LEARNING COURSE

Alternatives to POPs

Introduction

GGKP, 2024

gef global environment facility INVESTING IN OUR PLANET

GGKP

DISCLAIMER

The findings, interpretations and conclusions expressed in this document do not necessarily reflect the views of the Global Environment Facility (GEF), Green Growth Knowledge Partnership (GGKP), United Nations Environment Programme (UNEP), Secretariat of the Stockholm Convention, project stakeholders, or the project countries.

In the event of any inconsistency or conflict between the information contained in this non-binding material and the Stockholm Convention on Persistent Organic Pollutants (POPs), the text of the Convention takes precedence, taking into account that the interpretation of the Stockholm Convention remains the prerogative of the Parties.

While reasonable efforts have been made to ensure that the content of this publication is factually correct and properly referenced, GEF, GGKP, UNEP and individual contributors do not accept responsibility for the accuracy or completeness of the contents and shall not be liable for any loss or damage that may be occasioned, directly or indirectly, through the use of, or reliance on, the contents of this publication.

Recommended citation: *GGKP (2024). Alternatives to POPs: Introduction.* This citation ensures proper acknowledgment and attribution in accordance with applicable standards.

ACKNOWLEDGEMENTS

This learning course was developed as part of the GEF ID 10785 project titled “Global Development, Review and Update of National Implementation Plans (NIPs) under the Stockholm Convention (SC) on Persistent Organic Pollutants (POPs)” and funded by the Global Environment Facility (GEF).

This resource has been developed by the Knowledge and Risk Unit of the Chemicals and Health Branch, United Nations Environment Programme (UNEP), which ensured the content aligns with the latest information and knowledge and supports the objectives of the Stockholm Convention on Persistent Organic Pollutants (POPs). The Green Growth Knowledge Partnership (GGKP) facilitated the design, layout and dissemination of this material, ensuring its accessibility and alignment with global knowledge-sharing objectives.

The GEF is a family of funds dedicated to confronting biodiversity loss, climate change, pollution, and strains on land and ocean health. Its grants, blended financing, and policy support aim to help developing countries address their biggest environmental priorities and adhere to international environmental conventions. Over the past three decades, the GEF has provided more than $23 billion and mobilized $129 billion in co-financing for more than 5,000 national and regional projects.

The GGKP is a global community of organizations and experts committed to collaboratively generating, managing, and sharing green growth knowledge. Led by the Global Green Growth Institute (GGGI), Organisation for Economic Co-operation and Development (OECD), United Nations Environment Programme (UNEP), United Nations Industrial Development Organization (UNIDO), and World Bank Group, the GGKP draws together over 90 partner organizations. For more information, visit www.greengrowthknowledge.org.

Index

1. POPs
2. The development of alternatives to POPs
3. Difficulties on searching for alternatives
4. Guidance for the identification and evaluation of alternatives
5. Steps in the identification and evaluation of alternatives
6. Conclusions

POPs

Persistent organic pollutants (POPs) are chemical compounds that once released into the environment:

- Remain intact for exceptionally long periods of time
- Become widely distributed throughout the environment
- Accumulate in the fatty tissue of living organisms
- Are toxic to both humans and wildlife

The chemicals targeted by the Stockholm Convention are listed in the annexes of the convention:

- POPs intentionally produced:

  Annex A - Parties must take measures to eliminate the production and use of the chemicals listed.

  Annex B - Parties must take measures to restrict the production and use of the chemicals listed.

- POPs unintentionally produced

  Annex C - Parties must take measures to reduce the unintentional releases of chemicals listed with the goal of continuing minimization and, where feasible, ultimate elimination.

https://chm.pops.int/TheConvention/ThePOPs/tabid/673/Default.aspx

The development of alternatives to POPs

One of the essential aims of the Stockholm Convention is to support the transition to safer alternatives.

REF: https://chm.pops.int/Implementation/Alternatives/Overview/tabid/5834/Default.aspx

Difficulties on searching for alternatives

- Alternatives may be more expensive and their manufacture and use more complicated.
- Alternatives should not have the same properties as the POPs they are replacing. But, it is difficult to fully evaluate potential risks of alternatives.
- Various countries have remaining stocks of POPs that want to use.

