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Highly Hazardous Pesticides (HHPs)

Assessment Report on Issues of Concern

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1. Sources

Pesticides are widely used biologically active compounds designed to kill target organisms. A number of pesticides have also been shown to cause adverse effects on non-target organisms.

2. Why is it relevant?

Highly hazardous pesticides (HHPs) have a high potential to cause adverse impacts on human health, the environment and the sustainability of agricultural production, especially in low- and middle-income countries (LMICs).

Scientific studies have associated exposure to pesticides with chronic effects in humans, including increased risks for some cancers, birth defects, adverse effects on organs and reproduction, and pulmonary disease.

There is a very low rate at which pesticide containers are disposed in an environmentally sound manner.

Research in developing countries shows that they are frequently discarded, burned, or reused, for example in toys or to store food or water.

Lack of enforcement is of concern, whereby uncontrolled access to HHPs has led to unintended uses, and plant protection products that are banned in high income countries and do not meet international quality standards continue to be marketed in some LMICs.

Exposure of humans and other non-target organisms has been shown to be high if plant protection products are not used according to best practices.

Concerns over pesticides also apply to biocides, which often contain the same active ingredients as plant protection products and are applied in close proximity to humans (e.g. mosquito repellents) or in the environment (e.g. anti-fouling).

Increasing insecticide resistance is another major concern, particularly in the fight against malaria.

In 2015, the fourth meeting of the International Conference on Chemicals Management (ICCM4) adopted a resolution that recognized HHPs as an issue of concern and called for concerted action to address HHPs in the context of the Strategic Approach to International Chemicals Management (SAICM).

Governments and other stakeholders supported "*concerted action to address HHPs in the context of SAICM*"

For more detailed information on HHPs, please see Chapter 3.5 of the ***Assessment Report on Issues of Concern*** and Part A, Chapter 5 of the ***Annexes to the Assessment Report on Issues of Concern***. Available on the UNEP website.

3. Existing instruments and actions

At the international level, no overarching legally binding instruments exist for all HHPs.

Some HHPs may be identified and partially regulated under the Stockholm and Rotterdam Cand the Montreal Protocol. In general, the management of HHPs primarily takes place through national and regional pesticide legislation and implementation of these laws.

Meanwhile, international organisations have developed and used different instruments to support countries in managing HHPs; these include:

- Setting norms, particularly in the form of codes of conduct and guidelines for identification and sound management of HHPs under the joint leadership of the Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO);
- The development of guidance and tools; and
- Joint activities assisting countries in raising awareness, building capacity and managing HHPs.

See Annexes for more

4. Challenges and opportunities

One of the eight criterion for identifying an HHP remains ambiguous. The criterion is for "pesticide active ingredients and formulations that have shown a high incidence of severe or irreversible adverse effects on human health or the environment". Whether a pesticide meets this criterion is at the discretion of national regulatory authorities.

There is a disconnect between international recognition and national action. While most countries have set up their own pesticide legislation, many developing and transition countries still face many challenges for sound management of HHPs resulting in substantial ongoing use of and exposure to HHPs.

To reduce ambiguity while still allowing sufficient flexibility by countries, activities may include, inter alia:

- Developing practical guidance on how to identify severe adverse effects on human health and the environment;
- Fostering and coordinating international cooperation in supporting developing and transition countries to implement the criterion.

To address these challenges, concerted international actions are urgently needed in all possible forms to support developing and transition countries in managing HHPs and pesticides in general.

For more detailed information on HHPs, please see Chapter 3.5 of the ***Assessment Report on Issues of Concern*** and Part A, Chapter 5 of the ***Annexes to the Assessment Report on Issues of Concern***. Available on the UNEP website.

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GLYPHOSATE

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1. Sources

Glyphosate is an organophosphorus herbicide for agricultural, forestry and residential weed control that kills or suppresses all plant types, with the exception of those genetically modified to be tolerant to the active ingredient.

Since its introduction in 1974, glyphosate has become the most widely used herbicide worldwide. The largest use of glyphosate has been in agriculture, however glyphosate use in urban settings can also be a significant source of contamination.

