THE ILLEGAL TRADE IN CHEMICALS

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Abbreviations

ASGM	Artisanal and Small-scale Gold Mining
CEC	Commission for Environmental Cooperation
Comtrade	United Nations International Trade Statistics Database
CPPP	Chemical plant protection product
DNA	Designated National Authority
EIA	Environmental Investigation Agency
EIU	The Economist Intelligence Unit
EPA	Environmental Protection Agency
ESDO	Environment and Social Development Organization
EU	European Union
Europol	European Union Agency for Law Enforcement Cooperation
FAO	Food and Agriculture Organization of the United Nations
FICCI	Federation of Indian Chambers of Commerce and Industry
FIFRA	Federal Insecticide, Fungicide and Rodenticide Act
HHP	Highly hazardous pesticide
HS	Harmonized System
INECE	International Network for Environmental Compliance and Enforcement
INTERPOL	International Criminal Police Organization
IPEN	International POPs (Persistent Organic Pollutant) Elimination Network
iPIC	informal Prior Informed Consent
MEA	Multilateral environmental agreement
NGO	Non-governmental organization
OECD	Organisation for Economic Co-operation and Development
ONIP	OECD Network on Illegal Trade of Pesticides
PAN	Pesticide Action Network
PANAP	Pesticide Action Network Asia and the Pacific
PIC	Prior Informed Consent
POP	Persistent Organic Pollutant
REACH	Registration, Evaluation, Authorization and Restriction of Chemicals
SAICM	Strategic Approach to International Chemicals Management
SESN	Seaport Environmental Security Network
SHPF	Severely Hazardous Pesticide Formulations
SINDIVEG	Sindicato Nacional da Indústria de Produtos para Defesa Vegetal
TRACIT	Transnational Alliance to Combat Illicit Trade
UNEP	United Nations Environment Programme
UNICRI	United Nations Interregional Crime and Justice Research Institute
UNODC	United Nations Office on Drugs and Crime
VCM	Vinyl Chloride Monomer
WHO	World Health Organization

Executive summary

Chemicals provide important benefits to society and play a vital role in the global economy, but they also carry risks for the environment and human health, with greater risks to vulnerable social groups. Chemicals can contaminate soil, air and water and can damage biodiversity, and human exposure to chemicals is implicated in a range of acute and chronic health effects. As industries have grown in recent decades, so too have environmental and health concerns, and now a range of multilateral environmental agreements together with initiatives, non-binding legal instruments, national legislation and policy frameworks regulate the trade in chemicals.

The international community has progressively addressed the challenges in regulating the international trade in chemicals as knowledge in the field has evolved. The multilateral environmental agreements currently in place regulate only a fraction of the tens of thousands of chemicals that are traded today, and target selected toxic substances dangerous to human health and the environment. In these regulatory frameworks, enforcement and implementation challenges abound – gaps in international regulations concerning trade of chemicals and waste, exemptions under multilateral agreements, and inconsistencies among domestic regulations. Many chemicals remain unregulated by international law.

The growth in chemical production has coincided with a growth in illegal international trade – a particular concern for developing countries and for those with economies in transition. This report focuses on the illegal trade of pesticides and mercury, both of which are subject to strong international regulations. Pesticides are commonly used in agriculture and by household consumers, and their effects on health, food safety, and the environment touch virtually everyone. Mercury occurs in many consumer products, and is used extensively in Artisanal and Small-scale Gold Mining (ASGM). The evidence shows that the ultimate users of illegal pesticides or mercury are not aware of the health risks of exposure to these chemicals. In addition, chemical exposure is also a gender issue due to the positioning of men and women in feminized and masculinized sectors.

The value of the global chemical output produced and shipped topped US $4.1 trillion in 2010. The total scale of the illegal trade in chemicals remains unknown, but some insights are available:

- Annual revenue losses of €1.3 billion in the legitimate pesticides industry in the European Union attributable to counterfeit pesticides
- Estimates that 30 per cent of the pesticides sold in developing countries are substandard
- Reports that the illegal pesticide trade in India represents about 25 per cent of the value of pesticides used in the country
- Estimates that half of all mercury used in ASGM is traded illegally
- An estimated value of illegally traded mercury in the range of US $100–215 million annually

Many toxic products are too easily accessible in the marketplace or on the Internet. The potential and real economic, social and environmental costs of the illegal trade in chemicals are far from trivial, and legitimate businesses, national economies, and human health and the environment are suffering the effects.

The dearth of reporting mechanisms along the supply chain means that information on illegal trade in chemicals remains scarce, and the development of such mechanisms in enforcement regimes could markedly improve the ability of authorities to target their efforts. Constructive steps in the right direction might include building the expertise and capacity to identify illegal shipments, understanding the obligations inherent in full compliance with multilateral agreements and regulating the trade in chemicals within the prior informed consent procedure of the Rotterdam Convention. Establishing national reporting mechanisms similar to the requirements for annual reporting under the Basel Convention on the generation of hazardous waste could help develop the baseline data that analysts need to assess the gravity of illegal trade within national jurisdictions.

National policies and programmes can promote mercury-free alternatives and reward miners with tax incentives and other commercial benefits for using reduced mercury or mercury-free processes. Similarly, national policy can encourage the development of toxic-free alternatives with special projects through agricultural or environmental ministries or agencies in collaboration with NGOs and civil society partners. This same type of partnership may also help raise awareness among vendors, local farmers, rural communities and private landowners about the health and environmental risks associated with pesticides.

Seized hazardous chemicals or obsolete pesticides not uncommonly appear back on the market. National legislation can provide measures to ensure that used pesticide containers do not return to the market in a new supply chain. This approach may also encourage the development of a norm that seized illicit pesticides be treated as waste to be disposed of in an environmentally sound manner.

In addition, strategies to reduce environmental and human health risks need to account for the hazardous chemicals in such consumer products as cosmetics, toys, paint and food, and should promote the production and distribution of safe products.

Countries can support stewardship programmes on organic and ecosystem-based approaches to agriculture with the participation of industry, NGOs and others. Agricultural extension services can assist in this work, and developing or strengthening extension capacities to assist micro-, small- and medium-scale farmers is a logical complementary strategy.

Enhancing the knowledge of ASGM operators regarding the risks of handling and using mercury may help the operators understand the risks, but for many people the absence of economically viable alternatives means that artisanal gold mining is likely to continue. The combination of education and information on the health and environmental risks and the further dissemination of alternatives to mercury use will gradually encourage operators to change their practices. Meanwhile the legalization and regulation of ASGM can support such efforts, and provide a framework for the delivery of training and education services.

Countries dealing with mercury use in ASGM may benefit from better control of the production and marketing of gold and the harmonization of gold-export regimes to the extent possible to reduce the drivers of illicit cross-border trade. Other governance strategies may include standardized regional mercury-specific trade frameworks and anti-corruption campaigns at the local and national levels.

One way to compensate for gaps and inconsistencies in regulations is for the relevant authorities to cooperate with each other to the extent possible. Policymakers at the global and regional levels can strengthen coordination among the agencies involved in preventing the illegal trade in chemicals, and can work to ensure that the human resources and the technical means necessary to combat illegal trade are available on the front lines. Additional cooperation strategies may include the development of intelligence systems for sharing information among agencies and the coordination of transnational enforcement operations.

Law enforcement officers are not adequately trained and equipped to detect and recognize illicit chemicals and counterfeit containers. Shipping documents may not report mercury concealed among other materials, or mercury may be delivered clandestinely to a small port by fishing boat. The monitoring and reporting of mercury movements from source to end use and disposal need to be further improved so that the organizations charged with enforcing trade regulations are better informed. Maintaining adequate staffing levels and training frontline law enforcement officers to identify and interdict illicit movements of hazardous chemicals will require adequate resources.

Introduction

Chemicals surround us in our daily lives – from food and clothing to transportation and technology, chemicals are the building blocks of the things we use and consume. According to the United Nations Environment Programme (UNEP) Global Chemical Outlook, the value of the 1970 global output of chemicals produced and shipped was US $171 billion; by 2010 this value had grown to US $4.1 trillion. With this increase in the production, trade and use of chemicals, it is evident that chemicals play a vital role in the global economy (UNEP 2012).

While chemicals provide important benefits to society and people, they also carry risks for human health and the environment. The growth in global chemical output and the complexity in the chemical supply chain make the sound use and management of chemicals throughout their life cycles more important than ever.

The 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals were adopted to overcome the great challenge of how to reduce poverty and protect the environment at the same time. Several goals and specific targets feature sound chemical and waste management:

- **Goal 3** – reducing illnesses from hazardous chemicals and air, water and soil pollution and contamination
- **Goal 6** – improving water quality by reducing pollution, eliminating dumping and minimizing releases of hazardous chemicals
- **Goal 11** – reducing the adverse impacts of air quality and waste management
- **Goal 12** – achieving the environmentally sound management of chemicals and all wastes throughout their life cycles
- **Goal 14** – preventing and significantly reducing marine pollution of all kinds

Several multilateral environmental agreements regulate parts of the international chemical trade, but the growth in chemical outputs corresponds with a growth in illegal trade. A 2018 report by the Strategic Approach for International Chemical Management (SAICM) – a multi-lateral and multi-sectoral policy framework to promote sound management of chemicals and waste around the world – notes that, "illegal international traffic in hazardous substances and dangerous products is a pressing problem for many countries, especially for developing countries and in countries with economies in transition."

Considering these concerns, SAICM addresses the illegal international traffic of chemicals at the highest decision-making level. The Dubai Declaration on International Chemicals Management makes high-level policy commitments on preventing illegal traffic of toxic, hazardous, banned, and severely restricted chemicals and chemical products and waste (UNEP 2006a). The Overarching Policy Strategy and the Global Action Plan provide ways to meet the declaration's commitments.

These efforts go hand-in-hand with those of other international organizations such as the Food and Agriculture Organization of the United Nations (FAO), the International Labour Organization, the United Nations Development Programme, UNEP, the United Nations Industrial Development Organization, the Organisation for Economic Co-operation and Development (OECD), the World Bank, the World Health Organization (WHO) and the European Commission, all equally concerned by the illegal trade in chemicals, and each supporting the policy commitments through their institutional activities. Despite these efforts, the need to build knowledge remains.

The objectives of this assessment are to provide an overview of the knowledge gaps and enforcement challenges in the illegal trade in toxic, hazardous and severely restricted chemicals, especially in countries and regions with non-existent or low levels of chemical regulation, and to formulate prospective strategies and policies to combat the illegal trade in chemicals. The main chemicals of interest for this report are pesticides and mercury, both of which are subject to strong international regulations. Pesticides are commonly used by household consumers and in agriculture, and their effects on food safety and the environment touch virtually all of us. Mercury occurs in many consumer products, but its use in Artisanal and Small-scale Gold Mining (ASGM) is the main focus of the illegal trade.

Although some of the chemicals covered by this assessment are extremely toxic and could potentially be used for terrorist purposes, this report does not discuss the subject of nonproliferation or chemical weapons nor does it discuss pharmaceuticals. While this report considers counterfeit chemicals as an important part of the illegal trade in chemicals, it does not fully discuss the domestic and international intellectual property rights laws that govern trade in such chemicals.

This report uses "illegal" and "illicit" interchangeably to refer to violations of national or international laws or agreements. The term "informal" refers to economic activities that occur in gray areas outside the reach of routine regulations and reporting. Informal activities may simply be undocumented, but they may also be illegal. Annex 1 provides definitions for other terms used in this report.

Economic impacts

Estimating the global figures associated with the illegal trade in chemicals is challenging, but some regional and national examples can shed light on the scale of economic losses.