REF: https://chm.pops.int/Implementation/Alternatives/Overview/tabid/5834/Default.aspx

Guidance for the identification and evaluation of alternatives

The **Persistent Organic Pollutants Review Committee (POPRC)** established an Intersessional Working Group on alternatives and substitution, which took up the task of preparing a document intended to provide general guidance on the identification and evaluation of alternatives to the chemicals listed in the annexes to the Stockholm Convention or proposed for listing in the annexes.

The guidance focuses primarily on the chemicals listed in Annexes A or B (intentionally produced substances), but it also may be applied in identifying and evaluating techniques that could reduce releases of unintentionally produced persistent organic pollutants (Annex C).

REF: https://chm.pops.int/Implementation/Alternatives/Overview/tabid/5834/Default.aspx

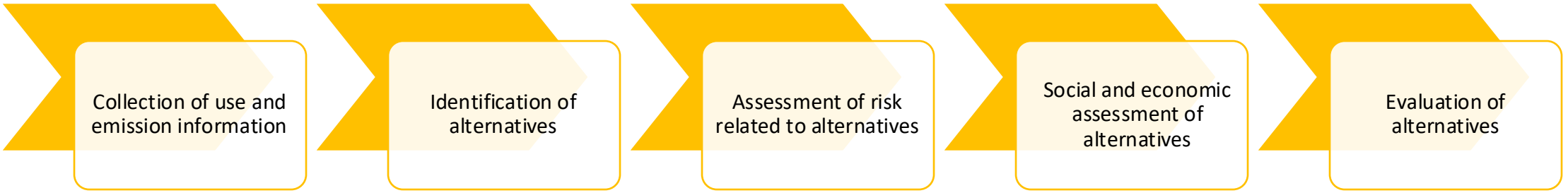
Guidance for the identification and evaluation of alternatives

The guidance provides a general description of the issues to be considered in identifying and evaluating alternatives to listed POPs and candidate chemicals.

It is intended for use by the **POPRC** and by **Parties** when considering the listing of new POPs. It may also be useful for **manufacturers** or **users** of listed POPs and candidate chemicals in identifying and deploying alternatives.

REF: UNEP/POPS/POPRC.5/10/Add.1

Steps in the identification and evaluation of alternatives



*(To be either implemented by **POPRC,** by **Parties**, by **manufacturers** or by **users**)*

Collection of use and emission information

Steps in the identification and evaluation of alternatives

- **Consultation to define a chemical's use**. Without a full picture of the life cycle of these chemicals, it would be impossible to discuss their alternatives. Consultations should be undertaken with, among others, manufacturers, importers, industrial users (downstream users) and waste collection and disposal firms.

- **Description of the existing POP and candidate chemicals' use and functionality**:
  - Production and import of chemicals and products that contain them.
  - Ways in which chemicals and products containing them are used in industrial processes or other practices, including the functions and features of the chemicals that render their use necessary (including technical, economic and social considerations).

- **Information on release into the environment** (at least qualitative). Quantitative information may be obtained from pollutant release and transfer registers or emission inventories, or risk assessment documents. Biomonitoring environmental monitoring data, human data and emission measurement data are also good sources of information.

Identification of alternatives

Steps in the identification and evaluation of alternatives

- **Identification of potential alternatives**
  - That can perform a function equivalent to that of the listed POP or candidate chemical to be replaced. Not only chemicals, but also innovative changes in the design of products, industrial processes, etc. (non-chemical).
  - Information may be collected through consultations with relevant industry constituencies, including manufacturers, industrial users and end users.
- **Assessment of availability, technical feasibility, accessibility and efficacy of alternatives**.
  - The commercial availability of an alternative is an important indicator of technical feasibility.
  - Information on the availability and technical feasibility of alternatives can be collected during stakeholder consultations.
- **Stimulation of innovation in the development of new and safer alternatives**.
  - National and international policies should send a clear message that alternatives are strongly needed for the protection of human health and the global environment; intellectual property rights should be properly protected to maintain the incentives needed for the development of alternatives; intellectual property rights should be properly protected to maintain the incentives needed for the development of alternatives; obstructions to innovation, such as delays in regulatory procedures, should be minimized; and international and cross-sectoral cooperation should be promoted.