2. Why is it relevant?

Recently, a number of countries have initiated or taken actions to address glyphosate due to growing public concern about human health risks. The scientific debates regarding adverse potential risks to human health are ongoing and a number of bodies have assessed glyphosate.

Glyphosate in agriculture is identified by the Global Chemicals Outlook II as an issue with emerging evidence of risks to human health and the environment.

In 2015, the International Agency for Research on Cancer classified glyphosate as "probably carcinogenic to humans". Some assessments and reassessments by other governmental institutions agree, whereas others concluded that glyphosate is not carcinogenic.

Assessments of the environmental impacts of glyphosate are in agreement. That glyphosate is toxic to aquatic life with long-lasting effects, and that there are potential risks from glyphosate to non-target terrestrial and aquatic plants (e.g. from off-field spray drift).

Once released in the environment, glyphosate may undergo complex distribution and transport processes among different environmental media.

Glyphosate-containing airborne particles can be transported by wind, with transport distances depending on particle size and weather conditions.

In soil, glyphosate is strongly adsorbed. The degradation half-life of glyphosate in soil can take up to several months and even years.

Once released to water a small fraction of glyphosate may remain dissolved in water and be transported via currents. In salt water, glyphosate may persist for months to years.

Globally, glyphosate is ubiquitous in surface waters and croplands due to its widespread use; however, studies on human exposure are limited.

Wildlife and humans may be exposed to glyphosate and its metabolite, aminomethylphosphonic acid (AMPA), via contaminated air, water and soil, and by consuming contaminated crops.

Humans may additionally be exposed through drinking water and during the application and disposal of glyphosate-based herbicide formulations.

For more detailed information on glyphosate, please see Chapter 4.4 of the ***Assessment Report on Issues of Concern*** and Part B, Chapter 4 of the ***Annexes to the Assessment Report on Issues of Concern***. Available on the UNEP website.

3. Existing instruments and actions

Some countries have taken regulatory actions on glyphosate. As an herbicide, glyphosate is subject to pesticide regulations for placement on the market, use and related activities that lead to human exposure in many parts of the world.

For example, a number of national governments and intergovernmental institutions have set up maximum residual levels that are allowed for glyphosate in or on food and feed and maximum contaminant levels in drinking water. These guideline values may vary considerably among countries and for different media.

Many countries have taken steps to legally ban or restrict glyphosate. For example, banning a co-formulants of glyphosate from glyphosate-containing products or reducing the time limit on the approval of glyphosate as an active ingredient.

In some examples, while no legal bans or restrictions may have been imposed, other instruments have been adopted or actions taken, e.g., requiring businesses to provide warnings to consumers about significant exposure to glyphosate.

See Annexes for more

In addition to legal bans or restrictions of glyphosate, voluntary phase-out has also taken place by some retailers in some countries.

4. Challenges and opportunities

While its carcinogenicity may still be under discussion and risks of consumer exposure through diet are low, significant risks for non-target terrestrial and aquatic plants may exist, particularly when officially designated risk mitigation measures on product labels are not properly implemented.

Reliance on glyphosate in many parts of the world has triggered the spread of glyphosate-resistant weeds resulting in increased application rates by farmers. This increased use has heightened environmental risks and human exposure.

Wide use of glyphosate promotes the adoption of genetically modified glyphosate-tolerant crops, which may significantly influence biodiversity, e.g., through reduced crop rotation, and weed management that is solely based on the use of herbicides.

The widespread nature of the use of glyphosate and glyphosate-tolerant crops and of glyphosate contamination in many parts of the world makes this an international issue. In particular, international action is warranted for assisting developing countries without the necessary capacity and means to address glyphosate contamination and related problems.

Efforts to address glyphosate need to look beyond chemical substitutions. Future efforts to manage glyphosate risks need to incorporate lessons learned from glyphosate and glyphosate-tolerant crops. A transition towards alternatives that minimise chemical use such as agroecological techniques and integrated pest management and other solutions could improve the sustainability of urban and agronomic systems while preserving human and environmental health.