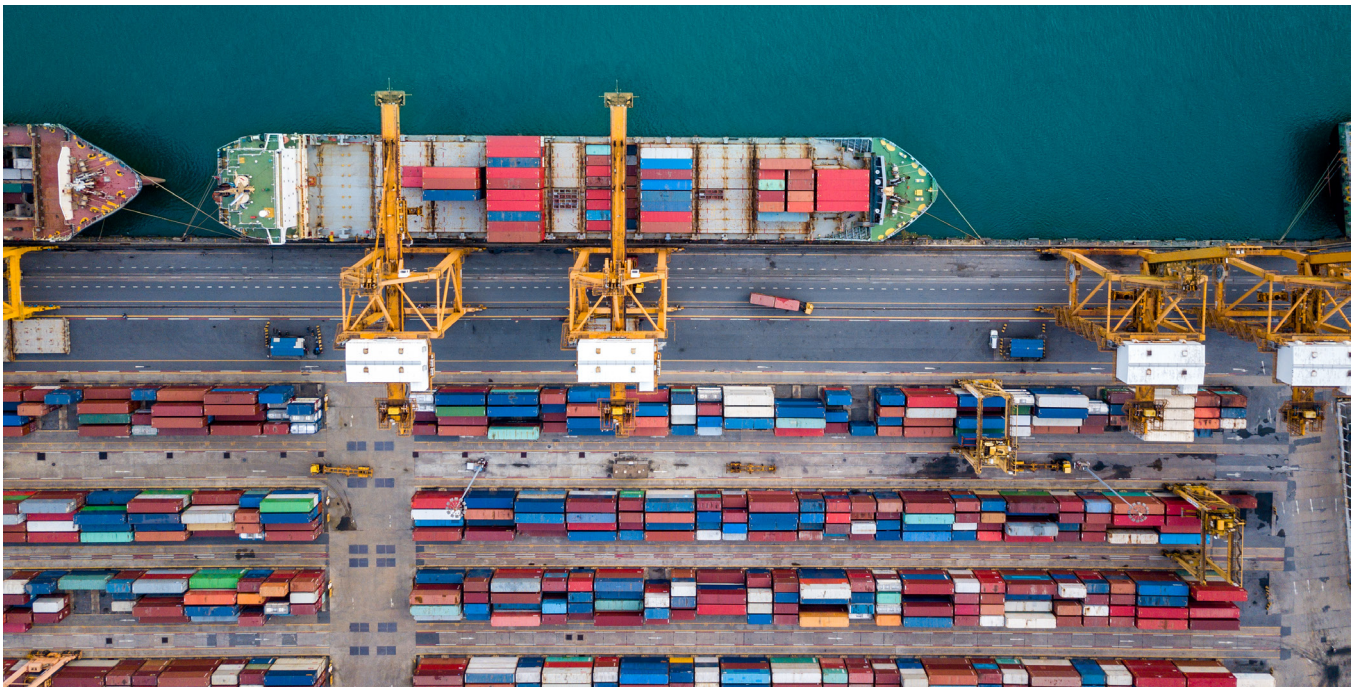
A recent European Union Intellectual Property Office study (2017) states that, *"Legitimate industry loses approximately €1.3 billion of revenue annually due to the presence of counterfeit pesticides in the EU marketplace, corresponding to 13.8 per cent of the sector's sales. […] If the knock-on effects on other industries and on government revenue are added, when both the direct and indirect effects are considered, counterfeiting in this sector causes approximately €2.8 billion of lost sales to the EU economy, which in turns leads to employment losses of about 11,700 jobs and a loss of €238 million in government revenues."*

Another study from India provides insight into the scale and economic risks associated with the illegal trade in pesticides. It reports a value of US $525 million for illegal pesticides – both imported and produced domestically – for India in 2013 (FICCI 2015). This dollar figure represents about 25 per cent of the value of pesticides used in the country that year, and about 30 per cent of the volume of the domestic pesticide industry. The agricultural sector represents about 20 per cent of India's gross domestic product, and the economic risks to the country and the industry are considerable.

The study anticipates potential growth in the illicit market of approximately 20 per cent per year in value terms, and a roughly 40 per cent share in the pesticide industry by value by financial year 2019 if the federal and State authorities in India fail to address the situation effectively. This eventuality could threaten the entire Indian agricultural sector. Potential bans of agricultural products due to the use of illicit pesticides could cripple the food industry, and the farmers' potential losses, and the health impacts, could be devastating. The use of illegal pesticides at the 25 per cent level by volume in India implies projected losses of about 10.6 million tonnes of food for a single year.

The illegal and informal mercury trade serves primarily the ASGM market. Data available through the Artisanal Gold Council and the United Nations International Trade Statistics Database (Comtrade) suggest that about half of all mercury used in ASGM is traded illegally or informally, and for many of the individual countries involved, the rate reaches nearly 100 per cent. Even the mercury imports that are properly documented often subsequently follow illegal pathways to the mining areas where the mercury is used. Much of the mercury that is documented when it is imported into Togo or South Africa, for example, is not documented when it is re-exported to ASGM areas in neighbouring countries.

Research carried out in sub-Saharan Africa by the World Bank (2016) estimates the cost of mercury to ASGM operators in that region at about US $150,000–200,000 per tonne – some two to three times higher than the value of bulk mercury sold by major traders. Based on the estimate that half of all mercury supplied to ASGM operations worldwide is illegally or informally traded, the on-site value of the illicit mercury trade is likely in the range of US $100–215 million annually, but since the ASGM use of mercury is merely an intermediate step in the production of gold, this US $100–215 million of mercury is directly responsible for the production of gold with a market value of some US $20-30 billion.



Human and environmental risks

Chemicals may threaten human health and the environment – acute and chronic health effects, water and soil contamination or damage to biodiversity are all possible outcomes. These outcomes are well studied although there remain some gaps in the understanding of long-term toxicity of combined exposure to mixtures of chemicals. The health and environmental impacts of widespread illegal chemical use and noncompliance with regulations, however, receive less attention. The grassroots reports submitted within the scope of this assessment suggest that users do not always associate illegal pesticides or mercury with health risks.

Vulnerable groups such as undocumented labourers working in illicit or formal activities are usually more exposed to chemicals because they have fewer protections. The International Labour Organization (2015) estimates the number of migrant workers in the agriculture sector at about 16.7 million; very little is known about their working and living conditions (Martin 2016), or about their exposure to illegal chemicals.

Farmworker Justice, an American non-governmental organization, identifies and advocates for undocumented farmworkers who suffer from pesticide poisoning (Farmworker Justice 2013). A recent study explores the protections for undocumented farmworkers with pesticide poisoning from legal and illegal uses of pesticides in California, and advocates for federal protection from deportation for these workers as part of an effort to improve reporting on the incidence of such poisonings (Lincoln 2018). Information about unintentional chemical poisoning exists, but does not convey the full picture. Reports suggest that the exposure of migrant workers to hazardous chemicals is common and that they are not reported (Lincoln 2018; PAN International 2017).

A well-known case of pesticide poisoning in India in late 2017 illustrates the shocking consequences that can result from the application of unauthorized herbicides. Reports first appeared in October 2017 of a poisoning in the eastern part of the Indian State of Maharashtra: at least 50 people died and about 800 were hospitalized after the application of herbicides, all of which were unauthorized in India, on cotton fields. Another eight people died subsequently.

This tragedy became known far beyond India, and in response to media reports the State government initiated an investigation that identified Monocrotophos – an extremely toxic organophosphate pesticide banned in many countries – as a source of the poisoning. Public interest litigation was filed before the Nagpur bench of the Bombay High Court seeking aid for the affected families. After several hearings, the court directed the Government to pay US $5,800 to each of the affected 63 families (BBC 2017).

Chemicals also enter countries illegally as part of a broad variety of consumer products. High concentrations of toxic heavy metals in toys are regularly reported in many countries (ESDO 2013; Ismali et al. 2017; Reuters 2018). Other examples of products containing illegal contaminants are skin-lightening creams and soaps. Although many countries ban or regulate the upper limit of mercury allowed in these products, most countries cannot effectively monitor compliance, and many consumers are able to purchase unsafe products such as skin-lightening creams and soaps in the marketplace or on the Internet (Zero Hg Working Group 2018).

According to the World Health Organization (2011), the main adverse effect of the inorganic mercury contained in skin lightening soaps and creams is kidney damage. Mercury in skin lightening products may also cause skin rashes, discoloration and scarring, as well as a reduction in the skin's resistance to bacterial and fungal infections. Other effects include anxiety, depression or psychosis and peripheral neuropathy. The Philippines Food and Drug Administration list of banned cosmetics featuring mercury above the allowable limit of 1 part per million has expanded from 50 to 71, after the illegal products were discovered over the period of January 2010 to November of 2013 (Food and Drug Administration Philippines 2017).

Gender and chemicals

The use of illegal chemicals has different adverse effects on population groups. It is based on the exposure levels, chemical composition, physical parameters and/or biological conditions. In the various cases gender mainstreaming will require specific considerations for action.

Both men and women are exposed to chemicals. Each uptake activity can show a specific configuration influenced by economic and social factors. The exposure can exacerbate the vulnerability of specific groups. According to Farmworker Justice, the majority of immigrant farmworkers in America are male from vulnerable social groups, with only about 20 per cent of women and about 12 per cent of adolescents working there.

The persistence of chemicals in human body however can differ for men and women and also influence the reproduction functions. The Human Milk monitoring survey conducted globally indicates places where banned chemicals are still being used (Gabizon and Ismawati 2017). In Nigeria, for instance, despite the interdictions of POPs including DDT and lindane they continue to be used illegally. The monitoring programme has shown particularly high levels of DDT in human milk. Women and children remain highly exposed to these chemicals.

Methodology

The methodology underpinning the analysis of the illegal trade in chemicals in this report includes primary and secondary sources. To establish the bases for illegal transboundary activities involving chemicals, the review focuses on international legal instruments and national legislation in selected cases analysed specifically for this purpose.

The analysis draws on the Comtrade Database, Knoema, the FAO database and national statistics. The methodology used here cross-checks data from various sources, and with regard to pesticides, compiles the results of six assessment steps: gap analysis, statistical analysis, industry reports and studies, market analysis, interviews with stakeholders and media reports. Figure 1 depicts the six steps, and Table 1 covers the purposes and challenges. Expert knowledge and interviews with people either researching specific cases or working on the subject of illegal trades inform the analysis. This approach allows the development of a comprehensive market analysis and an understanding of the market structure.

The methodology underpinning the mercury analysis includes a review of recent papers published in technical journals, consultant reports and information in the press; contacts and interviews with government officials, ASGM experts, mercury traders and key delegates to the Minamata Convention; case study research and a review by relevant stakeholders; and an analysis of relevant and available trade data.

This report benefits from engagement with stakeholder groups at the grassroots level. Local NGOs directly concerned with the use of chemicals in their countries provided reports from the front lines. These reports cover how citizens encountered chemicals in their daily lives, and document the absence of information on labels, the packaging techniques used by illegal traders and the availability of illegal products. The reporting involved fieldwork and interviews with local suppliers, vendors and users of chemicals, and was supported by desktop research and reviews of national legislation focusing on international trade, monitoring and enforcement.

The report builds upon the 2018 Basel Secretariat survey on preventing and combating illegal traffic and trade. The survey seeks a better understanding of areas requiring the improvement of legal clarity for preventing and combating illegal traffic of waste and chemicals.

Additional guidance in the development of this report came from an advisory group comprising international stakeholders and experts from UNEP, the United Nations Interregional Crime and Justice Research Institute (UNICRI), the United Nations Office on Drugs and Crime (UNODC) Container Control Programme, the International Criminal Police Organization (INTERPOL), the Health and Environment Justice Support (HEJSupport) and the International Pollutants Elimination Network (IPEN).

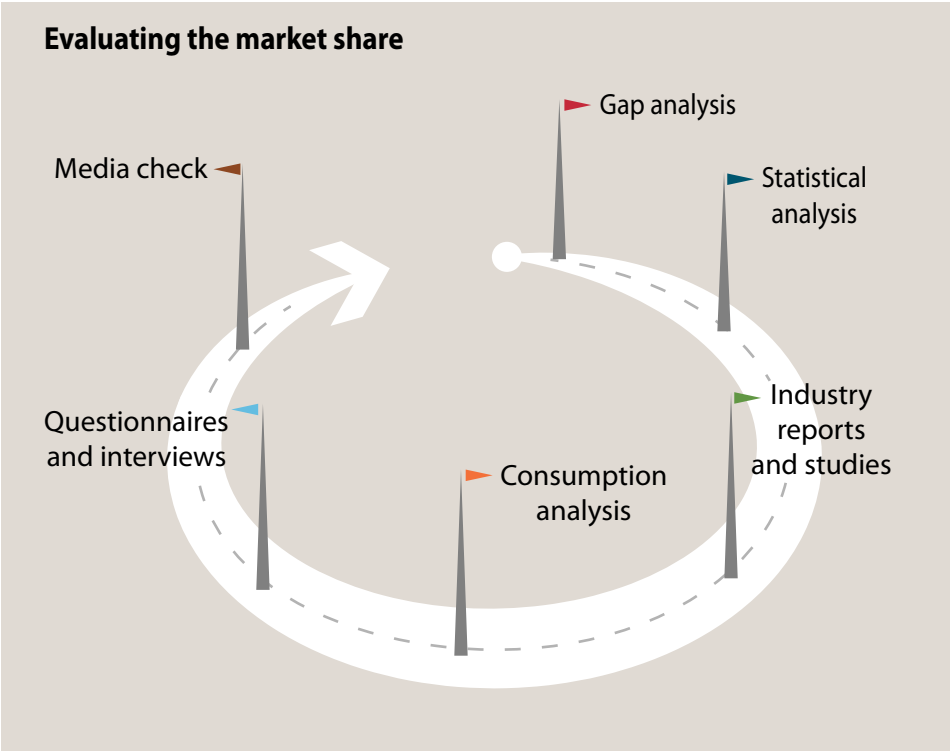


Figure 1: Evaluating the market share

Table 1: Assessment tools: Purpose and limitations analyzing trade in illegal pesticides

Assessment	Main purpose	Challenges
Gap analysis	Possible entry points along the life cycles of pesticides	Does not provide direct figures Requires qualified professionals
Analysis of official statistics	Pesticide balances (production and import vs. use and export) Pesticide sales vs. pesticide use data	Lack of data Customs statistics: • Often cover the entire HS group 3808 • Do not reflect cross-border and online individual purchases Active ingredients not reflected Differences in financial and calendar years
Industry reports and studies	Volume, production, sales and share of illicit products from the industry perspective	Financial reporting of the companies does not always reflect real production volume (tax optimization)
Market analysis	Demand and types of required pesticides based on agronomy	Requires qualified market researchers and agronomists
Questionnaires and interviews	Existing trade routes from the field perspective	Requires qualified professionals asking consistent questions in order to collect comparable information
Media check	Case studies, secondary source	May be incomplete or misleading

Policy and governance

The World Trade Organization (WTO) governs global trade, and while WTO has no specific agreements dealing with the environment, the trade in chemicals is subject to a range of policy and regulatory tools – multilateral environmental agreements (MEAs), regional conventions, initiatives, non-binding legal instruments and policy frameworks – that provide guidelines, standards and norms on matters of trade. Related matters of interest include the manner of enforcement under the various authorities and the gaps in coverage and the associated challenges.

