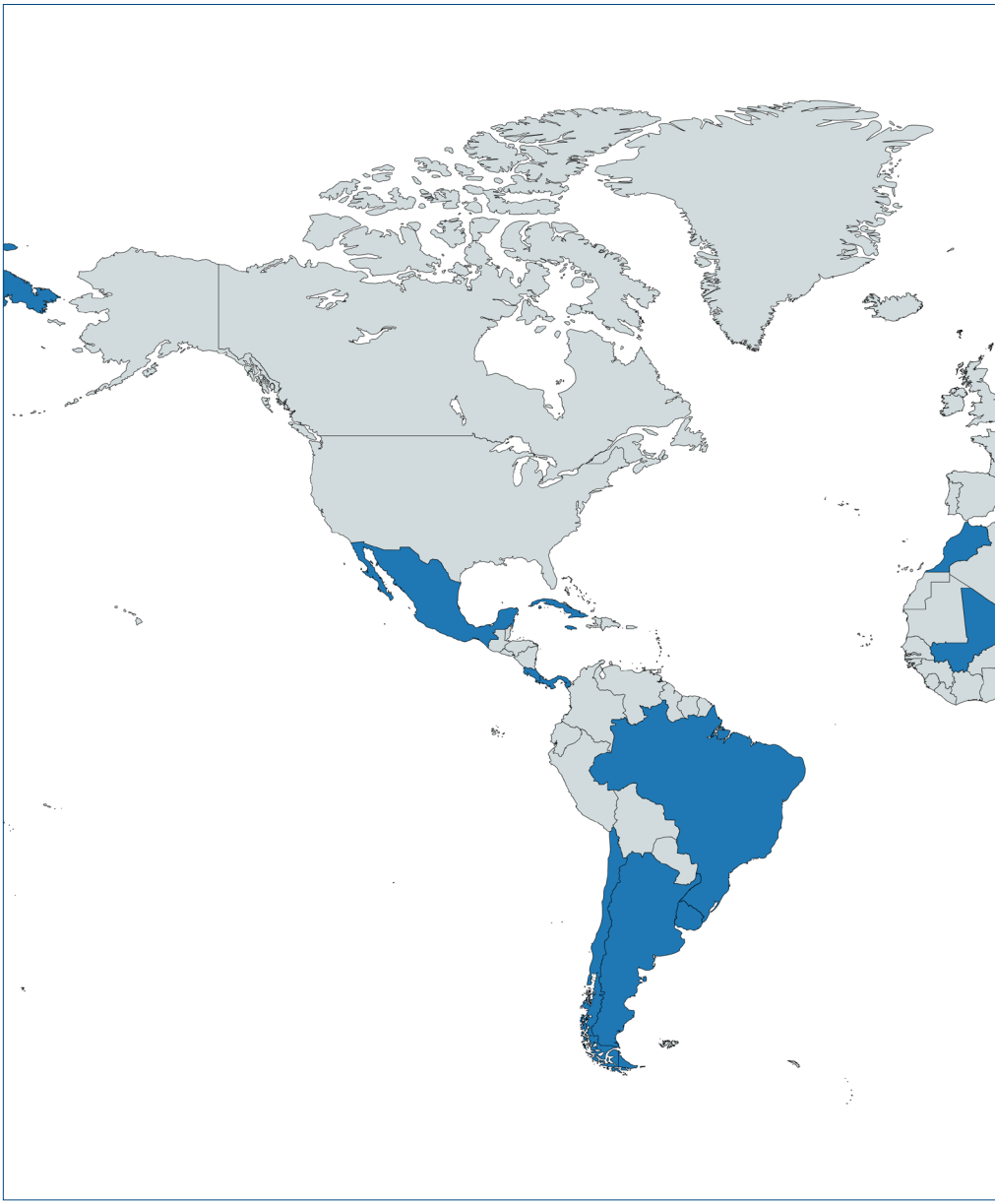
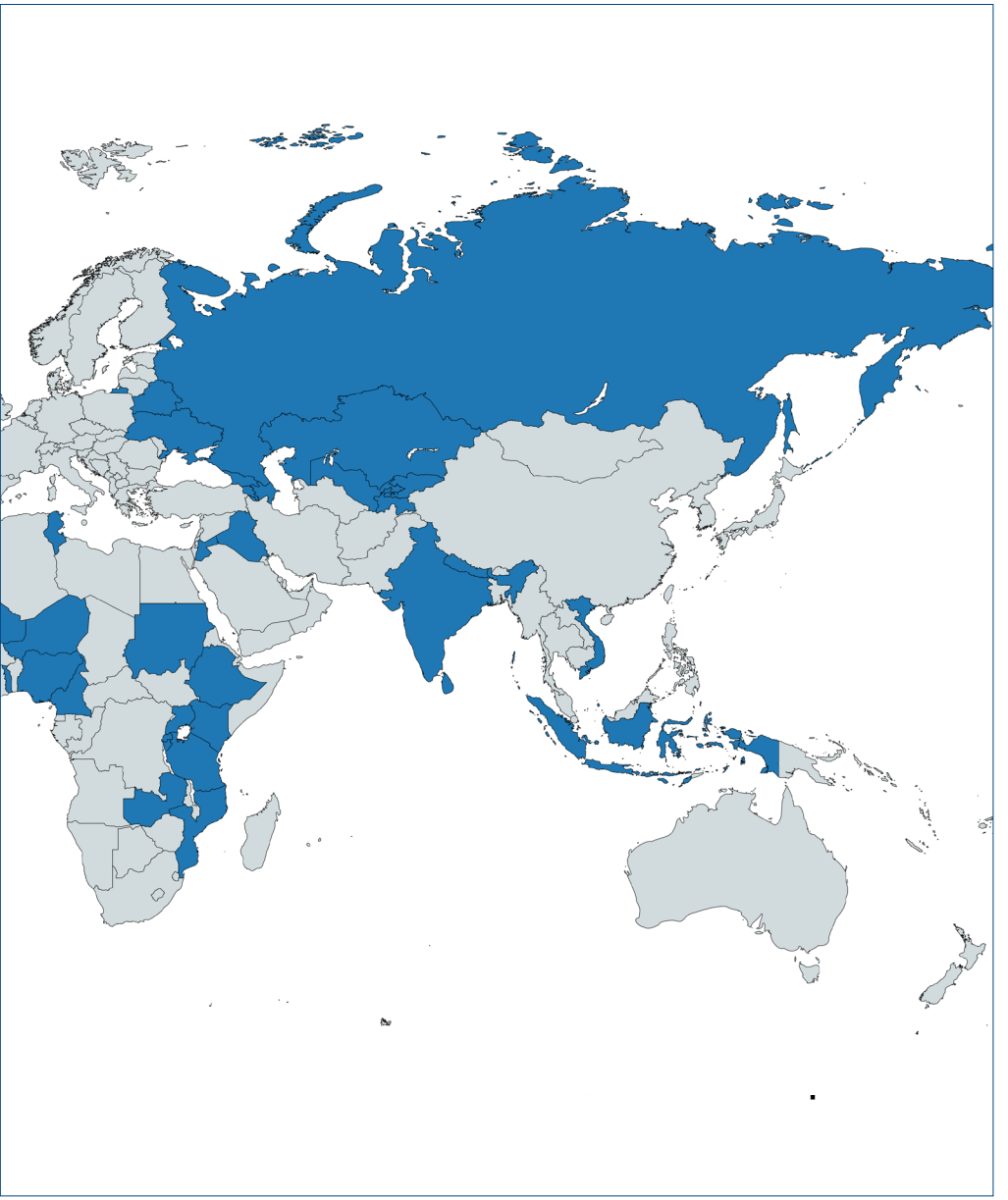




HHP PROJECTS FROM IPEN MEMBER GROUPS

This report is largely based on the work of the following IPEN Participating Organizations that have conducted projects on HHPs since 2017.