For more detailed information on glyphosate, please see Chapter 4.4 of the ***Assessment Report on Issues of Concern*** and Part B, Chapter 4 of the ***Annexes to the Assessment Report on Issues of Concern***. Available on the UNEP website.

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NEONICOTINOIDS

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1. Sources

Neonicotinoids are a class of neuroactive insecticides chemically related to nicotine. Since the first neonicotinoid (imidacloprid) was commercialized in the 1990s, seven main compounds (acetamiprid, clothianidin, dinotefuran, imidacloprid, nitenpyram, thiamethoxam and thiacloprid) are now available on the global market.

Today, neonicotinoids are used in protecting plants, livestock and pets from pest insects, as well as for malaria vector control, i.e., mosquitos, to protect humans, in more than 100 countries. Neonicotinoids are also used as biocides.

2. Why is it relevant?

Neonicotinoids target the central nervous system of insects and are highly effective with low rates of developed resistance in pest insects. Recent evidence shows that:

The widespread use of neonicotinoids may be a threat to bees and other pollinators, resulting in broad public concern, and identification by the Global Chemicals Outlook II as an issue with emerging evidence of risks to the environment.

The European Union has classified thiacloprid as potentially carcinogenic (category 2) and toxic for reproduction category 1B and identified it as an endocrine disruptor, indicating high human toxicity.

While neonicotinoids are unlikely to cause dietary risks of concern for consumers, the uses of these compounds may cause risks of concern during applications and other activities (e.g. children playing on imidacloprid-treated turf).

Some neonicotinoids are highly to very highly toxic and can result in lethal and sublethal effects on adult honeybees.

Exposure may also result in high risks for bees including at the colony level and in significant impacts on other wildlife, including birds, mammals and aquatic organisms.

Key neonicotinoid release routes to the environment include direct releases, leaf run-off, leaching and spray or dust drift during applications to air, water and soil.

Neonicotinoids can be transported certain distances in air before settling, and in some soil conditions they can persist and possibly accumulate for months to years.

Wildlife and humans may be exposed to neonicotinoids through contaminated environmental media.

Wildlife may also be exposed by eating treated seeds, crops and their pollen and nectar, and humans through contaminated pollen, foodstuffs and drinking water.

Different levels of occupational exposure may also occur, depending on the activities, application methods, and personnel protection equipment used.

Due to their widespread use, neonicotinoids are now detected around the world in a wide range of media. These include air, water, soil, sewage, crops and foodstuffs, house dust and human urine samples.

For more detailed information on neonicotinoids, please see Chapter 4.7 of the ***Assessment Report on Issues of Concern*** and Part B, Chapter 7 of the ***Annexes to the Assessment Report on Issues of Concern***. Available on the UNEP website.

3. Existing instruments and actions

As neonicotinoids are insecticides, they must conform to standard regulatory requirements for pesticides that exist in many countries, particularly in the form of limit values for levels in different environmental media and maximum residual levels in agricultural products.

Regulatory instruments and actions that have been taken by some countries include total bans and restrictions on specific uses (e.g., banning formulations containing certain neonicotinoids or restricting neonicotinoid use to only greenhouses), strengthened personnel protection equipment requirements, and additional labelling requirements and scheduled re-review of the compounds.

A number of countries are in the process of taking more actions on neonicotinoids, including labelling requirements by manufacturers for directions on application, and use of personal protection equipment to protect relevant workers.

Regulatory instruments and actions are complemented by voluntary actions, e.g. voluntary cancellations of neonicotinoid registrations, or third party standards and certification schemes which have included neonicotinoids in their frameworks.

See Annexes for more

4. Challenges and opportunities

Scientific evidence shows that the various neonicotinoid compounds have complex exchanges among environmental compartments, persist in water and soil environments, and may be transported off-field, and that bees, other wildlife and humans may be exposed to them through many different routes.

A number of countries and stakeholders have taken steps to limit uses and exposure through various instruments and actions. However, these efforts are likely not enough to address neonicotinoids as a whole.