Regulations and policies

Several multilateral environmental agreements provide frameworks for the regulation of the trade in chemicals. The most relevant MEAs regulate trade in response to the potential harm to human health or the environment, but do not cover international intellectual property laws that may also have implications for the legality of trade in chemicals.

The Montreal Protocol

Background: The Montreal Protocol on Substances that Deplete the Ozone Layer was adopted under the Vienna Convention for the Protection of the Ozone Layer. It requires Parties to either phase out or phase down the consumption and production of substances, listed in its annexes, according to specific schedules. The controlled chemicals include chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs), halons, the pesticide methyl bromide and others. The Kigali Amendment to the Montreal Protocol entered into force on 1 January 2019 and requires Parties to phase down the use of global warming hydrofluorocarbons (HFCs). These are widely used as replacements for CFCs and HCFCs in refrigeration, air-conditioning, foam blowing and fire protection. Their phase-down is an important contribution to limiting climate change.

Trade-related obligations: In addition to adhering to the phase-out and phase-down schedules, Parties must monitor, control and report on the production and consumption of ozone-depleting substances and hydrofluorocarbons, and establish and implement a system for licensing the import and export of controlled chemicals. The Protocol bans the trade with non-Parties starting from certain dates. In addition, some Parties use a voluntary informal Prior Informed Consent (iPIC) system and have established a mechanism to report seizures to the Ozone Secretariat and the Meetings of the Parties.

The Protocol's Multilateral Fund provides funding to developing countries primarily for technology transition, for capacity-building for customs and enforcement officers and environmental inspectors, and for equipping border checkpoints with refrigerant identifiers. UNEP OzonAction produces training materials and tools for customs and enforcement officers, holds regional enforcement meetings and border dialogues to enhance regional cooperation, and provides recognition and incentives to customs and enforcement officers. At the request of the Parties to the Montreal Protocol, the Ozone Secretariat approached the World Customs Organization to revise the Harmonized Commodity Description and Coding System (HS codes) to allow better monitoring of HFCs.

The Ozone Secretariat identifies trade data on exports reported by exporting countries and imports reported by importing countries, and confidentially shares any differences in trade data with the Parties. OzonAction facilitates bilateral discussions between trading partner countries to assist in analyzing and addressing the causes for these differences.

Exemptions: Meetings of the Parties can grant exemptions – including those for essential use and critical use – that extend to specific parties and quantities after the total phase-out of relevant controlled substances. The use of the pesticide methyl bromide for quarantine and pre-shipment applications is exempted but closely monitored through mandatory reporting.

The Montreal Protocol monitors compliance through mandatory reporting on the production and consumption of controlled substances. Consumption is defined as import plus production (or destruction) minus export. Thus, the monitoring of imports and exports is crucial for reliable data reporting and compliance. The provisions of the Protocol are implemented and enforced by national legislation and policies. Non-compliance is addressed through the non-compliance procedure and the Implementation Committee.

Status: The Montreal Protocol on Substances that Deplete the Ozone Layer was adopted under the Vienna Convention for the Protection of the Ozone Layer. It is a universally ratified treaty with several amendments and adjustments.

The Minamata Convention

Background: The Minamata Convention regulates mercury, including any mixtures of mercury with other substances. The Convention bans the opening of new mercury mines and mandates the phasing out of existing mines within 15 years of the Convention's entry into force (16 August 2017). Mercury from primary mining can be used only in manufacturing mercury-added products or in manufacturing processes that comply with the Convention. Otherwise, it must be disposed of in an environmentally sound manner.

Article 3(4), which prohibits the opening of new mercury mines, also prohibits the use of primary mined mercury in ASGM. Article 3(5) prohibits mercury that was previously used in the chlor-alkali industry from use in ASGM. These provisions, coupled with the consent requirements for international trade, make the Minamata Convention trade provisions potentially very powerful. The Convention is relatively new, however, and there are questions relating to the Parties' capacity or political will to address the issue of illegal trade. Large regional efforts, especially in Asia, Africa, and Latin America, are needed to increase national capacities; to develop practical tools for monitoring and regulating trade; and to target illegal trade routes for improved enforcement. This is the Convention's

first significant test from a compliance perspective, and will determine the effectiveness of the Convention over the next five years.

Trade-related obligations: Parties are prohibited from exporting mercury except to another Party that consents to import, provided its use by the importing party is allowed under the Convention or it is for environmentally sound interim storage. Excess mercury from the decommissioning of chlor-alkali facilities can only be disposed of, and disposal must use operations that do not lead to recovery, recycling, reclamation, direct re-use or alternative uses. Parties to the Basel Convention are prohibited from transporting mercury waste across international boundaries except for the purpose of environmentally sound disposal.

A Party or a non-Party can provide a general notification to the Secretariat indicating its consent to accept mercury imports, and the Secretariat maintains a public register of all such notifications.

Parties are prohibited from importing mercury from non-Parties unless the mercury is from sources identified under the Convention. Parties are prohibited from exporting mercury to non-Parties unless the non-Party has consented, has measures in place to ensure the protection of human health and the environment and to ensure its compliance with requirements of the Convention. The non-Party also agrees that the mercury will be used only for an allowed use or for interim storage.

Because the Convention does not explicitly define illegal trade, domestic laws, including those implementing the Convention, define the legality of the production and trade in mercury.

Status: The Convention entered into force on 16 August 2017 and has been ratified by 118 countries as of February 2020.

The Stockholm Convention

Background: The Stockholm Convention on Persistent Organic Pollutants (POPs) currently prohibits or restricts the production, use, and trade in 28 listed POPs,[1] which are chemicals that remain intact in the environment for long periods, become widely distributed geographically, accumulate in the fatty tissue of humans and wildlife, and have harmful impacts on human health or the environment.

Trade-related obligations: Parties must take measures to eliminate chemicals listed in Annex A of the Convention and to restrict chemicals listed under Annex B. A Party is permitted to import chemicals listed in either annex for a use or purpose that is permitted for that Party according to the annexes. A Party cannot export a chemical listed in either annex unless it is to a Party that is permitted to use that chemical. The import and export of POPs waste is also allowed for the purpose of environmentally sound disposal, in accordance with the Basel Convention.

Parties can trade listed chemicals with a State that is not a Party to the Convention only if the non-Party provides an annual certification specifying the intended use of the chemical and includes a statement in which it commits to protecting human health and the environment and ensuring proper waste management.

Because the Convention does not explicitly define illegal trade, domestic laws, including those implementing the Convention, define the legality of the production and trade in covered chemicals.

Exemptions: A party can register for a "specific exemption" to the restrictions on chemicals listed in Annexes A and B for a five-year period. A party can also register for an "acceptable purpose" exception for chemicals listed in Annex B.

Status: The Convention entered into force on 17 May 2004. There are 184 Parties to the Convention as of February 2020.

The Rotterdam Convention

Background: The Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade requires prior informed consent for trade in chemicals intended for use as pesticides or industrial chemicals that are listed in Annex III of the Convention.

Trade-related obligations: Each Party is required to inform the Secretariat whether or not it will allow the import of any chemical listed in Annex III, and if so, whether such import is subject to any conditions. The Secretariat compiles this information and circulates it to all Parties through the Prior Informed Consent (PIC) Circular. A Party's decision to allow or restrict imports must apply to imports from any source, including from non-Parties. All Parties are required to ensure that exports of chemicals subject to the prior informed consent procedure are consistent with the decisions of the importing Party.

When an importing Party has failed to transmit an import response, another Party can export a listed chemical only if the chemical is registered under the domestic legislation of the importing Party; or there is evidence that the chemical has previously been used in, or imported into, the importing Party and no regulatory action to prohibit its use has been taken;

or the Designated National Authority (DNA) of the importing Party has provided consent after explicit consent has been sought by the exporting Party.

If a chemical has been banned or restricted by an exporting party, the exporting country is required to notify the country of import through its DNA by submitting an export notification, and the DNA of the importing party is required to acknowledge the export notification. The Parties banning or restricting certain chemicals are obliged to submit notifications of their final regulatory actions to the Secretariat for verification that the notifications meet the information requirements of Annex I of the Convention. When Parties from at least two different PIC regions that ban or severely restrict a certain chemical submit Notifications that meet Annex I information requirements, the Secretariat forwards those Notifications to the Chemical Review Committee. This committee reviews the data supporting these decisions in accordance with the Annex II criteria, adopts a draft Decision Guidance Document and further recommends listing to the Conference of the Parties, which decides whether or not the chemical will become a subject to the Prior Informed Consent procedure.

Parties are also required to ensure that chemicals listed in Annex III and chemicals banned or severely restricted at the national level are, when exported, subject to labelling requirements and accompanied by a safety data sheet.

Because the Convention does not explicitly define illegal trade, domestic laws, including those implementing the Convention, define the legality of the production and trade in listed chemicals.

Status: The Convention entered into force on 24 February 2004. There are 161 Parties to the Convention as of February 2020. There are a total of 52 chemicals listed in Annex III of the Convention, 35 pesticides (including 3 severely hazardous pesticide formulations), 16 industrial chemicals, and 1 chemical in both the pesticide and the industrial chemical categories.[3]

The Basel Convention

Background: The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal restricts international trade in hazardous and other wastes. The Convention covers hazardous wastes, which are defined by their source (such as wastes from wood-preserving chemicals) and their constituents (such as mercury, lead and asbestos), as well as by their hazardous characteristics (such as explosive, flammable or toxic). The Convention lists wastes that are presumed to be hazardous and those that are presumed not to be. The Convention also applies to "other wastes", which include household wastes and the remains of incinerated household waste. Wastes are defined as substances or objects that are disposed of, are intended to be disposed of, or are required to be disposed of by provisions of national law.

In addition, the Convention covers wastes considered hazardous under the national legislation of a Party. Such national definitions must be communicated to the Secretariat of the Basel Convention and are made publicly available. Thus, the obligations with respect to hazardous waste are defined by both international and domestic definitions of waste.

Trade-related obligations: The Ban Amendment under the Basel Convention prohibits the export of hazardous wastes from member states of the European Union and the Organisation for Economic Co-operation and Development and from Liechtenstein to all other countries. The Parties to the Basel Convention adopted the amendment in 1995, and it will be ratified on 5 December 2019. The transboundary movement of hazardous and other wastes is permitted only if the exporting State does not have the capacity to dispose of the wastes in question in an environmentally sound manner, the wastes in question are required as raw material in the country of import, or the trade otherwise complies with criteria determined by the Parties.

The exporting Party must provide notification to the importing Party of the proposed shipment of waste, and the importing Party must then provide its consent. The Convention requires Parties to notify and to obtain consent when any transit of hazardous wastes or other wastes which is planned or takes place through an area under the national jurisdiction of another State that is a Party to the Convention. A movement document must accompany the shipment, and after the waste has been disposed of, the importing Party must confirm that it was done in an environmentally sound manner.

Parties have the right to partially or completely prohibit the import of hazardous wastes or other wastes into their jurisdiction for disposal, and other Parties must respect this restriction or prohibition. Also, a Party may not export to a State if it has reason to believe that the wastes in question will not be managed in an environmentally sound manner, and a Party may limit or ban the export of hazardous wastes or other wastes to other Parties.

The Basel Convention defines "illegal traffic" as the transboundary movement of hazardous or other wastes that takes place without notification or consent of all States concerned; when consent is obtained through falsification, misrepresentation, or fraud; when there is a material discrepancy between documents and wastes; or when the movement results in the deliberate disposal of the wastes in contravention of the convention.

The Convention requires Parties to consider illegal traffic as criminal under national legislation. In addition, States that have exported illegal waste as a result of the exporter's conduct must take back the waste, or if impracticable, ensure that it is otherwise disposed of in accordance with the Convention.

Exemptions: Trade with non-Parties is not permitted unless there is a special agreement between them that ensures the environmentally sound management of the waste.

Status: The Convention entered into force on 5 May 1992. There are 187 Parties to the Convention as of February 2020.

The Parties have recognized the need for synergies between the Basel, Rotterdam and Stockholm Conventions in preventing and combating illegal traffic and trade in hazardous chemicals and wastes, and in 2017 formalized this recognition in a new decision.[4] The Parties agreed that as the first step in implementing this decision the relevant organizations and global and regional enforcement networks should provide information on their activities aimed at preventing and combating illegal traffic and trade in hazardous chemicals and wastes as well as lessons learned from those activities. The Conferences of the Parties also invited Parties to share information on their national coordination mechanisms and cases of illegal traffic and trade.

Environmental Network for Optimizing Regulatory Compliance on Illegal Traffic

The Environmental Network for Optimizing Regulatory Compliance on Illegal Traffic was established by the Conference of the Parties to the Basel Convention at the eleventh Conference of Parties in 2013. Its membership includes parties to the Convention, entities with a specific mandate that could assist parties in preventing and combating illegal traffic of hazardous waste and other waste, and entities with a specific role or relevance to the objective of the network. It seeks to promote Parties' compliance with the provisions of the Basel Convention pertaining to preventing and combating illegal traffic in hazardous wastes and other wastes through the better implementation and enforcement of national law.