COUNTRY	ORGANIZATION
Argentina	Centro de Estudios sobre tecnologías apropiadas de la Argentina (CETAAR)
Armenia	Armenian Women for Health and Healthy Environment (AWHHE)
Azerbaijan	Ecological Society 'Ruzgar'
Belarus	Center of Environmental Solutions (CES) Ecoidea
Brazil	Associação Brasileira de Saúde Coletiva
Brazil	Associação Brasileira de Agroecologia (ABA)
Brazil	Centro de Tecnologias Alternativas Populares
Brazil	Toxisphera Environmental Health Association
Burundi	Propreté, Environnement Et Sante (P.E.S.)
Cameroon	Centre de Recherche et d'Education pour le Développement (CREPD)
Chile	Rapal Chile
Costa Rica	RAPAL Costa Rica

COUNTRY	ORGANIZATION
Cuba	Asociación Cubana de Técnicos Agrícolas y Forestales (ACTAF)
Cuba	RAPAL Cuba
Ethiopia	Pesticide Action Nexus Association (PAN Ethiopia)
Georgia	Ecovision Union on Sustainable Development
India	Abhivyakti Foundation
India	Gramin Vikas Evam Paryavaran Samiti (GVEPS)
India	Society for Sustainable Development (SSD)
India	Toxics Link
Indonesia	Gita Pertiwi
Iraq	Together to Protect Human & Environment Association
Jamaica	The Caribbean Poison Information Network (CARPIN)
Jordan	Land and Human to Advocate Progress (LHAP)
Kazakhstan	The Center "Cooperation for Sustainable Development"
Kazakhstan	Greenwomen Public Association
Kenya	Centre for Environment Justice and Development (CEJAD)
Kyrgyzstan	Independent Ecological Expertise (IEE)

COUNTRY	ORGANIZATION
Mali	Action pour la Conservation de l'Environnement et le Développement Durable (ACEDD)
Mexico	Red de Acción sobre Plaguicidas y Alternativas en México (RAPAM)
Morocco	Moroccan Association Health Environment and Toxicovigilance (AMSETOX)
Mozambique	Africa Foundation For Sustainable Development (AFSD)
Nepal	Center for Public Health and Environmental Development (CEPHED)
Niger	AVD Kowa Murna
Nigeria	Sustainable Research and Action for Environmental Development (SRADev Nigeria)
Nigeria	Sustainable Environment Development Initiative (SEDI)
Panama	RAP-AL Panama
Russia	Eco-Accord
Russia	Eco-SPES
Rwanda	Rwandese Association of Ecologist (ARECO)
Sri Lanka	Centre for Environmental Justice (CEJ)
Sudan	Sudanese Environment Conservation Society
Tajikistan	FSCI Foundation to support civil initiatives (FSCI, Dastgiri-Center)

COUNTRY	ORGANIZATION
Tanzania	AGENDA for Environment and Responsible Development
Togo	Les Amis de la Terre- Togo
Togo	Organisation Pour l'Environnement et le Développement durable (OPED)
Tunisia	Association d'Education Environnementale pour la Future Génération (AEEFG)
Tunisia	Association Tunisienne d'Agriculture Environnementale ...
Uganda	Association of Uganda Professional Women in Agriculture and Environment (AUPWAE)
Uganda	National Association of Professional Environmentalists (NAPE)
Uganda	Uganda Network on Toxic Free Malaria Control (UNETMAC)
Ukraine	Chemical Safety Agency (CSA)
Uruguay	Red de Acción en Plaguicidas y sus Alternativas para América Latina (Pesticide Action Network)- RAPAL Uruguay
Uzbekistan	For Environmentally Clean Fergana
Vietnam	Climate Change Institute
Zambia	Children's Environmental Health Foundation (CEHF)
Zambia	Zambia Consumers Association (ZACA)

EXECUTIVE SUMMARY

Since the founding of our network, IPEN and our Participating Organizations have focused on efforts to promote phasing out Highly Hazardous Pesticides (HHPs) as a core of our work. Initially, our work focused on pesticides listed as persistent organic pollutants (POPs) under the Stockholm Convention, but we have since expanded our efforts to include a broad range of activities to support global and local efforts to replace pesticides with safe agricultural practices.

Since 2009, Pesticide Action Network (PAN) International has provided an International List of Highly Hazardous Pesticides, based on hazard criteria used by UN Agencies and National Authorities.[1] The list is updated regularly to take the most recent assessments into account. IPEN uses the PAN list in our efforts to address HHPs.

This report builds on the work done by IPEN and partners since 2017 through 83 projects in 43 Low- and Middle-Income Countries (LMICs). Activities were implemented by 57 groups and included:

- identification of HHPs registered and in use;
- identification of available alternatives;
- promoting safe agricultural practices; and
- conducting outreach to policy makers and farmers about the need for phasing out HHPs.

IPEN supports efforts under the Stockholm Convention to remove acceptable purposes for two pesticides, DDT and sulfluramid, and for a strong listing decision for the pesticide chlorpyrifos. Thus, several of our projects specifically focused on these three pesticides. In addition, we also focused research in several countries to support regulatory controls on glyphosate, the world's most widely used pesticide.[2]

1 https://pan-international.org/wp-content/uploads/PAN_HHP_List.pdf
2 https://ipen.org/campaigns/toxics-free-sdgs-campaign

KEY FINDINGS, OUTCOMES, AND RECOMMENDATIONS:

- HHPs have a wide range of toxic health and environmental impacts, including cancer, impaired neurodevelopment in children, reproductive health effects, and endocrine disruption, among others.
- Awareness of the hazards of HHPs and available, safe alternative approaches is generally low.
- Pesticide registers in 31 LMICs surveyed by IPEN member groups showed that many HHPs are still allowed for use. In some countries, almost 70% of all pesticides allowed for use were HHPs.
- Many pesticides allowed for use in LMICS are prohibited in other countries due to concerns about their human health and environmental impacts. While 250 HHPs were banned or not approved for use in the EU in 2022, an average of 25 HHPs were banned in the project countries. This means that more than two hundred HHPs are allowed for use in these countries that have been banned elsewhere.
- Intentional and unintentional pesticide poisonings from HHPs remain a significant problem in LMICs, and women and children are often especially impacted groups.
- Organic and agroecological practices that are safe for human health and the environment are available, in use, and profitable in many countries. However, adoption of safer practices by farmers in LMICs is undermined by extensive marketing and sales of HHPs to LMICs.
- Under the Stockholm Convention, pesticides can be listed for global elimination (Annex A). But for DDT and sulfluramid, the listing was instead for global restriction (Annex B) which allowed time-unlimited, continued uses of the toxic pesticides. This is not an effective approach, as shown by the continued use and ongoing health and environmental impacts from DDT and sulfluramid after they were listed under Annex B.
- Production, export, and sales of HHPs contributes to violations of human rights that harm especially impacted groups such as women and children. In addition, HHPs are obstacles to achieving many of the U.N. Sustainable Development Goals.
- Governments should take national action to ban HHPs, prohibit export of HHPs, and support the newly established Global Alliance on Highly Hazardous Pesticides to effectively phase out HHPs.