While current measures contribute to solving issues in many developed countries, developing countries lack adequate measures to address neonicotinoid exposure.

Certain factors need to be taken into account, such as financial and human capacities in developing countries, accessibility to suitable personnel protection equipment and their alternatives, and education of farmers and other users.

These needs require international action, for example, under an international framework of sound management of highly hazardous pesticides.

Efforts to reduce exposure to neonicotinoids need to look beyond substitutions with other chemicals having similar mechanisms and effects and towards alternative techniques that minimize chemical uses.

For more detailed information on neonicotinoids, please see Chapter 4.7 of the ***Assessment Report on Issues of Concern*** and Part B, Chapter 7 of the ***Annexes to the Assessment Report on Issues of Concern***. Available on the UNEP website.

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TRICLOSAN

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1. Sources

Triclosan is a synthetic, broad-spectrum antibacterial chemical used as an additive in thousands of consumer and medical antibacterial products and plastics.

It has been used commercially across the globe since the 1970s. Major global use is in cosmetics and personal care products (68%, particularly deodorants) followed by disinfection and medical use (16%) and lower amounts in paints (8%), and in plastic materials, toys and appliances (8%).

2. Why is it relevant?

The Intensive use and continuous release of triclosan to the environment have raised public concerns, as scientific evidence of adverse environmental and human health impacts emerged. Based on various assessments:

Triclosan was identified as an issue with emerging evidence of risks to human health and the environment by the Global Chemicals Outlook II;

Triclosan is highly toxic to aquatic organisms such as fish, amphibians invertebrates, algae, and some soil organisms.

Evidence of effects on the endocrine system at environmentally relevant concentrations has also been noted;

Triclosan in surface water at measured concentrations may cause harmful effects in aquatic ecosystems.

Triclosan in the environment might also promote antimicrobial resistance, but more evidence is required;

Current levels of general population exposure to triclosan through relevant products and breast milk, as well as the associated health risks, may still be low. However, the potential adverse effects such as endocrine disruption cannot be ruled out.

Triclosan is primarily released to the environment through wastewater from the production and use. It has been detected in surface, ground and drinking water.

While triclosan is moderately soluble in water, it has rather short half-lives (under aerobic conditions) in the various environmental compartments.

As such, triclosan is not likely to persist in the environment and undergo long-range transport. However, triclosan is resistant to degradation under anaerobic conditions

In typical wastewater treatment plants from developed countries, triclosan can be removed from influents with reported efficiencies of 57% to 99% or up to 50% when partitioned into sludge or biosolid waste.

Human exposure to triclosan occurs primarily through the skin or mouth during the use of triclosan-containing products, with only a minor contribution via environmental exposures.

Workers may have additional significant exposure through inhalation and dermal contact where triclosan is produced or largely used.

For more detailed information on triclosan, please see Chapter 4.11 of the ***Assessment Report on Issues of Concern*** and Part B, Chapter 11 of the ***Annexes to the Assessment Report on Issues of Concern***. Available on the UNEP website.

3. Existing instruments and actions

A wide range of instruments and actions have been developed and taken across the globe to address some specific uses of triclosan. Some countries and regions have established legally binding obligations to ban the use of triclosan in different products, e.g. in over-the-counter consumer antiseptic products, biocidal products or in liquid soap.

These actions can be complemented by other instruments such as legally binding requirements of pollution prevention plans e.g., by those who use and import triclosan-containing cosmetics, natural health products or drugs or by voluntary phase-out by some major multinational companies.

Over 200 scientists, medical doctors and public health professionals signed the Florence Statement on Triclosan and Triclocarban. The statement calls for avoidance of triclosan, triclocarban and other antimicrobial chemicals except where they provide an evidence-based health benefit and there is adequate evidence demonstrating they are safe, among other recommendations.

See Annexes for more

4. Challenges and opportunities

Scientific evidence shows that the various neonicotinoid compounds have complex exchanges among environmental compartments, persist in water and soil environments, and may be transported off-field, and that bees, other wildlife and humans may be exposed to them through many different routes.