Regional Conventions

The Convention to Ban the Importation into Forum Island Countries of Hazardous and Radioactive Wastes and to Control the Transboundary Movement and Management of Hazardous Wastes within the South Pacific Region (Waigani Convention) and the Bamako Convention on the Ban on the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa (Bamako Convention) are regional agreements regulating trade in hazardous wastes.

The Bamako Convention prohibits the import of all hazardous and radioactive wastes into the African continent for any reason; minimizes and controls transboundary movements of hazardous wastes within the African continent; and prohibits all ocean and inland water dumping or incineration of hazardous wastes. The Convention defines a violation of these requirements as illegal trade. Currently, 28 African countries are Parties to the Convention.

Agenda 21

At the United Nations Conference on Environment and Development held in Rio de Janeiro, Brazil, in 1992, Parties endorsed Agenda 21, a non-binding action plan for sustainable development. Chapter 19 of the plan outlines six programme

areas for the environmentally sound management of toxic chemicals, while chapter 20 focuses on four objectives for the environmentally sound management of hazardous wastes. Both chapters include specific objectives related to illegal international trade.

In 2002, the Johannesburg Plan of Implementation renewed the commitments to chemical management in Agenda 21 and set a target that by 2020 chemicals should be used and produced in ways that lead to the minimization of significant adverse effects on human health and the environment. To achieve this 2020 target, the Strategic Approach to International Chemicals Management was set up to provide a non-binding policy framework for chemicals management.

Strategic Approach to International Chemicals Management (SAICM)

SAICM is a policy framework developed by the International Conference on Chemicals Management, comprising the Dubai Declaration on International Chemicals Management, an Overarching Policy Strategy and a Global Plan of Action.

The Overarching Policy Strategy contains five Strategic Objectives, one of which seeks to prevent illegal international traffic in hazardous, banned and severely restricted chemicals, for example by strengthening domestic and regional implementation of relevant multilateral agreements and the capacity of countries to prevent and control illegal international traffic. SAICM provides direction and identifies approaches to combat illegal international traffic, and recommends improved governance, capacity-building, and technical cooperation as well as building on existing enforcement initiatives.

The SAICM Global Plan of Action identifies specific activities to implement the Overarching Policy Strategy. SAICM has a sunset date of 2020. As of September 2019, discussions are ongoing among SAICM stakeholders on the future overarching policy approach to the sound management of chemicals and waste beyond 2020, building on the experiences of SAICM to date.

The Sustainable Development Goals

In 2015, the General Assembly on the 2030 Agenda for Sustainable Development adopted a resolution including 17 global Sustainable Development Goals. Several goals and specific targets feature sound chemical and waste management. Implementation of several of the Sustainable Development Goals (i.e. SDGs 2.4, 3.9, 6.3, 12.4, 12.5), which address sound management of chemicals and waste, can significantly contribute to combatting the illegal trade in chemicals. Implementation of the Sustainable Development Goals with close links to sound chemical and waste management requires a systematic approach and cooperation among actors from chemical producers to consumers.

Organisation for Economic Co-operation and Development Initiatives

OECD activities against the illegal trade in pesticides in 2010 resulted in the formation of the OECD Network on Illegal Trade of Pesticides (ONIP) – a working group of experts, national regulators, inspectors and customs officials seeking to strengthen and harmonize national regulatory frameworks to counter the illegal international trade in agricultural pesticides. ONIP actively engages in bringing countries together to exchange information and collectively counter illegal trade in pesticides, and in 2012 established the Rapid Alert System, which is used to disseminate information among OECD member countries about suspect shipments.

Recently OECD released best practice guidance (OECD 2018) for inspectors and regulatory authorities on identifying and tackling illegal pesticides from manufacture through formulation, trade and use to destruction. ONIP developed OECD recommendations – adopted in February 2019 – on countering the illegal trade of pesticides (OECD 2019). This legal instrument promotes greater cooperation between countries and between custom authorities and regulatory and compliance and enforcement agencies in their efforts to identify and respond to illegal trade in pesticides. OECD has also published Guidelines on Pesticide Compliance and Enforcement (2012), which include recommendations to strengthen control of pesticides at national borders.

Through the OECD Task Force on Countering Illicit Trade, countries are working together against illegal trade in general, including chemicals. Additionally, OECD advocates due diligence in supply chains by helping to guide private sector actors in reducing the environmental and other impacts of the supply chain, for example encouraging the private sector to prioritize gold that is not produced with mercury.

International Code of Conduct on Pesticide Management

The International Code of Conduct on Pesticide Management, established by the Food and Agriculture Organization of the United Nations and the World Health Organization, provides best practices and technical guidelines for managing pesticides throughout their life cycles. The code underlines the need for governments to detect and control illegal trade in pesticides through national inter-agency and intergovernmental cooperation and information sharing, and emphasizes the importance of enforcement to ensure compliance with pesticide legislation, including trade restrictions. The code states that with respect to highly hazardous pesticides, trade measures may be considered if "risk mitigation measures or good marketing practices are insufficient to ensure that the product can be handled without unacceptable risk to humans and the environment." The code also reinforces the obligation

that countries dispose of hazardous pesticide waste in an environmentally sound manner and in compliance with the Basel Convention. FAO has also published "Guidelines Compliance and Enforcement of a Pesticide Regulatory Programme" (2006).

The Regional Enforcement Network for Chemicals and Waste

The Regional Enforcement Network for Chemicals and Waste was a project implemented by UNEP to combat environmental crime through strengthening the capacity of law enforcement officials and other relevant authorities in 25 participating countries in Asia Pacific to control illegal trade in chemicals and waste.

The Green Customs Initiative

The Green Customs Initiative involves multiple international organizations including the secretariats of the relevant MEAs, INTERPOL, the World Customs Organization, UNEP, the United Nations Office on Drugs and Crime, and the Organization for the Prohibition of Chemical Weapons. The Initiative develops training courses and knowledge tools for customs and border officials to increase their capacity to monitor and facilitate the legal trade and to detect and prevent illegal trade in environmentally sensitive commodities.

The International Network for Environmental Compliance and Enforcement and Seaport Environmental Security Network

The International Network for Environmental Compliance and Enforcement (INECE) and Seaport Environmental Security Network (SESN) is a network of government, civil society and academic organizations working to monitor transboundary movement of hazardous waste and to improve environmental compliance and enforcement. INECE and SESN facilitated an inspection of international hazardous waste in 2010 and found that much of it was illegal under the Basel Convention (Heiss et al. 2011).

Registration, Evaluation, Authorization and Restriction of Chemicals

The relatively comprehensive European Union legislation governing chemicals includes Registration, Evaluation, Authorization and Restriction of Chemicals (REACH), a collection of 40 regulations that apply to all chemical substances. REACH requires that chemicals imported or placed on the EU market must be registered, and requires authorization for hazardous chemicals under Title VII. These are some of the strongest controls governing which chemicals can be placed on the market, and provide important legal infrastructure for regulating trade in chemicals by restricting the market for dangerous chemicals and improving information and transparency about chemical use and impacts.

Another EU regulation implements the Rotterdam Convention, providing detailed rules on the content and procedures for notification and consent. The regulation requires consent from not only Rotterdam parties, but from all importers. In addition, an export notification for listed chemicals is required irrespective of intended use.

The Waste Shipment Regulation implements the provisions of the Basel Convention and expands its obligations by banning the export of hazardous waste for both recovery and disposal to any countries not OECD members unless they have adequate disposal facilities, and bans the export of waste listed as "other waste" under the Convention. The regulation also implements the OECD Decision-Recommendation of the Council on Exports of Hazardous Wastes, and requires all operators involved in the shipment of waste and its disposal or recovery to ensure the protection of the environment and human health. The European Commission also periodically sends out a questionnaire to all non-members of OECD asking whether they allow the import of non-hazardous waste for recovery, and if so, under what conditions. This process allows importing countries to require prior written notification and consent, even though the waste is considered non-hazardous. The regulation includes bans on the export of hazardous wastes that are prohibited in the EU.

The manner of enforcement

The actual implications of illegal trade are determined by the manner in which these obligations are enforced and the resulting consequences of that enforcement. Neither the Montreal Protocol, nor the Minamata, Stockholm and Rotterdam Conventions explicitly define "illegal trade" or otherwise stipulate specific consequences if the export or import takes place contrary to the convention and protocol rules. In contrast, Parties to the hazardous waste conventions (i.e. Basel, Bamako, and Waigani Conventions) are required to treat illegal traffic as criminal acts under domestic law, and to impose criminal penalties on all persons who have planned, committed, or assisted in such illegal traffic.

In addition to implementing international obligations, States can also impose domestic requirements that will determine whether trade is legal or not. Under domestic legislation on chemicals, a number of countries prohibit the import of unregistered pesticides or chemicals, allow import only when notification requirements have been met, and/or require importers to be licensed. Domestic laws may also impose labelling requirements and may protect the intellectual property of the producers, banning fake and counterfeit chemicals.

Countries impose fewer restrictions on the export of chemicals than on their import, and some allow the export of chemicals not permitted domestically, but other countries prohibit these exports or require that importing countries be notified about the export of chemicals which are domestically listed as harmful.

Hence, the domestic legal framework specifies the consequences of illegal trade in chemical products and wastes – whether a State is enforcing its international obligation to criminalize illegal traffic in hazardous waste or addressing illegal trade in chemicals purely as a domestic legal issue. The penalties for illegal trade can be administrative, civil or criminal.

Gaps and challenges

Despite the existing international framework, various gaps and challenges remain in regulating international trade in chemicals to ensure their sound management and to reduce air, water and soil pollution. These challenges include enforcement and implementation, inconsistencies among domestic regulations, an abundance of complex exemptions allowed under multilateral agreements, the gaps in the Conventions' coverage to prevent the trade in many harmful chemicals, open borders between some countries, and low awareness and capacity of custom authorities to identify illegal chemical trade.

Differences in national legislation and gaps in coverage

The legality of trade in chemicals is ultimately determined and enforced by national legislation, which can differ significantly from jurisdiction to jurisdiction. States implement and enforce their international obligations differently and may also impose additional domestic controls on trade in chemicals; these inconsistencies can make the effective regulation of trade in chemicals more difficult.

The differences in domestic rules result from a variety of factors. The Basel Convention allows Parties to define certain waste as hazardous beyond those listed by the Convention, so the exact scope of the Convention differs from one country to another. Consequently some wastes are legally defined as hazardous in one jurisdiction but not in another – used tyres in Australia, for instance, but not in Ghana.

In addition, Parties can differ on whether something is considered waste – one Party's waste may be another Party's product, for instance in the case of e-waste. To address this issue different initiatives – such as the technical guidelines on e-waste – have been recently adopted on an interim basis.[5] Regional conventions also create divergent definitions of waste. Under the Bamako Convention, for example, substances banned in the country of manufacture are considered hazardous waste. Similarly, substances defined to be hazardous wastes by domestic legislation of a Party of export, import or transit are considered hazardous wastes, even when such substances are not covered under the Convention. This significantly expands the breadth of covered substances compared to the Basel Convention but complicates enforcement.

Because maximum residue levels of pesticides are not uniform (despite attempts to adopt global standards through the Codex Alimentarius), food products banned in one country may still be permitted entry in countries that allow higher levels of hazardous substances or do not regulate particular substances in products. With no provisions on illegal trade stipulated in the Stockholm and Rotterdam Conventions, the rules and practices of States differ. The situation with the Basel Convention may be slightly different, but a number of discrepancies remain, including at the nexus of the Basel and Stockholm Conventions, for example in the case of waste with low POPs content (see Chapter Three).

These differences in national legislation incentivize trade in harmful chemicals. Highly hazardous pesticides – such as paraquat, for example – that are not permitted for use in industrialized countries are manufactured and exported to developing countries that still permit their use.

Gaps in coverage of the conventions

The present coverage of the conventions means that trade in many harmful chemicals is unregulated by international law. Significantly, only a fraction of the tens of thousands of chemicals that are traded are subject to international environmental regulation (UNEP 2012; Honkonen and Khan 2017). Thus, many chemicals of concern fall outside the scope of key existing legally binding MEAs. On the other hand, the SAICM policy framework has a much broader scope and covers all chemicals and wastes throughout their entire life cycles. Therefore, SAICM as a multi-stakeholder and multi-sectoral framework could better address the gaps in illegal trade of chemicals and waste.

Many highly hazardous pesticides, for example, do not meet the requirements for listing as POPs under the Stockholm Convention and therefore do not fall within its scope and remain on the market. Additionally, some instruments address chemicals in specific phases of their life cycles, such as when they become waste (the Basel Convention), or they address the entire life cycle of a single substance, such as mercury (the Minamata Convention).

The gaps in regulated chemicals are also due in part to the failure of Parties to agree to include all chemicals that could be covered by international conventions, especially for chemicals with important industrial uses. Chloroparaffins, for example, which are used as flame retardants and plasticizers, among other things, would qualify for listing under the Stockholm Convention, but thus far Parties have failed to agree to add these substances to the list. Short-chain chloroparaffins have been recently added to the Stockholm Convention, but the long- and medium-chain chloroparaffins are still marketed.

Gaps in the coverage also result from the specific exemptions, acceptable purposes and other notifications that may be transmitted by Parties in accordance with Article 4 or the relevant Parts of Annexes A and B to the Stockholm Convention and result in the delay of actual ban or restriction.[6] The Stockholm Convention, for example, permits hazardous

materials such as foam and plastics that contain banned PentaBDE and OctaBDE to be recycled until 2030. These chemicals are now appearing in new products such as carpet padding, mattresses and furniture made from contaminated recycled materials (Straková, DiGangi and Jensen 2018).