BACKGROUND

Highly Hazardous Pesticides (HHPs) have been the target for phase-out internationally for many years, but progress has been slow and some regions have seen slower progress than others. In 2006, when the Strategic Approach to International Chemicals Management (SAICM) was adopted, the Food and Agricultural Organization (FAO) Council suggested that a progressive ban on highly hazardous pesticides could be included in their activities.[3] Since then, a range of international organizations, agreements, and declarations have been made to support action addressing HHPs.

Most recently, the Global Framework on Chemicals – For a Planet Free of Harm from Chemicals and Waste[4] was adopted in 2023 and its foundational Bonn Declaration[5] included support for the global phase-out of HHPs in several ways:

- Governments commit to "…enhance the safe production of food, feed and fibre by preventing or, where prevention is not feasible, minimizing the adverse impacts of pesticides on health and the environment.";
- One of the resolutions accompanying the Framework endorses the formation of a Global Alliance on Highly Hazardous Pesticides;[6] and
- One of the Framework targets (A7) is that by 2035, stakeholders will have taken "effective measures to phase out highly hazardous pesticides in agriculture where the risks have not been managed and where safer alternatives are available and to promote a transition to and make available those alternatives."

HHPs are typically older pesticides for which the patents have expired and generic products are produced cheaply. Safe alternatives are typically already available and in use since they are largely phased out in most high-income countries. However, HHPs still create significant problems, especially in Low- and Middle-Income Countries (LMICs) where they cause ongoing harms to human health and the environment.

3 https://www.fao.org/3/j8664e/j8664e.pdf
4 https://www.chemicalsframework.org/page/text-global-framework-chemicals
5 https://www.chemicalsframework.org/bonndeclaration
6 https://www.chemicalsframework.org/page/resolution-v11-highly-hazardous-pesticides

Environmental contamination from HHPs can impact biodiversity and has been shown to cause declines in the populations of birds, insects, amphibians, and aquatic communities. HHPs can also impact ecosystem functioning such as pollination or natural pest suppression. For example, neonicotinoid insecticides have been identified as an important driver of the dramatic decline in bee diversity and abundance, which led to the 2018 EU ban on neonicotinoids for use on open-field crops (Sgolastra et al., 2020).

Because of their inherent properties, HHPs are always of particular concern for human health. Short-term exposure to some HHPs can cause harmful effects on the liver, kidneys, blood, lungs, nervous system, immune system, and gastrointestinal tract. Prolonged exposure to certain HHPs can result in effects on the skin, eyes, nervous system, cardiovascular system, gastrointestinal tract, liver, kidneys, reproductive system, endocrine system, immune system, and blood. HHPs can also cause cancer, including in children.[7] Most HHPs are endocrine disrupting chemicals, including DDT, sulfluramid, chlorpyrifos, and glyphosate. Thus, the developing fetus and children are especially vulnerable to exposure. In addition, exposure to endocrine disrupting HHPs can have effects on future generations (Gore *et al.*, 2024).

A recent estimate of unintentional, acute pesticide poisoning concluded that about 385 million cases occur annually worldwide, including around 11,000 deaths. The authors conclude that about 44% of farmers are poisoned by pesticides every year, most of them in LMICs (Boedeker et al., 2020). In addition, HHPs are used for self-harm and are estimated to account for 20% of all suicides globally.[8] The World Health Organization (WHO) concludes that almost 138,000 suicides could be prevented annually by banning HHPs.[9] A recent study concludes that a worldwide ban on the use of highly hazardous pesticides is likely to prevent tens of thousands of deaths every year (Gunnell *et al.*, 2017).

People are exposed to HHPs either directly when they are used, or indirectly through contaminated food, water, dust, and other environmental contamination. Direct exposure occurs, for example, when diluting, mixing, and applying pesticides, cleaning containers and equipment, through pesticide spray drift, and by working in plantations and fields during or just after pesticide application. These exposures include not only the primary handler of the pesticide but also bystanders,

7 https://iris.who.int/bitstream/handle/10665/329501/WHO-CED-PHE-EPE-19.4.6-eng.pdf?sequence=1
8 https://iris.who.int/bitstream/handle/10665/326947/9789241516389-eng.pdf
9 https://iris.who.int/bitstream/handle/10665/342273/WHO-HEP-ECH-EHD-21.01-eng.pdf?sequence=1

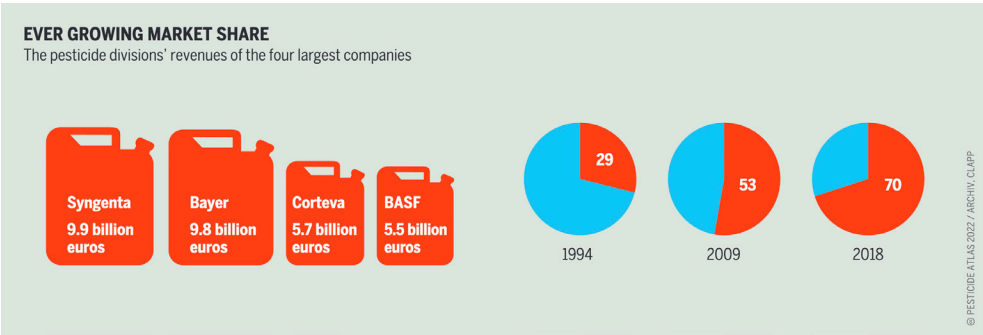
people entering treated fields, and consumers eating treated produce soon after application.

Of special concern is the impact of exposure on children since they are more sensitive to pesticide exposures than adults. In 2017, the International Labour Organization (ILO) estimated that over 70% of the 152 million children in child labor work in agriculture and these numbers were increasing. Sixty million of these children were younger than age 12.[10]

Women are also a specially impacted group when considering HHP exposures. It has been estimated that women on average make up 40% of the agricultural labor force in developing countries, where they conduct many informal tasks in and related to farming, such as weeding and thinning of crops, washing out pesticide containers, washing pesticide-contaminated clothing, and other tasks. Pesticide residues have been widely detected in the blood, breast milk, and umbilical cord blood of women working in agriculture. Health effects of pesticide exposure that impact women include the development of breast cancer, endocrine disruption and endocrine-related health conditions including impacts on reproduction (Jain et al., 2023), birth defects, and metabolic toxicity. In addition, pesticide self-poisonings disproportionally occur among young women in LMICs (Lekei et al., 2020; Schölin *et al.*, 2023).