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ENVIRONMENTALLY PERSISTENT PHARMACEUTICAL POLLUTANTS (EPPPs)

1. Sources

Pharmaceuticals, including antibiotics, and their metabolites can enter the environment through a variety of pathways, including wastewater and solid waste from pharmaceutical manufacturing, consumption and excretion, improper disposal of unused or expired products, animal husbandry and aquafarming.

2. Why is it relevant?

Pharmaceuticals are important for human and animal health. They have positive impacts on food production and economic welfare.

The presence of pharmaceuticals in the environment may result in different adverse effects on wildlife and ecosystems; some well-known cases include endangerment of some vulture species, reproductive failures in fish, and the development of antimicrobial resistance.

Pharmaceuticals designed to be slowly degradable or even non-degradable present a special risk when they enter, persist or disseminate in the environment.

There are also so-called "pseudo-persistent pharmaceutical pollutants", which are degradable although continuous emissions to the environment can lead to their constant environmental presence.

Due to their increasing use and following increasing attention in both the scientific community and public media, policymakers have initiated various actions to address pharmaceuticals in the environment

Internationally, EPPPs were recognized as an issue of concern under the Strategic Approach to International Chemicals Management (SAICM) at the fourth meeting of the International Conference on Chemicals Management (ICCM4) in 2015.

The same resolution "*considers that information dissemination and awareness raising on EPPP are particularly relevant and that improving the availability of and access to information on such chemicals is a priority*" and *"recognizes the current knowledge gaps on exposure to and the effects of EPPP*".

3. Existing instruments and actions

The sound management of EPPPs is a complex issue: while the focus is on pharmaceutical pollutants in the environment, action needs to be taken at every stage of pharmaceutical products' life cycles, starting from drug development stages.

For more detailed information on EPPPs, please see Chapter 3.3 of the ***Assessment Report on Issues of Concern*** and Part A, Chapter 3 of the ***Annexes to the Assessment Report on Issues of Concern***. Available on the UNEP website.

3. Existing instruments and actions (cont.)

Many efforts by governments and other stakeholders have focused so far on gathering knowledge and raising awareness. For example, there is a database of existing environmental measurements across the globe gathered from peer-reviewed literature.

Declarations and policy strategies have been developed to guide action to address specific pharmaceuticals or in specific regions. in a demonstration of the political commitment to solving potential EPPP issues. Some policy strategies have taken the whole life cycle of pharmaceuticals into consideration.

Development of actions or instruments for sound management of individual stages of pharmaceutical life cycles has been uneven. Many different instruments and actions have been developed for areas such as marketing authorisation and take-back of unused and expired pharmaceuticals.

Actions remain lacking in other areas, such as treatment of waste from manufacturing and domestic sources containing pharmaceuticals, as well as from prescriptions and use.

4. Challenges and opportunities

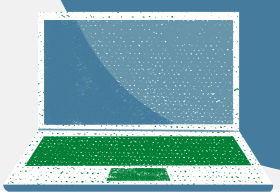
Under SAICM, the current designation of EPPPs is limited in scope to pharmaceutical pollutants that "are designed to be slowly degradable or even non-degradable" and "resist chemical degradation during passage through the human or animal body".

Preventing pharmaceuticals from entering waste streams in the first place is an effective solution to sound management, due to the financial and technical challenges associated with the treatment of pharmaceutical pollutants once they become waste. Efforts to tackle different life-cycle stages of pharmaceuticals have been limited in their success.

The specific scope of SAICM needs to be expanded to a more general scope of "pharmaceuticals in the environment" in order to include those pharmaceutical pollutants that are not environmentally persistent. These include those that are pseudo-persistent and those that may cause effects that are difficult to reverse, such as antimicrobial resistance.

Global efforts to prevent pharmaceutical pollutants from entering waste streams need to be stepped up in areas including;

- Strengthened support of developing and transition countries;
- Strengthened engagement of pharmaceutical manufacturers, particularly multinational corporations;
- Filling in gaps associated with existing pharmaceutical products.



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