A convention's decision-making process can also limit the breadth of its protections. Parties have been unable to add the hazardous pesticide paraquat to the Rotterdam Convention, for example, despite a clear indication by the Convention's scientific committee that it falls under the scope of the Convention, because some Parties oppose the listing and consensus is required to list new chemicals. In addition, the obligations for transboundary shipments are unspecified at times. The prior informed consent procedure with strict requirements for transboundary movement of hazardous waste is better defined in comparison with the same procedures for various chemicals.

Finally, the adoption and ratification of these conventions are not universal so a number of countries remain outside of their geographical coverage. The gaps in the effective regulation of trade in harmful chemicals and in the harmonization of regulations, combined with the problems of enforcing existing regulations at the national level, demonstrate the significant challenges States face in ensuring that trade in chemicals is managed in an environmentally sound manner.

Toxic products for which regulations are limited or non-existent

Because the various multilateral environmental agreements are framed narrowly, trade in many harmful substances, such as lead paint, chrysotile asbestos, and highly hazardous pesticides, is unregulated at the international level.

Lead paint

With no international instruments governing trade in lead paint, the responsibility falls to the national level. Nearly one-third of countries impose lead paint controls, and most of these countries regulate the manufacture, import, export or sale of lead paint. Fifteen per cent of these countries, however, do not regulate lead paint imports and 25 per cent do not regulate

exports (UNEP 2016) while 122 countries have no regulations at all in place. In addition, national legislation banning trade in lead paint often allows exemptions for industrial uses, and the paint can end up in consumer markets in countries with weak or poorly enforced regulations.

The Global Alliance to Eliminate Lead Paint is a voluntary partnership formed by UNEP and the World Health Organization to prevent exposure to lead, with a goal of phasing out lead paints by 2020. The Alliance has drafted a model law and guidance for regulating lead paint with the primary objectives of setting legal limits for lead in paint and of prohibiting the manufacture, sale, distribution and import of paints exceeding the lead limits.

In a resolution passed in December 2017 to address lead paint, the third United Nations Environment Assembly encouraged governments, among other institutions, to develop, adopt, and implement legislation and regulations. The resolution also requests that UNEP assist countries in eliminating lead paint by providing tools and capacity-building to develop national legislation and regulations.

Asbestos

The Rotterdam Convention regulates some trade in asbestos. There are two classes of asbestos – amphibole and serpentine. The Rotterdam Convention includes all types of the amphibole group in its Annex III of substances subject to the prior informed consent procedure. Despite the fact that the 2006 Conference of the Parties to the Rotterdam Convention decided that chrysotile asbestos, the only type of asbestos in the serpentine class, meets the requirements and the criteria for inclusion in Annex III, the Parties have so far failed to agree to include it, with a handful of countries blocking its inclusion. Thus, trade in chrysotile asbestos, the most commonly used type of asbestos, is regulated solely at the national level, if at all. About one third of countries have banned the use of all forms of asbestos, with a number of important industrial nations declining to implement a ban or even to allow listing asbestos under Annex III of the Rotterdam Convention, thus imposing the requirement of a global PIC procedure on its trade.

The International Labour Office and WHO (2007) recommend that States use import and export taxes to reduce the use

of chrysotile asbestos. In addition, the International Labour Organization (2006) adopted a resolution committing the agency to actively promote a global asbestos ban.

Highly Hazardous Pesticides

A highly hazardous pesticide (HHP) is a pesticide that could cause severe or irreversible harm to health or the environment under particular conditions. The FAO and WHO Code (2014) defines HHPs as *"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 the World Health Organization (WHO) or the Globally Harmonized System of Classification and Labelling of Chemicals (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."* Since no international instruments specifically govern trade in HHPs, the responsibility for trade in HHPs and for the question of whether such trade is illegal, falls to the national level.

In 2015, the fourth session of the International Conference on Chemicals Management adopted Resolution IV/3 establishing HHPs as a SAICM Issue of Global Concern (UNEP 2015b). Delegates recognized, *"that highly hazardous pesticides cause adverse human health and environmental effects in many countries, particularly in low-income and middle-income countries"* and agreed to take concerted efforts to implement a strategy developed by FAO, UNEP and WHO. Delegates further indicated that this should be done, *"with emphasis on promoting agroecologically based alternatives."*

The Rotterdam Convention recognizes a different and more limited category of pesticides, called Severely Hazardous Pesticide Formulations (SHPFs), defined as chemicals that are formulated for pesticidal use and that are known to produce severe health or environmental effects observable within a short period of time after single or multiple exposures under conditions of use. Under the Convention, a Party from a developing nation or a country in transition that is experiencing human health or environmental problems caused by an SHPF may make a proposal to the Secretariat for its inclusion in Annex III, but no new substances have been added through this procedure in nearly twenty years. Apart from this mechanism, there are no international rules governing trade in SHPFs.

The FAO and WHO criteria defining HHPs encompass a broader range of pesticides than those addressed by existing MEAs, and include, for example, not only pesticides that have been listed by the Rotterdam and Stockholm Conventions and the Montreal Protocol, but also pesticides that meet the criteria of classes 1a or 1b of the WHO Recommended Classification of Pesticides by Hazard, pesticides that meet the criteria of carcinogenicity, mutagenicity, reproductive toxicity Categories 1A and 1B of the Globally Harmonized System, and pesticides that have shown a high incidence of severe or irreversible adverse effects on human health or the environment.

The FAO and WHO guidelines on HHPs (2016) note that, *"Enforcement of pesticide legislation may need to be strengthened to prevent illegal production, importation, trade, and use."*

CHAPTER

3

Chemicals, waste and markets

Distinguishing between chemical products and waste is not as straightforward as it might appear at first glance, but the distinction is important because the regulations for products are different from the regulations for waste. Authorities at all levels need to know which regulations to apply in each situation they face, and so do traders.

The wide use of industrial chemicals and high consumption trends across sectors are producing a steadily growing demand for chemicals. These chemicals and other products containing toxic and dangerous chemicals can be traded in both legal and illegal markets. In general, the illegal trade in these goods and substances can take the following forms:

- **Legal trade mixed with illicit goods, for example online marketing (legal) of sub-standard or counterfeit products (illicit)**
- **Illegal trade in licit goods, such as smuggling to avoid taxes or to launder money, or intentionally placing legally produced chemicals on markets where they are restricted or banned**
- **Illegal trade operations of illicit goods – illegally developed supply chains for illicit, mainly banned products**

These different approaches can be applied to any substance or consumer good.

The chemical and waste nexus

Chemical products can eventually become waste, and substances that are considered waste sometimes become products. Because the regulation of international trade in chemicals is partly based on whether a substance is considered a product or a waste, the distinction between these phases of the product life cycle is important. Countries distinguish between waste and non-waste differently, and regulators and private entities can face difficulties in determining whether waste or product legislation applies. In addition, countries designate a substance as hazardous differently depending on whether it is considered a waste or a product.

Products becoming waste

Products can become waste as a result of regulations, such as when chemicals are banned and are no longer permitted for use or export. States may establish phase-out periods to allow existing stocks to be used before the new restriction on their use goes into effect. While this may be a way to reduce waste, it also facilitates the continued use of products that have been deemed unsafe. In Bolivia, stockpiles of imported and donated pesticides have been increasing (Haj-Younes 2015). The research undertaken in La Paz County in Bolivia revealed that banned, outdated and highly toxic pesticides were stored on smallholder farms, and estimated that 60 per cent of those chemicals were obsolete. Both retailers and farmers lacked knowledge on pesticide toxicity and safe handling practices, and poisonings were frequently reported (Haj-Younes, Huici and Jørs 2015).

Another way that illicit products become waste is when they are seized by authorities. When banned or counterfeit chemicals are confiscated, their proper disposal can be a challenge, especially in developing countries, which often lack the technological means to safely dispose of or destroy the hazardous chemical. When this is the case, the products must be exported for environmentally sound disposal in accordance with the Basel Convention.

The proper disposal of confiscated chemicals can be a problem in wealthier countries as well. While Canadian authorities were investigating a case of unregistered glyphosate imported from China, for example, the substance was reported as stolen from the importer's storage facility, preventing the proper disposal of the chemical (UNICRI 2016).

The waste management legislation in most countries places responsibility for waste disposal on the owner of the waste in question. These owners can attempt to avoid responsibility for disposal in a number of ways, including by selling it on the black market – a growing concern for previously confiscated counterfeit pesticides – or by declaring bankruptcy, which has led to huge amounts of waste accumulating in unguarded storage facilities where there is a risk that the chemicals may be relabeled and put back on the market.

To mitigate the challenges that arise from chemical products becoming wastes, some analysts suggest employing a combination of options that include charging the manufacturers and distributors of illicit pesticides for their disposal and using civil and criminal asset forfeiture and confiscation from persons and entities implicated in and convicted of illegal activities (UNICRI 2016).

Waste becoming products

Wastes may reappear as products through recycling or diversion of seized goods to the black market, or when obsolete pesticides are returned to the market. Although domestic and international laws and guidelines provide a legal basis for designating the limited ways in which waste can become a product or secondary raw material, the most common way that chemical waste becomes a product is through illegal activity.

A basic tenant of the circular economy is that materials should only stay in the waste phase temporarily because the ultimate objective is to recover and reintroduce them into the economy to replace primary materials. Banned chemicals, however, can contaminate new products made from recycled materials.

Electronic and electrical products illustrate the convergence of products, chemicals, and waste. Computers, mobile phones, televisions, and other electronic goods that are intended for disposal are classified as hazardous waste under the Basel Convention, due to the presence of toxic materials such as mercury, lead, and brominated flame retardants. The Basel Convention does not, however, cover goods that are intended for recycling, repair or recovery. Because countries distinguish between waste and non-waste, the determination of whether a product is waste depends on national law. If, for example, electronic equipment is destined for direct reuse or repair, domestic legislation may not consider it waste.

Globally, most e-waste has not followed proper channels for disposal or recycling (Baldé et al. 2017). E-waste is often exported under the guise of repair or reuse to developing countries that do not have the infrastructure to recycle it safely. This poses a serious threat to both human health and the environment. Yet there is a demand for this waste because it can be a source of such valuable materials as gold, copper and rare earth metals.

The Basel Convention has issued guidelines to help regulators distinguish between electronic waste and products (BRS

Secretariat 2019a), noting that used equipment should normally be considered waste if:

- The equipment is not complete, has defects, is damaged and cannot perform its key functions, or cannot be repaired at a reasonable cost
- The protection against damage during transport, loading and unloading operations is inadequate
- The equipment contains hazardous components that are prohibited for use under national legislation or is destined for disassembly

Civil society organizations argue that the guidelines are incomplete and allow traders in electronic waste to improperly claim the electronics are repairable, thereby escaping coverage by the Convention (BAN 2017). Another concern is the lack of clarity on how the regulations cover cathode ray tubes, electronic parts for product repairs, and secondhand electronic products with limited lifespans.

At a regional level, the EU Directive on Waste Electrical and Electronic Equipment provides criteria for distinguishing e-waste from non-e-waste, and includes requirements that the shipment be accompanied by proof that the equipment is destined for direct reuse, is fully functional and has appropriate protection against damage during transportation.

Mercury is another waste that may be recovered for use as a product. Mercury waste can become a product in some jurisdictions, such as the EU, where recycled mercury can be used in products that are not banned under Part A of Annex II of Regulation (EU) 2017/852 of the European Parliament and of the Council of 17 May 2017 on mercury. Elemental mercury can also be produced as a by-product of the refining of various non-ferrous ores and of the processing of oil and gas, and some refiners have recovered mercury from their wastes and produced elemental mercury for sale on domestic or international markets (UNEP 2006b). In addition, mercury is recycled and recovered from industrial processes that use mercury or mercury compounds, such as from the decommissioning of chlor-alkali facilities (UNEP 2017). The Basel Convention lists mercury-containing waste as a hazardous waste and has published technical guidelines for the environmentally sound management of mercury wastes (BRS Secretariat 2019d). These guidelines also include information about proper mercury recycling and recovery.

Finally, waste can become a product when a chemical is banned but remains present in products that are traded. This happens when products are produced with materials before they have been banned or when they are made from recycled materials that contain the banned chemicals. The improper recycling of e-waste, for example, can result in the contamination of recycled materials with harmful chemicals such as flame retardants, and heavy metals such as lead or cadmium (UNEP 2010). These materials may be used to make new products such as children's toys and food contact items, resulting in increased risks to human health. The incorporation of banned chemicals into new products may occur when the people handling the waste and preparing it for recovery are unaware of the presence of chemicals in the materials or claim that they do not have separation techniques to remove toxic chemicals from waste. The Stockholm Convention on POPs, for example, granted a special exemption to Canada and the EU permitting the recycling of materials such as foam and plastics that contain Penta and OctaBDEs until 2030 (UNEP 2015a).

The waste–product nexus: Fuel exported to Africa

Although vehicle fuels with high sulfur and benzene content are banned in Europe because of their harmful effect on human health, some European countries export these dirty fuels to Africa. European traders and oil companies exploit the weak fuel standards of most West African States by blending cheap fuel with sulfur and other harmful additives, resulting in sulfur levels that average 200 times, and as much as 1,000 times, the European limits. The combustion of high-sulfur fuels is a significant contributor to air pollution in West Africa, causing health problems such as respiratory diseases and premature death.