Despite the damage they cause, large pesticide companies continue to produce and market HHPs in LMICs. One IPEN Partner report from Brazil even showed that agribusiness in the country used the guise of the COVID-19 pandemic to successfully advocate for loosening HHP regulations, permitting the use of previously banned pesticides.[11] The 2022 Pesticide Atlas reports that the five largest pesticide companies generate more than one-third of their pesticide sales from HHPs. The

10 https://www.ilo.org/ipec/news/WCMS_575661/lang--en/index.htm
11 https://ipen.org/documents/agribusiness-and-pandemic-brazil



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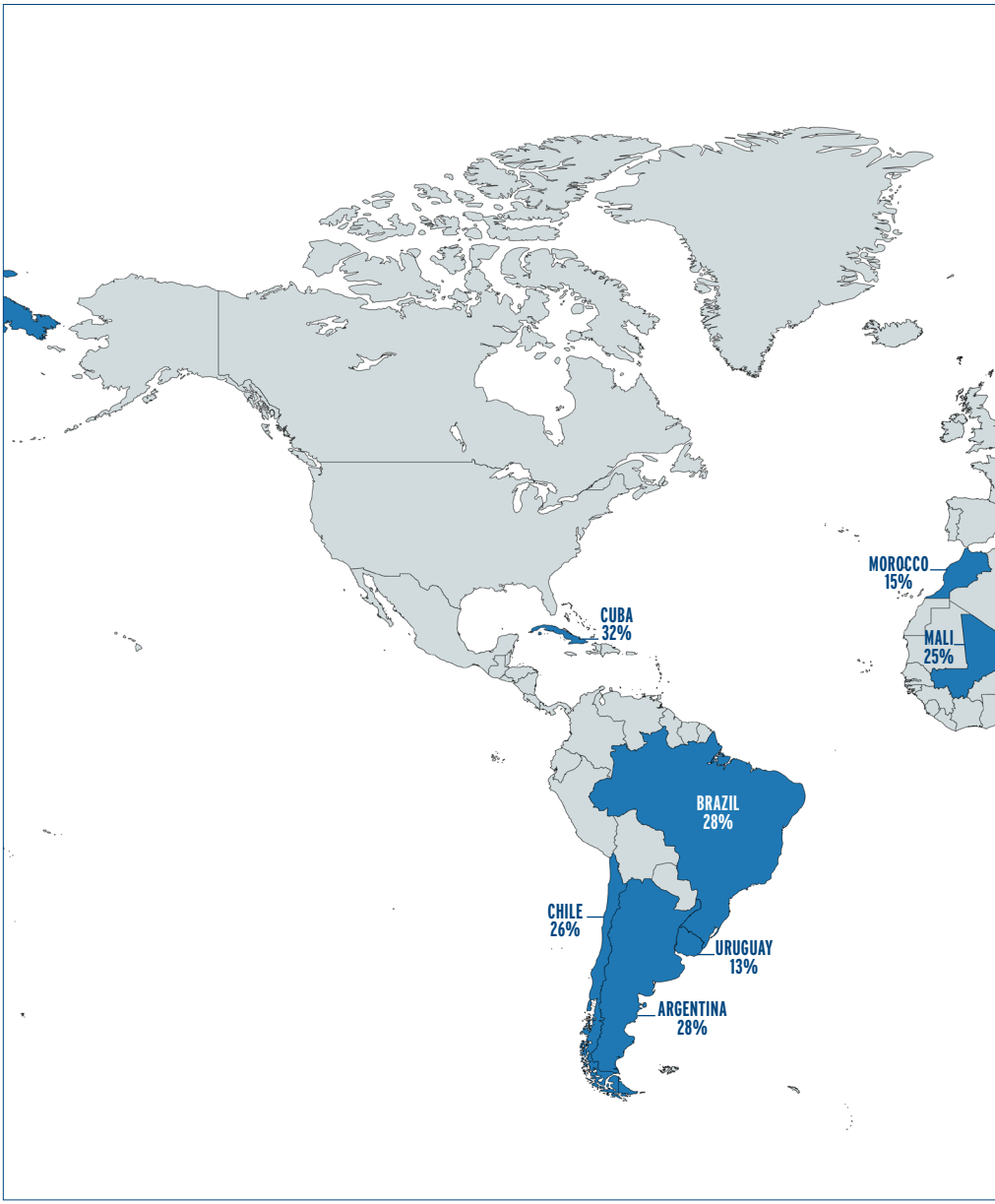
report shows that in 2018, four firms – Syngenta Group, Bayer, Corteva, and BASF –controlled around 70% of the global pesticide market.[12] Reports by IPEN Partners documenting the situation around HHPs in their countries show that international companies are largely responsible for importing and selling HHPs. In addition, some countries and regions that do not permit the use of HHPs in their own territories due to their health and environmental impacts still allow for production and export of HHPs. An investigation by Public Eye and Unearthed showed that in 2018, EU member countries approved the export of 81,615 tonnes of pesticides containing substances not allowed for use in Europe (Gaberell *et al.*, 2020).

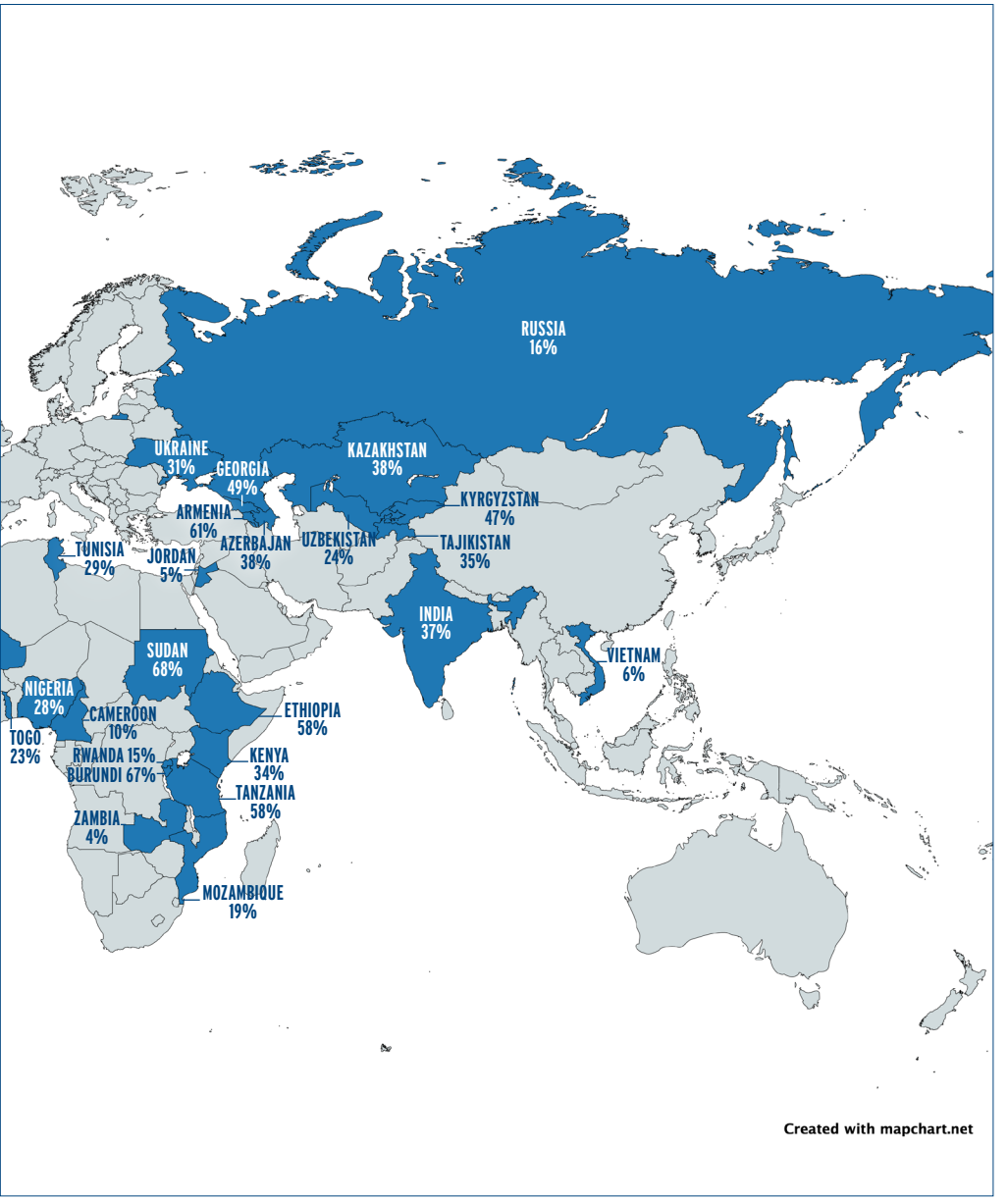
Using PAN's Consolidated List of Banned Pesticides,[13] IPEN Partners compared how many HHPs were allowed for use in their countries while banned in one or more country. In the EU, 125 HHPs are banned and an additional 125 HHPs are not approved for use. The number of banned HHPs in the project countries is provided in Annex 2 and shows that there is a stark contrast. The number of banned HPPs ranges from one to 75, with an average of 25 HHPs banned in the project countries. That means that on average, more than 200 HHPs are allowed for use in the project countries that are currently not allowed for use in the EU.