Assessment of risk related to alternatives

Steps in the identification and evaluation of alternatives

A “safer alternative”:

- Is an alternative that either reduces the potential for harm to human health or the environment.
- Should not meet the Annex D screening criteria (persistence, bioaccumulation, potential for long-range environmental transport and adverse effects).

Ideally, human health and environmental risks should be quantitatively assessed. If such assessment may be impossible, efforts should be made to collect information to ensure that:

- The alternative chemical does not have hazardous properties that raise serious concern, such as mutagenicity, carcinogenicity or adverse effects on the reproductive, developmental, endocrine, immune or nervous systems;
- The risk resulting from the use of the alternative is considerably lower than that resulting from the use of persistent organic pollutants, given its known hazardous properties and exposure conditions.

Qualitative and quantitative structure-activity relationship (QSAR)

- Method of estimating the physical and chemical properties of a substance, including toxicity, from its molecular structure.
- Using QSAR techniques, chemical hazard information can be obtained relatively quickly and cheaply.
- QSAR models are especially apt for:
  - Pre-selection and selection of chemicals to be used in original innovation processes (operational product and process development);
  - Synthesis and development of chemicals;
  - Sustainable design and selection of sustainable uses of chemicals

Social and economic assessment of alternatives

Steps in the identification and evaluation of alternatives

Costs analysis

It should be performed to estimate quantitatively the cost of the adoption of alternative products or processes.

- Including both manufacturers and users' costs.

Assessments of cost should also take into account costs related to the application of the chemicals.

- Such as waste disposal costs, the cost of remediating contaminated sites, health costs and any other social costs.

Social and economic assessment

Social and economic analysis includes the following steps:

- Setting the scope of the analysis
- Assessing impacts
- Comparing impacts

There are various types of impacts to be considered:

- Economic impacts: include the cost difference (whether an increase or a decrease) between the chemical or specific use to be replaced and each alternative.
- Human health and environmental impacts.
- Social impacts: the potential adverse effects on some social groups should be considered, including in developing countries.
- Wider economic impacts: follow from the distribution of the economic effects and how the relevant markets function.

Impacts will ideally be described by quantitative data where suitable data sources exist and where such an analysis is proportionate.

Evaluation of alternatives

Steps in the identification and evaluation of alternatives

Parties providing information on alternatives to the POPRC for its preparation of risk management evaluations should present such **information in a concise manner**. The POPRC will take such information into account in considering the feasibility and availability of identified alternatives as part of the process of deciding whether to recommend the listing of a chemical in the Annexes to the Convention and whether to recommend any specific exemptions.

When collecting information for presentation to the POPRC, Parties may take into account the following points, in addition to the information on the technical feasibility, costs, efficacy, risk, availability and accessibility of the alternatives:

- Human health and environmental benefits achieved by substitution through alternatives
- Benefits deriving from the chemical, including consideration of whether it performs an essential function for human health and safety
- Requirement of a transition period for adjusting downstream production processes to the alternative
- Requirement of sound environmental management of waste arising from replacement of chemicals by alternatives
- Application of the precautionary principle where scientific evidence is incomplete

Conclusions

- It is essential to **identify the precise use and functionality** of listed POPs and candidate chemicals.
- The **availability of alternative** chemicals, products, or processes can be determined by conducting a survey on which specific alternatives are feasible for what use.
- Although it may be difficult to implement a risk assessment on alternatives, Parties should at least confirm that **POPs are not substituted by others** or by chemicals of concern of significant risk.
- Although it is difficult to estimate precisely costs and benefits of alternatives, Parties should make every effort to collect information on social and economic impacts to evaluate **cost-effectiveness** for a particular use.
- **Cooperative efforts** are helpful to facilitate further dissemination of better and safer alternatives worldwide.

REF: UNEP/POPS/POPRC.5/10/Add.1