The countries trading these fuels are Parties to the Basel Convention, and most of the importing countries are also Parties to the Bamako Convention so these exports should be recognized as illegal trade. The Basel Convention prohibits Parties from exporting hazardous waste to Parties that have banned the import of such wastes (Article 4(1)(b)). The Bamako Convention provides multiple definitions of hazardous waste, including *"hazardous substances which have been banned, cancelled, or refused registration by government regulatory action, or voluntarily withdrawn from registration in the country of manufacture, for human health or environmental reasons"* (InforMEA 2018; Article 2(1)(d)). Thus, the Bamako Convention significantly expands the breadth of covered substances, as compared to the Basel Convention.

Because the low quality blend stocks cannot be used in Europe where they are manufactured, they are considered waste under the Bamako Convention, and therefore illegal exports under the Basel Convention. Yet the inadequate air quality regulations in many African countries means that some of this fuel can also be characterized as a product in African markets further complicating the issue of identifying and addressing illegal trade.

CASE IN POINT

Indonesia

To assess the illegal mercury trade for the Artisanal and Small-scale Gold Mining sector in Indonesia, BaliFokus Foundation, an environmental NGO, conducted a number of interviews with miners from different ASGM hotspots in the country. The analysis suggests that miners have easy access to mercury as it is available in the market in various packages and in different amounts from 100 g up to 25 kg packed in plastic bags or plastic jugs.

According to a national regulation issued in 2016, importing mercury for ASGM use is forbidden in Indonesia. A lack of monitoring and enforcement, however, results in weak control over mercury trade in shops or via e-commerce platforms. Miners can access mercury 24 hours a day and 7 days a week from various locations, stores and private retailers, and even from door-to-door salesmen. There are various payment options to meet miners' needs, including cash, loan, credit or as part of working capital.

Many miners who work in ASGM hotspots in Sumatera buy mercury in Java every three months when they go home for a break. The owner of the mining area assigns them to buy at least 3 kg of mercury per person (there are five miners in every group) to be reimbursed by the owner upon their return. West Java miners buy mercury directly from the main suppliers and mercury mines in Sukabumi, Bekasi or Bogor.

Although Indonesia has the necessary regulations related to packaging and labelling of hazardous substances such as mercury, none of the packaging of mercury sold in ASGM villages and hotspots contains proper symbols, pictograms, hazard statements or Material Safety Data Sheets.

Apart from those miners buying mercury directly from Indonesian mercury mines, most miners and ASGM communities do not know where the mercury came from originally. Some of the packages containing mercury are labeled as mercury from Germany or Spain (because they are well known for high-grade mercury) and are sold at a higher price compared to the locally produced mercury.

The current Indonesian regulations require mercury traders to obtain a permit and be registered at the local departments of the relevant governmental agencies, such as the Trade and Industry Agency and the Environmental Agency, but no private retailers or special stores have the necessary permits for selling hazardous substances such as mercury. Most shops and traders have no idea where exactly the mercury comes from except the information provided by the middlemen.

Moreover, the relevant law enforcement agencies such as the local resort police or environmental investigators conduct no monitoring to check for compliance and investigate non-compliance with Indonesian regulations. In several ASGM sites, many of the law enforcement officers are involved in the ASGM business to varying degrees.

The local units of the police, military, marine, or special forces sometimes play active roles in providing security services to ASGM activities. These services may involve securing the raw material supply, guarding the mining area, and/or protecting the production and transportation of gold. When the financiers or the owner of an ASGM site hire a helicopter to bring several plastic jugs of mercury to a remote site in the jungle, for example, law enforcement personnel have been known to secure the helicopter landing space.

Chemicals traded illegally

Hundreds of thousands of consumer products contain hazardous chemicals. Cosmetics, drugs, children's toys, paint and not least food are among the products that may contain toxic chemicals. Lindane, for instance, a persistent organic pollutant in the organochlorine class, is present in products still available for sale. For about 60 years, many countries produced lindane as a pesticide, but due to its toxicity it is listed under the Stockholm Convention (in Annex III) and banned or severely restricted in 69 countries (PAN International 2017).

The rapid growth of the agriculture industry has led to intensive production and use of pesticides. Trade in unidentified, fake, obsolete and banned chemicals occurs in licit and illicit markets. Pesticides containing hazardous chemicals are traded under different brand names with limited or no specific information about their chemical composition. Limited product information on chemical content and trading that lacks transparency are obstacles to effective controls.

The types of chemicals that are traded illegally vary according to the conditions in domestic markets and the volatility of the global market. Pest outbreaks, for example, always create opportunities for the illegal marketing of effective, but extremely toxic and restricted pesticides. Furthermore, the use of pesticides is projected to increase in light of the changing climate (European Commission 2019).

Fake chemicals are normally defined as active or inactive chemicals sold in assorted unmarked packaging while counterfeit chemicals are sophisticated copies of legitimate, branded products. According to experts, a recent trend is illegal parallel trade – chemicals are placed on the market in violation of laws requiring the consent of the producer, as when the product is not intended for a particular jurisdiction.

Globally, the World Health Organization sets international guidelines to classify pesticides by their hazards for the purpose of encouraging nations to identify, assess, and decide their own appropriate measures to mitigate the risks. Hundreds of pesticides are classified in five different categories based on acute toxicity levels – extremely hazardous, highly hazardous, moderately hazardous, slightly hazardous and unlikely to present an acute hazard (WHO 2009). Furthermore, the Chemical Review Committee under the Rotterdam Convention reviews chemicals. The obsolete, banned, and fake chemicals traded illegally may cover the range of toxicity.

Obsolete chemicals are those that can no longer be used because they have been banned, have undergone a physical change that makes them no longer effective or safe, are no longer wanted, are unidentifiable or are contaminated. Estimating the quantities of obsolete pesticides that return to the market is challenging. Recent research from Bolivia reveals that significant quantities of obsolete pesticides are found outside of their storage places (Haj-Younes 2015) suggesting that they are still widely used.

The OECD Best Practice Guidance to Identify Illegal Trade of Pesticides (2018), states that the proper disposal of legitimate pesticide packaging is important in order that the packaging not be reused for illegal pesticides. The guidance further states that the destruction of identified illegal pesticides and obsolete pesticides is important to prevent them from reappearing on the market. Nevertheless, huge amounts of waste are accumulated in unguarded storage facilities in Eastern Europe, the South Caucasus and Central Asia, where there is a risk that the pesticides are relabeled and brought back to the market (OSCE 2015).

Lindane generated hundreds of thousands of tonnes of waste with the largest stockpiles reported in countries of the former Soviet Union, China, India, Japan, Brazil, South Africa and the United States (Vijgen et al. 2011; Vijgen, Aliyeva and Weber 2013). Phasing out chemicals requires due diligence. Many countries lack the technologies to dispose of or neutralize pesticides safely. In addition, countries are continuously working towards phasing out hazardous pesticides that become obsolete (PAN Africa and IPEN 2009).

Banned chemicals are chemicals for which all uses within one or more categories have been prohibited by one or more countries, either because of an international obligation to do so (such as the ban on chemicals listed under Annex A of the Stockholm Convention) or as a result of domestic legislation. Banned pesticides are still traded, however. In Pakistan, which relies heavily on pesticide imports, banned persistent organic pollutants such as DDT, aldrin and dieldrin are reportedly traded (Faheem et al. 2015).

Aldicarb, a highly hazardous pesticide banned in 56 countries (PAN International 2017), nevertheless appears to be traded illegally, and has reportedly been used to poison animals in Spain after the ban was introduced in 2003 (Bodega Zugasti 2016). South Africa reports aldicarb with the trade name Temik among the domestically banned chemicals easily available in the informal, unregulated street pesticide markets (PAN International 2017; Rother 2010; Arnot et al. 2011). Domestically banned chemicals such as aldicarb or carbofuran (often marketed under the trade name Furadan) are used to poison not only pests but also dogs, birds, lions, elephants and rhinos (Arnot et al. 2011; Monkeyland 2015; National Geographic 2018).

The Stockholm Convention permits the use of DDT for vector control for diseases such as malaria, but prohibits its trade as a pesticide. Recent research suggests that DDT is traded outside

of the public health sector in African countries (van den Berg, Manuweera and Konradsen 2017). According to experts, DDT is still illegally sold at markets in many Central Asian and Eastern European countries. Grassroots sources report that a DDT product named Dust is widely available to consumers in Tajikistan and Kyrgyzstan.

Paraquat is a highly controversial weed killer that persists in the environment, and is frequently implicated in poisoning (Public Eye, PAN UK and PANAP 2017). Classified as moderately hazardous by WHO, paraquat is banned in many countries including European Union member States, China, South Korea, Togo, Laos, Sri Lanka and Zimbabwe. France and many other European countries banned the use of paraquat, but a study analysing data from a poison control centre implicates paraquat in severe poisoning in France (Kervegant et al. 2013). China restricted paraquat for domestic use, but allows paraquat production for export (People´s Republic of China, Ministry of Agriculture 2012). The neighbouring country of Laos imports all of its pesticides including paraquat from China, Thailand and to some extent from Vietnam (PANAP 2013). Zimbabwe decided to restrict paraquat, but the Global March for Elephants and Rhinos – a grassroots organization – reports (2018) that poachers are using paraquat and cyanide to kill animals (Public Eye, PAN UK and PANAP 2017).

Endosulfan is a persistent organic pollutant that is present all around the world (PANAP 2008). A moderately hazardous chemical in the WHO classification, endosulfan is another highly debated pesticide banned under the Stockholm Convention in 2009, and domestically by 107 countries (PAN International 2017). In the early 1980s, endosulfan was voluntarily withdrawn from the market and replaced by pyrethroids in cotton production in West Africa. After a decade, the cotton bollworm developed resistance to pyrethroids, and endosulfan was reintroduced. Although, endosulfan was domestically banned in nine of the West African countries it is still reportedly available and used in farming in the region (PAN Africa and IPEN 2009). Research on dermal toxicity risks and ecological impacts confirms the persistent use of endosulfan in this region (Jepson et al. 2014).

Fumigants are volatile, poisonous substances used to kill insects, nematodes, and other animals or plants that damage stored foods or seeds, and are widely used in all countries. According to recent reports the main buyers of fumigants are pest control operators and fumigation companies (MarketsAndMarkets 2019). In many cases the work of these operators lacks the transparency necessary to deter the illegal trade in spurious and substandard fumigants.

In many ASGM operations, the mercury that operators use to extract gold from ore comes through trade that violates national or international laws on the import, marketing or use of mercury.

While the implementation of the Montreal Protocol – an international treaty regulating ozone depleting substances – has been hailed as a major success, the sale of these substances in illegal markets presents a challenge to the full achievement of the strategy to phase them out (UNODC 2013).

Fake fuels are products that contain substances in addition to or different from what an authorized seller represents, and the sale of such products is a growing form of illicit trade (TRACIT 2018). In some cases, fuel of a certain type that is less valuable is sold as a fuel that is more valuable. This is achieved, for example, when the marker (e.g. green dye) for fuel for agricultural uses is removed, making the fuel resemble the more valuable fuel that is used for common automobiles. Such "laundering" undermines air pollution regulations that allow the less valuable, and more polluting, fuel only for a narrow set of uses. Illegal fuel laundering plants are reported to dump or abandon toxic contaminated sludge – the hazardous chemical residue generated in the laundering process (BBC News 2006).

The illegal trade in pesticides

The trade in illegal pesticides arises from a combination of factors, but in all cases the ongoing demand and an economic interest in illegal production and trade are the main drivers of illicit pesticide markets. Political, socioeconomic and geographic conditions loom large, and include a developed agricultural sector with a significant share of small- and medium-scale farmers, access to finance, proximity to areas outside of the de facto control of governments, and the presence of qualified professionals in chemistry and agronomy. The imposition of high import duties is an extra incentive.

The key elements in the selection of illegal trade routes are geographic location and agro-climatic conditions. Easy access to potential markets combined with a developed transport infrastructure and weak transit and border regulations attract the attention of criminals who use such countries as hubs for further illicit activities.

Illicit pesticide products commonly but not exclusively appear in the markets in developing countries and countries with economies in transition, with one estimate of the quantity of substandard pesticides sold in developing countries put at 30 per cent (Vaagt 2005). The easy access to chemicals is determined by socioeconomic factors including standards of living. In these markets the illegal pesticides cost considerably less than legal products. Among the factors accounting for this pattern are patent protections, the lack of knowledge and awareness, and weaknesses in regulation and enforcement. In addition, the high level of poverty in developing and transition countries means that many small farmers are poor, and opt to purchase low-cost counterfeit pesticides to protect their yields.

Patents on active ingredients in pesticides protect the patent-holding manufacturers of the products from the introduction of cheaper generic versions typically for 10 years. This protection provides the patent holder with the opportunity to avoid market competition until the patent expires, at which time the price of the product typically drops in response to the availability of generic substitutes. This system clearly provides an economic opportunity for illegal traders who can produce and distribute substitutes prior to the expiration of the patent.

These illegal traders easily find ready markets, especially in countries with developing and transition economies in large part because of the widespread lack of knowledge regarding the risks associated with the use of counterfeit pesticides, and because of low standards of living. The information on the registered brands is not particularly user-friendly, and the information on the counterfeit products is next to nothing.