The evidence shows that the continued production, promotion, and sale of HHPs leads to violations of human rights, including the human right to a clean, healthy, and sustainable environment[14] and the right to a safe and healthy working environment.[15] The use of HHPs can also have very detrimental consequences for the enjoyment of the right to food.[16] In addition, HHPs are obstacles to achieving many of the U.N. Sustainable Development Goals. In 2019, the U.N. Special Rapporteur on human rights and toxics highlighted the continued inaction on chlorpyrifos as constituting a violation of numerous internationally recognized human rights.

12 https://eu.boell.org/sites/default/files/2023-04/pesticideatlas2022_ii_web_20230331.pdf
13 https://pan-international.org/pan-international-consolidated-list-of-banned-pesticides/
14 https://undocs.org/Home/Mobile?FinalSymbol=a%2Fhrc%2F48%2Fl.23%2Frev.1&Language=E&DeviceType=Desktop&LangRequested=False
15 https://www.ilo.org/ilc/ILCSessions/110/reports/texts-adopted/WCMS_848632/lang--en/index.htm
16 https://ap.ohchr.org/documents/dpage_e.aspx?si=A/HRC/34/48

IN 31 COUNTRIES SURVEYED BY IPEN, THE PERCENTAGE OF REGISTERED PESTICIDES THAT ARE CONSIDERED HHPS

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TOGO
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RWANDA 15%
BURUNDI 67%
KENYA
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TANZANIA
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ZAMBIA
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MOZAMBIQUE
19%
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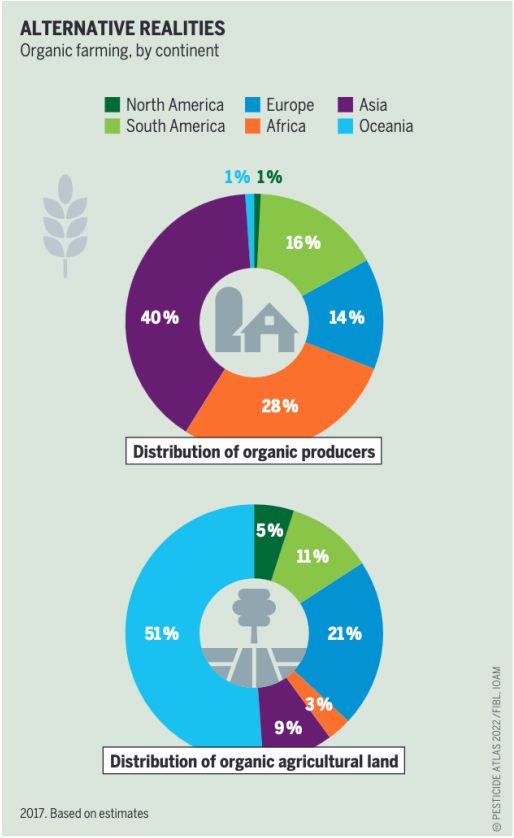
SAFE ALTERNATIVES AND APPROACHES ARE AVAILABLE

A range of alternatives to replace HHPs are available and in use, including other pesticides. One of the most common approaches implemented is Integrated Pest Management (IPM). This builds on consideration of available pest control techniques and measures, and while it aims to keep the use of pesticides to a minimum, they are allowed "when no other effective alternatives are available."[17]



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However, there are ecosystem-based approaches to pest management that do not pose any threat to human health or the environment that are preferable to approaches reliant on toxic chemicals. These include organic and agroecological practices where farmers use Indigenous knowledge and local innovations to devise their own local solutions to pest and crop management problems. There are numerous case studies of successful implementation of these controls, in many cases with increased yields and incomes. See, for example, Watts et al., 2015, Stuart et al., 2023, Tittonell et al., 2020, and relevant references therein.

17 https://www.fao.org/pest-and-pesticide-management/ipm/integrated-pest-management/en/

Many of the IPEN HHP country reports on DDT, sulfluramid, and chlorpyrifos contain details about non-chemical alternatives already in use, showing that these are feasible approaches in all regions. These include certified organic farming, Indigenous and traditional knowledge, use of natural herbs to spray crops for insect control, crop rotations (changing where crops are grown to avoid buildup of pest populations), and planting two or more types of crops close together to utilize pest repellent properties of certain types of crops and plants.

PARTIAL LIST OF CASE STUDIES ON ALTERNATIVES TO PESTICIDES PRODUCED BY IPEN PARTNERS:

Argentina: Promoting the Agroecological Paradigm on the Way to Eliminating Highly Hazardous Pesticides

Ethiopia: Agroecology: a Viable Option to Phasing Out Highly Hazardous Pesticides from Ethiopia

Kenya: Extent and Use of Non-Chemical Pest Management Alternatives Among Smallholder Vegetable Farmers in Kenya: the Case of Siaya and Migori Counties

Latin America: Alternatives to Highly Hazardous Pesticides in Latin America

Niger: Alternatives to Highly Hazardous Pesticides in Niger

Tanzania: Tanzania National Report on Alternatives to HHPs

Vietnam: Alternatives for Reducing Highly Hazardous Pesticides in Rice Production: Case of the An Giang Province, Vietnam

IPEN Partners also developed some information on alternatives for specific HHPs, such as:

Alternativas a la Sulfluramida
El herbicida glifosato y sus alternativas
Alternativas al clorpirifos y a otros insecticidas organofosforados

HHPs: DEFINITION AND FOUR FOCUS PESTICIDES

WHAT ARE HHPs?

The following definition of HHPs has been adopted by FAO and WHO:[18]

> *Pesticides that are acknowledged to present particularly high levels of acute or chronic hazards to health or environment according to internationally accepted classification systems such as WHO or Global Harmonized System (GHS) or their listing in relevant binding international agreements or conventions. In addition, pesticides that appear to cause severe or irreversible harm to health or the environment under conditions of use in a country may be considered to be and treated as highly hazardous.*

HHPs come from all major groups of synthetic pesticides: organochlorine pesticides, organophosphates, carbamates, neonicotinoids, and phenylpyrazoles.

Eight criteria were developed by the FAO/WHO Joint Meeting on Pesticide Management (JMPM) in 2007 to identify HHPs,[19] which apply to both the active substance and to the pesticide product:

Criterion 1: Pesticide formulations that meet the criteria of classes Ia or Ib of the WHO Recommended Classification of Pesticides by Hazard; or

Criterion 2: Pesticide active ingredients and their formulations that meet the criteria of carcinogenicity Categories 1A and 1B of the Globally Harmonized System on Classification and Labelling of Chemicals (GHS); or

Criterion 3: Pesticide active ingredients and their formulations that meet the criteria of mutagenicity Categories 1A and 1B of GHS; or

Criterion 4: Pesticide active ingredients and their formulations that meet the criteria of reproductive toxicity Categories 1A and 1B of GHS; or

18 https://www.fao.org/3/I3604E/i3604e.pdf
19 https://www.fao.org/fileadmin/templates/agphome/documents/Pests_Pesticides/Code/JMPM_2007_Report.pdf

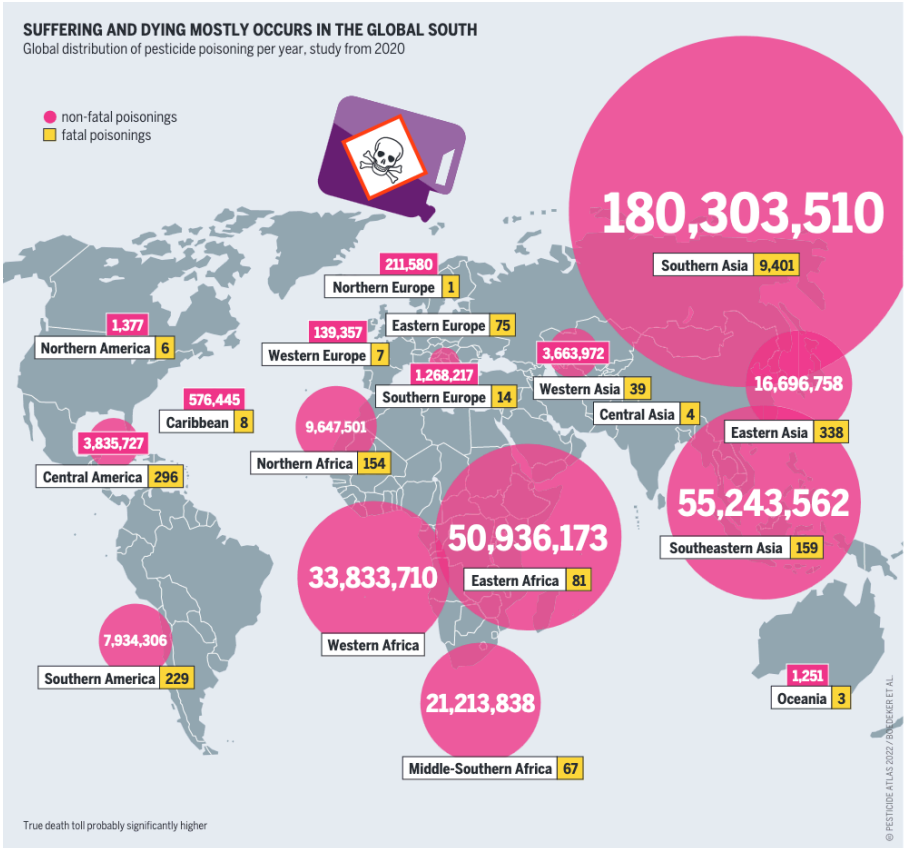
Criterion 5: Pesticide active ingredients listed by the Stockholm Convention in its Annexes A and B, and those meeting all the criteria in paragraph 1 of Annex D of the Convention; or

Criterion 6: Pesticide active ingredients and formulations listed by the Rotterdam Convention in its Annex III; or

Criterion 7: Pesticides listed under the Montreal Protocol; or

Criterion 8: Pesticide active ingredients and formulations that have shown a high incidence of severe or irreversible adverse effects on human health or the environment.

It was further recommended at this meeting that WHO and FAO would develop a list of HHPs, but the list was not developed. Instead, Pesticide Action Network (PAN) International developed an International List of Highly Hazardous Pesticides, building on the criteria developed by the JMPM with additional hazard criteria used by recognized authorities (such as EU and US environmental regulators). This list was initially



Eimermacher/stockmarpluswalter, CC BY 4.0. In Pesticide Atlas 2022, Heinrich-Böll-Stiftung & others.

released in 2009 and has been regularly updated, with the most recent update in 2021.[20] Details of the criteria used by PAN are provided in Annex 1 and include the following:

- High acute toxicity
- Long term toxic effects
- Endocrine disruptor
- High environmental concern – meeting the criteria under the Stockholm Convention or Montreal Protocol
- High environmental concern – where two of the three following criteria are met:
    - P = 'Very persistent' AND/OR B = 'Very bioaccumulative' AND/OR
    - T = Very toxic to aquatic organisms
- Hazard to ecosystem services: Highly toxic for bees
- Known to cause a high incidence of severe or irreversible adverse effects

HHPs: FOUR FOCUS PESTICIDES

Due to IPEN's core work around the Stockholm Convention, we have focused several projects on the Convention's listing of three HHPs: DDT, sulfluramid, and chlorpyrifos. Several IPEN members have also focused research on glyphosate, the world's most widely used pesticide.

Dichlorodiphenyltrichloroethane, DDT

DDT is an organochlorine insecticide that was widely used during the second World War to kill insects that transmit diseases such as malaria and typhus. Until the 1970s, it was used for this purpose and as an agricultural and household pesticide. By that time, concerns about its harmful impacts on humans and the environment resulted in many countries banning or restricting its use. Studies show that exposure to DDT can lead a wide range of health impacts, including breast cancer, diabetes, decreased semen quality, spontaneous abortion, and impaired neuro-development in children (Eskenazi et al., 2009).