Some countries allow the temporary registration of pesticides for testing purposes without limiting the quantities, and as a result, illegal traders can introduce commercial quantities in the market with only a temporary registration. Control systems such as quality testing facilities are underdeveloped and lack formal definitions for counterfeit and substandard pesticides, and staff capacity and expertise are inadequate. Criminal liability is minimal, and among governmental authorities, competition is more common than coordination. For instance, none of the countries of Eastern Europe, the Caucasus and Central Asia has a system for the collection and disposal of pesticide containers, and illegal traders seize this opportunity to acquire original containers for use in selling counterfeit products. Nor do any of the countries have early warning systems to flag counterfeit products moving across their borders. This set of circumstances may increase the risk of corruption among officials, law enforcement, customs, and company staff, and this potential or actual corruption adds to the difficulty in controlling the illegal trade in chemicals in these regions (OSCE 2015).

The grassroots reporting of Toxisphera Environmental Health Association from Brazil finds that most observers attribute the illegal trade in chemicals in the country to the lower price for illicit products. Dorfman and Rekowsky (2011) report that, "The price of the product is significantly lower in Uruguay, where substances usually imported from China are sold with lower profit margins, and are exempted from some charges (certification, packaging reverse logistics, etc.)."

Uruguay and Paraguay have more lenient regulations that allow some active ingredients that are banned in Brazil. The lack of controls and inspections and the absence of mechanisms for supervising sales facilitate illegal trade. In addition Uruguay and Paraguay – unlike Brazil – have no requirements for agronomic prescriptions to authorize the sale of pesticides. This situation further encourages the cross-border trade in illegal pesticides. Information on the illegal trade is widely available in Brazil, and consumers are likely aware that they are buying illicit products, but the significant price difference between the legal and the illegal products appears to be a sufficient incentive. Paraguay imports more pesticides than it needs for its own applications (Comtrade 2018; FAO 2018), and the inference that the remaining pesticides are illegally transported to Brazil by clandestine routes is easy to draw.

Stakeholders

The key stakeholders – and victims – in the illegal pesticides trade are the farmers who intentionally or unintentionally purchase illicit plant protection products. Farmers benefit from the low costs, but risk their own health and the quality and safety of their products by using substandard products. The banks and other money transfer systems involved in transactions for illicit activities are also important stakeholders.

According to EU Directive 2009/128/EC (establishing a framework for community action to achieve the sustainable use of pesticides), all professional and non-professional users of pesticides can be considered stakeholders in the illegal marketing of plant protection products. Table 2 provides an overview of stakeholders organized by the stage in the life cycle and the type of illegal product.

Stakeholders in the illegal pesticides trade

STAGE OF LIFE CYCLE	TYPE OF ILLICIT PRODUCT	KEY STAKEHOLDERS
Registration	Counterfeit pesticides Substandard pesticides	Corrupt **state officials** responsible for: - registration - patent check - relevant tests
Production (domestic)	Counterfeit pesticides Substandard pesticides	Irresponsible registered **pesticides manufacturers** Unregistered **chemicals blenders** (informal sector) **Importers** of improper active ingredients Irresponsible **waste management companies** (empty containers) **Distributors**, intentionally purchasing illicit products Irresponsible **packaging** manufacturers and **printing** houses Corrupt or inexperienced **tax authorities** Corrupt and/or inexperienced **law enforcement** **Banks** or other money transfer systems (informal sector)
Import	Counterfeit pesticides Substandard pesticides Banned pesticides Restricted pesticides	Transnational organized **criminal groups** Corrupt or uninformed or inexperienced **customs officers** **Importers** **Logistics companies** **Banks** or other money transfer systems
Distribution	Counterfeit pesticides Substandard pesticides Banned pesticides Restricted pesticides	Illegal **producers** or **importers** **Distributors** **Banks** or other money transfer systems Corrupt or inexperienced **agronomists** and extension services **Farmers**
Application	Counterfeit pesticides Substandard pesticides Banned pesticides Restricted pesticides	**Farmers** Illegal **distributors** Corrupt or inexperienced **agronomists** and extension services Corrupt or inexperienced soil care **inspectorate officers** Irresponsible **waste management companies** (empty containers)

Table 2: Stakeholders in the illegal pesticides trade

Determining the scale of illegal trade

The evaluation of the potential scale of the illegal trade in pesticides cannot rely solely on open data sources – such as UN Comtrade and FAO Stat – used in calculating national pesticide balances. Some shipping documents do not accurately reflect the contents of the shipment, the collection of trade data is far from uniform, and some countries collect and submit no data at all. In addition, reporting challenges may arise because of different categories under which the same pesticide may be reported.[7] Comparisons between the trade value – measured in currency – and the quantity traded, which is measured in weight or volume, are difficult. And trade figures of exporting countries often do not correspond to the trade figures of importing partner countries. The consideration of import data only may overlook a significant amount of smuggled pesticides. Finally, differences between financial years and calendar years complicate comparisons across countries.

Comtrade data and regional trade statistics provide the basis for evaluating the volumes of registered cross-border trade, and in some cases imply the scale of illegal production of pesticides in particular countries. Specific information from national statistics departments and business association reports, which sometimes are more accurate, can provide the basis for a cross-check with available international trade data.

The calculation of pesticide balances can reveal discrepancies in the reporting. Imports plus domestic production should equal consumption plus exports plus market residues, but a significant informal economy may keep substantial trades from registering in the national pesticide balances. In addition, several countries report on the use of active ingredients and others report on the use of prepared products.

Figure 2 shows the pesticide balances for India – the fourth largest producer of pesticides in the world, and the sixth largest pesticide exporter (~US $1.8 billion per year). India also imports US $800 million in crop protection products per year. The Directorate of Plant Protection, Quarantine and Storage of the Ministry of Agriculture and Farmers Welfare posts national pesticide statistics on its website.

The orange bars show that legal export and consumption of pesticides in India exceeds legal import and production by significant amounts, which the existing reporting system fails to identify.

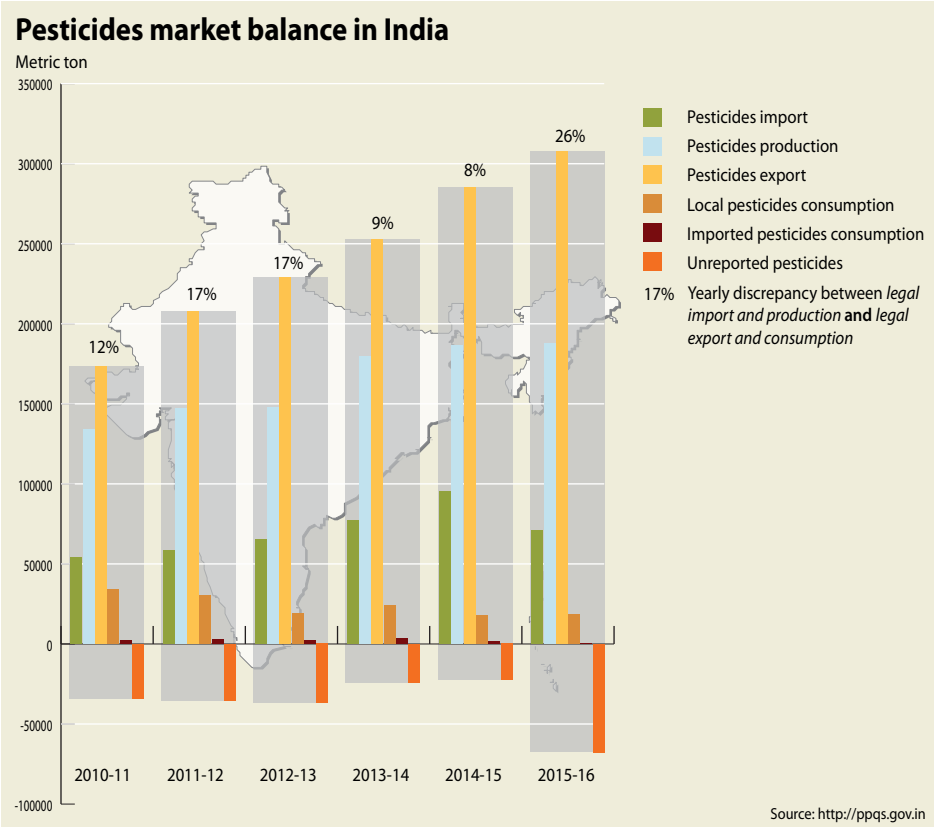


Figure 2: Pesticides market balance in India

CASE IN POINT

Ukraine

The analytical approach to reconciling the conflicting data is to cross-check data sources in a comprehensive, six-step assessment that includes gap analysis, statistical analysis, the review of industry reports and studies, market analysis, interviews and a check of media sources. This assessment of the situation in Ukraine demonstrates how this analytical approach works.

Agriculture is an important economic sector in Ukraine. The foreign trade turnover of agricultural products in 2017 reached US $22.6 billion with exports totaling almost US $18.0 billion (Ukraine, Ministry of Agrarian Policy and Food 2018). In 2017 Ukraine increased its agricultural production, and the agricultural sector's contribution to Ukraine's gross domestic product came to almost 18 per cent (Ukraine, Ministry of Agrarian Policy and Food 2018). Agricultural land covers 42.7 million hectares, about 70 per cent of the country, and arable land comes to 32.5 million hectares. Crop production is one of the most important components of the country's agriculture, and crop protection products are in widespread use (Proconsul 2017).

New regulations in the wake of the revolution in 2014 practically destroyed effective customs and phytosanitary controls. According to experts, gaps in the hazardous waste management regulations, particularly in the collection of empty containers, led to the appearance of domestically produced substandard plant protection products, some of which used obsolete stocks. Weak regulation of intellectual property rights has led to significant production of counterfeit products. Uncontrolled areas in the east of the country and Transnistria in the south-west offer the potential for smuggling plant protection products. Finally, the simplified procedures for importing active ingredients, which are not routinely cross-checked with tax authorities, has resulted in an increase in so-called garage blending of pesticides. These informal producers often use highly hazardous active ingredients that are still permitted.

Ukraine is one of the biggest importers and users of plant protection products in the world (Comtrade 2018; FAO 2018). In 2014, as the direct consequence of the military conflict, pesticide imports declined in terms of both tonnage and dollar value. Starting in 2015, however, pesticide imports have grown in terms of dollar value, and starting in 2016 have grown in terms of tonnage. This trend cannot be explained only by the growth in consumption and price increases of active ingredients in China.

The domestic production of pesticides constitutes 10–12 per cent of the Ukraine market – about 13,000 tonnes (Business Censor 2018). The major pesticides manufacturers all depend on imported active ingredients, but have managed to increase their production. The slight reduction of Ukraine's pesticides exports from 2013 to 2017 (Comtrade 2018) can be explained by an increase in demand in the domestic market and by the improvement in the procedures for customs clearance of re-exports.

The available statistical information suggests that Ukraine's large market and favorable location makes it home to one of the most interesting illegal markets of pesticides in Eastern Europe, the Caucasus and Central Asia. Industry reports and studies of international organizations confirm these trends. While some experts consider the share of illegal pesticides to be 25 per cent of the Ukraine pesticides market, the European Business Association values the illegal share at about US $150 million, or almost 19 per cent (Agro Portal 2016).

China remains the biggest pesticide exporter to Ukraine, but international companies are increasing their market share, and 62 per cent of the pesticides are generics. The Chinese-owned Israeli manufacturer, Adama, has become the largest single supplier of chemical plant protection products in Ukraine, followed by Bayer and Syngenta (Infoindustria 2018).

Historically, the largest share in imports came from herbicides at 62 per cent; the share of fungicides amounted to 24 per cent (Business 2018). The insecticides market also shows significant growth, part of which is believed to be due to climate change.

The repackaging of pesticides in violation of storage conditions, including the use of small containers targeting private landowners and small farms, causes a significant problem. In Ukraine, illegally repackaged products may account for about one quarter of annual pesticide sales, and according to law enforcement agencies in Ukraine, confiscated banned pesticides and repackaged outdated and obsolete pesticides are in some cases returned to the market (OSCE 2015).

In 2018, MAMA-86, a Ukrainian national environmental non-governmental organization, conducted field research and surveys in four regions of Ukraine. Interviews with pesticide vendors from non-specialized chemical plant protection product (CPPP) stores, revealed that the vendors often do not have information about the product suppliers to provide to consumers. Some stores repackage pesticides from larger containers into bottles, plastic bags or plastic canisters to meet the demand of small farmers and private landowners. The names of the CPPPs in such containers are usually written with a marker.

The packages of fake CPPPs do not have the distinctive holograms that appear on the preparations from well-known foreign manufacturers, and distinguishing between original and falsified packages is sometimes nearly impossible. Given that some stores – even those specializing in CPPPs only – sell both original and counterfeit products, this is a serious problem. The counterfeit products are usually 50 per cent cheaper than the originals, and sometimes price is the only indicator that may help consumers distinguish between fake and original products.

The retailers note that the decision to sell counterfeit pesticides is based on consumer demand for a cheaper but effective product. In addition, retailers need to compete with street vendors who often sell their counterfeits close by for a much lower price. Often enough the sellers behave aggressively and do not participate in the interviews or do not allow photos – behaviors that suggest that they recognize the illegality of their business.