DDT was listed under the Stockholm Convention for global restriction as one of the original "Dirty Dozen" banned toxic chemicals,[21] and the

20 https://pan-international.org/wp-content/uploads/PAN_HHP_List.pdf
21 https://chm.pops.int/TheConvention/ThePOPs/The12InitialPOPs/tabid/296/Default.aspx

listing entered into force in 2004. Unfortunately, the Convention listing allowed for time-unlimited, continued production and use of DDT to kill organisms that spread diseases (so-called "disease vector control") and the pesticide has continued to be used extensively to combat malaria. This is typically conducted by spraying walls and indoor surfaces with DDT, leading to human exposure to DDT and its toxic metabolite DDE in homes and workplaces.

Countries report their DDT use to the Stockholm Convention, and there are currently 18 countries listed as still using DDT,[22] however, only nine provided input to the most recent DDT questionnaire. Five of these countries reported continued use in 2020: Botswana, India, South Africa, Zambia, and Zimbabwe. In 2023, India was the only country known to still be producing DDT, but India is expected to end the production by the end of 2024. In 2023, India reported a total production of 1,071 tonnes of the active ingredient. While DDT use is declining in India, its use has recently increased in Southern Africa.[23]

Reports from IPEN partners in Africa show that DDT was banned for use in the 1970s but was then reintroduced for malaria control when an exemption for this purpose was introduced in the Stockholm Convention and when WHO recommended it for this purpose in 2006, despite concerns by scientists (Overgaard et al., 2007). Information obtained by IPEN partners through personal interviews indicates that DDT is still used illegally for agricultural purposes in some African countries. In addition, remaining stockpiles of DDT are an important source of continued contamination and exposure (Mukiibi et al., 2021).

Sulfluramid

Sulfluramid is a pesticide with the active ingredient EtFOSA, which is produced from the PFAS (per- and polyfluoroalkyl substances) chemical PFOSF. When sulfluramid is used, EtFOSA transforms into perfluorooctane sulfonate (PFOS). PFOS and PFOSF were both listed for global restriction under the Stockholm Convention in 2009 since it was deemed likely, as a result of their long-range environmental transport, to lead to significant adverse human health and/or environmental effects. Evidence shows PFOS contamination in rivers and sediments, groundwater, and eucalyptus leaves in the agricultural area of Bahia, Brazil where sulfluramid is used (Nascimento et al., 2018). Also, sulfluramid has been highlighted as one source of PFOS contamination

22 https://chm.pops.int/Implementation/Exemptionsandacceptablepurposes/RegistersofAcceptablePurposes/AcceptablePurposesDDT/tabid/456/Default.aspx

23 https://chm.pops.int/Implementation/PesticidePOPs/DDT/DDTMeetings/DDTEG92022/tabid/9097/Default.aspx

in the Southern Atlantic Ocean (Löfstedt Gilljam et al., 2016a, 2016b). Carrots have been shown to accumulate PFOS after application with sulfluramid (Zabaleta et al., 2018), and uptake of perfluoroalkyl acids such as PFOS has also been shown in other crops such as maize, lettuce, wheat, and soybeans (Ye et al., 2023).

Exposure to PFOS can cause liver damage, kidney disease, and cancer. It impacts the immune system and is an endocrine disrupting chemical impacting the thyroid (Brunn et al., 2023; Gore et al., 2024).

Unfortunately, the Stockholm Convention PFOS listing was accompanied by a wide range of specific exemptions and time-unlimited "acceptable purposes," including the use of sulfluramid for insect baits for control of two species of leaf-cutting ants (Atta spp. and Acromyrmex spp). While sulfluramid is not allowed for non-agricultural use, there is no time limit for its continued use in these types of insect baits. This is leading to continued release of significant amounts of the toxic chemical PFOS into the environment, where it will remain a very long time due to its persistence (Guida et al., 2023). There is an urgent need to end this "acceptable purpose" under the Stockholm Convention.[24]

Argentina, Brazil, Costa Rica, and Vietnam are currently listed as using sulfluramid in the register of acceptable purposes of PFOS under the Stockholm Convention.[25] Brazil reported that around 50 tonnes of PFOSF were used annually between 2009 and 2018 for the production of sulfluramid ant bait (Torres et al., 2022).

Reports from IPEN partners in Latin America show continued production and export of sulfluramid-based ant baits from Brazil to several other countries in the region. This is supported by data showing that from 2004 to 2019, Brazil exported 4,675 tonnes of ant baits to a range of Latin American countries: Argentina, Bolivia, Chile, Colombia, Costa Rica, Cuba, Ecuador, El Salvador, Guatemala, Honduras, Panama, Paraguay, Peru, Suriname, Trinidad and Tobago, Uruguay, and Venezuela. Sulfluramid-based ant baits were also reported to be exported to Angola and the United States (Torres et al., 2022). In addition, one IPEN member group found that the increased expansion of large-scale monoculture tree plantations in Brazil and other Latin American countries leads to increased use of sulfluramid.

Overall, IPEN partners report there are a wide variety of trademarks, formulations, and presentations of products with sulfluramide in the

24 https://ipen.org/sites/default/files/documents/en_ipen-sulfuramide-factsheet-v1_10a-en.pdf
25 https://chm.pops.int/Implementation/Exemptions/AcceptablePurposes/AcceptablePurposesPFOSandPFOSF/tabid/794/Default.aspx

region, which makes it difficult to identify them. In addition, reports show that sulfluramid is sold for uses not approved by the Stockholm Convention such as household use and for control of other types of ants in agriculture. A recent scientific publication shows that there are 31 companies producing sulfluramid-based products intended for household use, such as pastes to control termites, paste to control cockroaches, and paste and granulated bait to control household ants (Löfstedt Gilljam et al., 2016a).

Chlorpyrifos

Chlorpyrifos is a broad spectrum, chlorinated organophosphate (OP) insecticide used for many purposes, including as pest control in agriculture for a wide range of crops, in households, in parks, golf courses, lawns, as wood treatment, and to control mosquitos. Chlorpyrifos is designed to be highly toxic to insects, including bees and other pollinators. It is highly toxic to many aquatic organisms such as fish, frogs, and crustaceans, to soil living organisms such as earthworms, and to many terrestrial species, especially birds. It is also toxic to mammals. It was authorized for use in over 88 countries and use is currently estimated at approximately 50,000 tonnes per year. China and India are currently two of the biggest producers of chlorpyrifos globally, with large amounts being exported for use in other countries.[26]

Chlorpyrifos is neurotoxic and hinders normal development of the nervous system. For example, prenatal and childhood chlorpyrifos exposures are linked to attention deficit hyperactivity disorder and impaired mental- and motor-skill development in young children. Chlorpyrifos can also cause neurological damage in adults. Adult agricultural workers use OP pesticides as mixtures, and studies have shown workers with moderate OP exposure inclusive of chlorpyrifos have signs of neurotoxicity such as impaired peripheral nervous system function. Additionally, endocrine disruption by chlorpyrifos is suggested by changes in the adrenal gland weight and structure, reduced sperm count, and changes in hormone levels such as estrogen and testosterone in rodent experiments. In addition, chlorpyrifos may alter the thyroid hormone system. Other actions of chlorpyrifos have also been reported, including neuroendocrine, estrogenic, and androgenic effects. (Gore et al., 2024).

Reports from IPEN Partners show that chlorpyrifos is one of the most widely used pesticides in many countries. It is imported and used in large

26 See POPs Review Committee Risk Profile of Chlorpyrifos and references therein: UNEP/POPS/POPRC.19/9/Add.3 https://chm.pops.int/TheConvention/POPsReviewCommittee/Meetings/POPRC19/Overview/tabid/9548/Default.aspx

volumes on large agricultural and outdoor areas, as well as for indoor use in homes and other spaces. There are typically many different brand names and formulations available. Environmental contamination, human exposures, and health impacts have been documented in many countries, including Indonesia, India, Mexico, and Chile. In addition, chlorpyrifos residues have been widely detected in vegetables and other food.

Glyphosate

Glyphosate is an organophosphorus pesticide that was developed and patented by the agrochemical company Monsanto (now Bayer) in 1974. It is an herbicide, a chemical used to kill plants that are considered weeds. One of the most well-known herbicide formulations containing glyphosate as its active ingredient is Monsanto's Roundup®. In 1996, so-called Roundup Ready soybeans were introduced as one of the first crops genetically modified to be resistant to glyphosate. Soon, other Roundup Ready crops were introduced, including corn, canola, and sugar beets. Roundup will typically kill any plants, including crops, but GMO crops can survive spraying of Roundup. This allows farmers to use glyphosate repeatedly during the growing season without harming their crops, which has led to a massive increase in the amount of glyphosate used and increased contamination of crops sprayed with glyphosate (Jarrell et al., 2020).

When the patent for glyphosate expired, many companies started producing generic glyphosate-based products, making it the most used herbicide globally. In 2014, sales of glyphosate products were estimated to be between 850,000 - 900,000 tonnes, constituting more than 90% of all herbicides sold to the agricultural sector globally (Antier et al., 2020). Herbicides containing glyphosate are currently used in 140 countries and glyphosate has been found to widely contaminate soil, water, air, and food (Muñoz et al., 2021).

A wide range of health impacts caused by exposure to glyphosate have been reported, including respiratory diseases, neurological effects, and chronic kidney disease (Agostini et al., 2020). In addition, many studies have shown a link between glyphosate and cancer, primarily non-Hodgkin lymphoma (Weisenburger, 2021). In 2015, the International Agency for Research on Cancer (IARC) concluded that glyphosate was probably carcinogenic to humans (group 2A). Glyphosate is an endocrine disrupting chemical that can impact female and male reproductive health (Gore et al., 2024).

Health impacts caused by Roundup have led to a staggering number of legal actions against Monsanto/Bayer. In California, Monsanto was found liable in three cases where plaintiffs had developed non-Hodgin lymphoma, with damages calculated at more than US$130 million. In June 2020, Bayer announced that it would settle about 125,000 Roundup product liability claims through a total payment of $10.1 billion. However, even that amount will not cover all the legal cases against Monsanto/ Bayer related to Roundup (Centner, 2020).

Despite delays caused by strong industry efforts to create doubt about the toxicity of glyphosate, it is now banned in some countries, including Vietnam and in Mexico is being phased out in 2024 based on a Presidential Decree.

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ANNEX 1

Criteria used by PAN to identify Highly Hazardous Pesticides

HIGH ACUTE TOXICITY
'Extremely hazardous' (Class Ia) according to WHO Recommended Classification of Pesticides by Hazard or
'Highly hazardous' (Class Ib) according to WHO Recommended Classification of Pesticides by Hazard or
'Fatal if inhaled' (H330) according to the EU or the Japan Globally Harmonized System (GHS) or
LONG TERM TOXIC EFFECTS
Carcinogenic to humans according to IARC or US EPA or
'Known or presumed human carcinogens' (Category I) according to the EU or the Japan Globally Harmonized System (GHS) or
Probable/likely carcinogenic to humans according to IARC, US EPA or
Likely to be Carcinogenic to Humans: At High Doses according to EPA or
'Substances known to induce heritable mutations or to be regarded as if they induce heritable mutations in the germ cells of humans', 'Substances known to induce heritable mutations in the germ cells of humans' (Category I) according to the EU or the Japan Globally Harmonized System (GHS) or
'Known or Presumed human reproductive toxicant' (Category I) according to the EU or the Japan Globally Harmonized System (GHS) or

ENDOCRINE DISRUPTOR

EU interim criteria as laid down in Reg. (EC) No 1107/2009 'Suspected human reproductive toxicant' (Category 2) AND 'Suspected human carcinogen' (Category 2) according to the EU or the Japan Globally Harmonized System (GHS) or

Pesticides identified as endocrine disrupters in the EU according to Reg. (EU) 2018/605

HIGH ENVIRONMENTAL CONCERN

Pesticides listed in Annex A & B of the Stockholm Convention or meeting the Conventions' criteria or Ozone depleting pesticides according to the Montreal Protocol or

HIGH ENVIRONMENTAL CONCERN - WHERE TWO OF THE THREE FOLLOWING CRITERIA ARE MET:

P = 'Very persistent' half-life > 60 days in marine- or freshwater or half-life > 180 days in soil ('typical' half-life), marine or freshwater sediment) (Indicators and thresholds according to the Stockholm Convention) AND/OR

B = 'Very bioaccumulative' (BCF >5000) or Kow logP > 5 (existing BCF data supersede Kow log P data) (Indicators and thresholds according to the Stockholm Convention) AND/OR

T = Very toxic to aquatic organisms (LC/EC 50 [48h] for Daphnia spp. < 0,1 mg/l)

HAZARD TO ECOSYSTEM SERVICES

'Highly toxic for bees' according to U.S. EPA (LD50, µg/bee < 2) or

KNOWN TO CAUSE A HIGH INCIDENCE OF SEVERE OR IRREVERSIBLE ADVERSE EFFECTS

Pesticides listed in Annex III of the Rotterdam Convention or meeting the Conventions' criteria

ANNEX 2

The number of HHPs banned in countries where IPEN partners have conducted HHP surveys and other activities.

COUNTRY	NUMBER OF BANNED HHPs	COUNTRY	NUMBER OF BANNED HHPs
Argentina	18	Mexico	26
Armenia	22	Morocco	59
Belarus	1	Mozambique	36
Brazil	75	Nepal	32
Burundi	19	Niger	29
Cameroon	25	Nigeria	19
Chile	26	Panama	19
Costa Rica	23	Peru	27
Cuba	19	Russia	24
Ethiopia	12	Rwanda	24
Georgia	21	Sri Lanka	33
India	47	Sudan	18
Indonesia	54	Tanzania	15
Iraq	11	Togo	20
Jamaica	22	Tunisia	25
Jordan	19	Uganda	7
Kazakhstan	22	Uruguay	21
Kenya	14	Vietnam	38
Kyrgyzstan	24	Zambia	3
Mali	19		

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left: iStockphoto, Black Hmong woman harvesting rice & carrying her baby.
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PAGE ii
iStockphoto, Sa Pa, Vietnam - June 6, 2015: people are harvesting the paddy field.

PAGE xii
iStockphoto, Man spraying vegetables in the garden.

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Spraying to precent malaria. Vanuatu 2009. Photo: AusAID Creative Commons Attribution 2.0 Generic https://commons.wikimedia.org/wiki/File:Spraying_to_precent_malaria._Vanuatu_2009._Photo-_AusAID_%2810722134375%29.jpg

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