The interviews with local residents who use pesticides on their land demonstrate that only some of them buy pesticides from official distributors and in specialized stores. Private householders more often purchase pesticides on the market at more affordable prices. They believe what sellers tell them about the quality of the products and usually do not require additional documents or certificates that might reduce the risk of using counterfeit products. None of the interviewed buyers have ever visited the official websites of authorized manufacturers to study the appearance of the original packaging of the product to better understand if the CPPPs they purchase are counterfeit or original. Label information is not of interest to buyers either, but they do want to be sure that the effect of the product application will last long enough to protect their crops.

Some regions in Ukraine experienced cases of pesticide poisoning that occurred as a result of the use of pesticide concentrates that were stolen from farms. These stolen pesticides were intended for field use, but local residents incorrectly applied them on their plots of land, and the results were acute pesticide poisoning.

Source countries

In 2015, the People's Republic of China led the world in pesticide production and consumption at 3.75 million tonnes and 1.70 million tonnes, respectively (National Bureau of Statistics of China (N/A)). Although the Government is making serious efforts to close illicit pesticide production, China remains one of the key sources of illicit plant protection products in the global market. In October 2017 the Ministry of Agriculture announced that it had established the Pesticide Management Office (People´s Republic of China, Ministry of Agriculture 2017) to regulate the production, sale and use of such chemicals. India is becoming another major source of illicit pesticides that are mainly sold on the domestic market but also in neighbouring countries, South-East Asia and East Africa.

CASE IN POINT

Kazakhstan

Pesticide applications in Kazakhstan are on the rise, and imported pesticides are estimated at 88 per cent of the total usage (Forbes Kazakhstan 2016). The volume of the illegal trade is unknown, but field research and interviews with pesticide sellers, buyers and experts found three general violations of national laws:

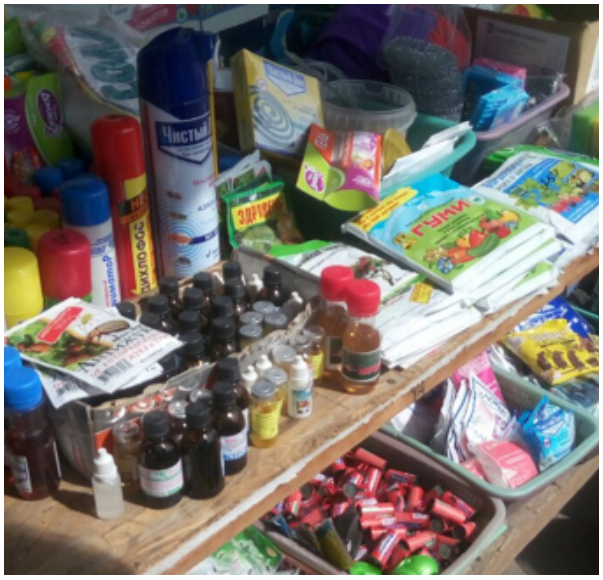
- Companies and private traders import, store or sell pesticides without the required license
- Companies with a license to sell authorized pesticides also trade unauthorized pesticides
- Prohibited and unregistered pesticides are available on the open market

Several large companies in Kazakhstan offer only authorized products from well-known suppliers. Buyers can shop on official websites or at company stores. Company agents conduct on-site consultations with farmers, and propose pesticides to respond to specific problems. Contracts and guaranteed results lead some farmers to buy from these companies even though the prices may be 3–10 times the price of counterfeit products. Company specialists provide instruction in the proper use of their products, and usually take back empty containers for proper disposal.

According to the information provided by non-governmental organizations from Kazakhstan – EcoForum Kazakhstan and Living Asia – agents from unlicensed companies also visit farms to sell unauthorized products, and farmers looking for the cheapest product that is effective are willing to buy no-name products that provide the right results. Product certification is not a factor, and product safety is a minor concern at best. Farmers can also purchase pesticides through social media.

Many residents of villages and summer houses buy pesticides in small packages at shops and local markets where the products for sale vary little from region to region. Some of these products are authorized, and have labels with all the required information. Some products are authorized for use, but their labels do not contain all the required information. And some of the products are prohibited, have unknown contents and labels written in Chinese, and may have been smuggled into the country. Some sellers keep pesticides in the open air, under the sun and exposed to temperatures above 30 degrees Celsius.

Local market vendors provide little or no information about their suppliers. They may say that the product came from Russia or China, but provide no details. Beyond the advice to dissolve the product in water, the vendors offer little information on the frequency of applications, the amount to use or safety precautions to take. They may suggest wearing gloves and avoiding pesticide applications when the temperatures are high. Some retailers suggest washing and reusing empty pesticide containers. None of those interviewed mentioned the need for safe disposal.



Trade strategies

As with legitimate products, illicit pesticides reach the market through imports and domestic production. The techniques for importing illegal pesticides include:

- Standard smuggling methods (disguising the product; splitting containers into small batches; changing the weight)
- Incorrect HS Code or Group (veterinary drugs instead of patented insecticide, e.g.)
- Forging Registration Certificates or shipping documents
- Long logistics chains that require additional document checking
- Incorrect or missing labels (mislabeling, labels that are hard to read; labels with incomplete information; labels in foreign languages)
- Online sales via applications such as WhatsApp, Instagram and Facebook

The marketing of pesticides online is a developing global trend, and different types of illegal pesticides are available (US EPA 2018a; Ecologist 2018). Unregulated online marketing, sometimes coupled with anonymous delivery, complicates traceability, and allows criminals to target uninformed buyers.

Online trade simplifies the purchase of plant protection products, and reduces the cost. Manufacturers, distributors and pest control operators all maintain websites. Plant protection products are also available from online retailers and auction sites, on illegal trade sites with no fixed addresses and on the dark web. Not all of these types of sites are intentionally involved in trading illicit pesticides. In general, analyses of online trade of chemicals are rare as this is an emerging trend that requires a specific approach, but some concrete examples such as the distribution of unauthorized pesticides on Amazon reveal its importance.

The illegal trade in domestically produced pesticides also includes online sales as well as the following:

- Production of illicit pesticides from legally imported active ingredients (see Annex 1)
- Relabeling or repackaging of pesticides in small containers to meet the demand of small-scale farmers (see street market in Ukraine, below)
- Seized stocks returned to the market
- Reuse of original pesticide containers
- Garage blending and dilution (see Annex 1)
- Use of banned pesticides from stockpiles

Some countries have no restrictions on importing active ingredients that can be used to manufacture pesticides, and relabeling or repackaging is popular among counterfeiters. Corruption and lax enforcement – often coupled with relabeling – allow for the return of seized stocks to the market. In countries with no empty container management system for handling used pesticide containers, especially those with a substantial informal economy, illegal traders buy used containers and fill them with substandard or obsolete stocks.

It has been 10 years since Kyrgyzstan ratified the Stockholm Convention, which regulates obsolete pesticides among other persistent organic pollutants. During this period, the amount of obsolete pesticide stockpiles in the country has declined by 50 per cent, but the country did not take any measures to dispose of obsolete pesticides. The clear implication is that the reduction in the amount of obsolete pesticides occurred as a result of their illegal use, which may have included open burning and applications on private land.

A street market in Ukraine where traders sell glyphosate stored in Coca-Cola bottles to be poured in consumer containers on demand. Chemicals for sale are often next to food items.

Trade routes

Once smugglers establish a trade route for one type of goods, they can easily switch to another type or expand their activities (UNEP 2018). This scenario suggests that the main trade routes of illicit pesticides may be similar to other illicit trafficking, with variations related to general economic conditions and the role of the agricultural sector in the importing countries. In addition, the penetration of illicit goods into normal supply chains is a growing trend.

Europe has been a preferred market for the illegal trade in pesticides. In 2017, pesticide exports from the EU amounted to about US $6.0 billion, and imports came to about US $1.5 billion (EUIPO 2017).

Statistical analysis can sometimes provide insight into unusual trade patterns. From 2014 to 2016, for example, Morocco reported to Comtrade an average of almost US $700,000 per year in exports to France. France, however, reported a total for imports from Morocco of a grand total of US $112 for the same time period. One explanation for this difference between the export and import figures is that smugglers diverted the product; another possibility is illegal traders changed the shipping documents. A plausible explanation that is also legal is difficult to imagine.

Brazil and its neighbouring countries are considered another hotspot for illegal traders. The farmers of Brazil have become the world's top exporters of sugar, orange juice, coffee, beef, poultry and soybeans (Pignati et al. 2017). Intensive agricultural production relies on intensive use of pesticides. The use of active ingredients in Brazil increased from 151,523 tonnes in 2001 to 395,646 tonnes in 2015, an average annual growth rate of 7.5 per cent (Pignati et al. 2017).

Brazil is both an importer and a producer of pesticides. While illegal pesticides are imported to Brazil through a variety of official or clandestine roads, regular or clandestine inland waterways and sea ports, official airports and clandestine landing areas (Farias, Mingoti and Spadotto 2017), local production of illicit pesticides is also well developed.

Long borders with Uruguay and Paraguay make the inspection of illegal entries a complex challenge. Another route for illegal pesticides begins in the Chilean ports, and enters Brazilian territory via Paraguay or Bolivia with direct access to the State of Mato Grosso, the largest consumer of pesticides in Brazil (SINDIVEG 2017).

The illegal trade in mercury

As the toxic effects of mercury have become more widely recognized, efforts to reduce the supply of and demand for mercury have increased, culminating in the UN Minamata Convention on Mercury in 2013. Since then countries around the world have increasingly imposed regulations and restrictions to:

- **More closely scrutinize mercury sources, uses and trade**
- **Ban the marketing of mercury from certain sources**
- **Reduce and aim for the phase-out of primary mercury mining**
- **Improve monitoring and control of mercury trade**
- **Reduce the use of mercury in artisanal and small-scale gold mining**
- **Reduce the use of mercury in thermometers, switches, lamps and other products**
- **Phase down the use of mercury in dental amalgam**
- **Safely manage and dispose of mercury containing wastes**
- **Etc.**

As a result of the ongoing demand for mercury in the face of the gradually reduced supply, the market price has risen and new mercury mining is taking place especially in Mexico and Indonesia (UNEP 2017).

The legal restrictions and increased scrutiny, along with the related higher administrative procedures and costs, have given traders and middlemen an incentive to bypass the normal controls, especially where they see weaknesses in monitoring or enforcement systems. Moreover, the need to transport mercury to remote regions for ASGM provides a further incentive to identify the fastest and cheapest solutions, which are often undocumented or illegal. Much of the mercury trade has therefore been pushed out of sight, and undocumented or illegal transfers of mercury have increased, stimulated by the considerable profits to be made.

Meanwhile, ASGM operators have come to rely heavily on mercury, and many remain unaware of its toxic effects. Even for those who would prefer not to use mercury, the mercury-free alternatives may be unknown, less accessible, more expensive or simply inconvenient. Many ASGM operations are part of the informal economy – undocumented, but not in violation of legislation. Illegal trade in mercury, in contrast, is trade that violates existing laws on the import, marketing or use of mercury.

In one case, a German company illegally exported large quantities of mercury – fraudulently characterized as waste material – to Switzerland. Customs agents in Indonesia and the Philippines have intercepted Indonesian mercury and cinnabar (mercury ore) smuggled in shipping containers. Mercury from China has appeared illegally in sub-Saharan Africa and Myanmar (World Bank 2016). Undocumented Mexican mercury moves across the country's southern border. Large quantities of mercury imported by Colombia and Bolivia are transferred illegally to neighbouring countries such as Peru. Most of these activities are linked to the continued demand for mercury in the ASGM sector.

Stakeholders

Figure 3 identifies the key stakeholders dealing with ASGM and the mercury trade. The most influential of these are informal traders and brokers of mercury and gold. They are referred to in the literature in a variety of ways. Some refer to "middlemen" who buy gold from miners, smuggle mercury and may be involved in money laundering and other criminal activities. Others describe "brokers" who facilitate the mercury trade and help to hide mercury storage and mercury recycling activities. Others speak of "smugglers" or "illegal dealers" who buy gold, promote the use of mercury and often accept gold in exchange for a reduced price or a "free" supply of mercury (Fritz, Maxson and Baumgartner 2016).

Only slightly less influential are the guards and security personnel who ensure that mercury reaches the ASGM sites, followed by the larger ASGM community, and the customs and local government agents.

Researchers and local non-governmental organizations recognize that informal mercury suppliers and gold buyers have a strong influence on mercury trade for ASGM by supplying, storing and even recycling mercury – as well as trading mercury for gold – using methods that are not transparent. Because of their importance and influence, these stakeholders also represent a significant barrier to the common national objective of reducing mercury use in ASGM, because these informal traders facilitate the continued use of mercury by miners even when mercury is formally prohibited. Moreover, in places where mercury is traded informally, the trade may sometimes appear in official data only at the time of import into the country, and the subsequent pathways and end uses are never recorded. This is one of the main reasons that the legalization of ASGM and the development of specific ASGM regulations are key measures required to support the transition to mercury-free ASGM, a goal that is important to many Parties to the Minamata Convention (Fritz, Maxson and Baumgartner 2016).

Local government agents are often involved because the activities of informal traders reduce the potential revenues of the local governments. This potential for lost revenue further encourages governments to prioritize the fight against gold smuggling and the related informal mercury trade. Security personnel, collaborators and the larger ASGM community benefit directly from the informal trading network, but they are also critical to the support and protection of informal trade, which is often, due to the nature of the business, coordinated by an outlaw group or organized crime (see Annex 5).

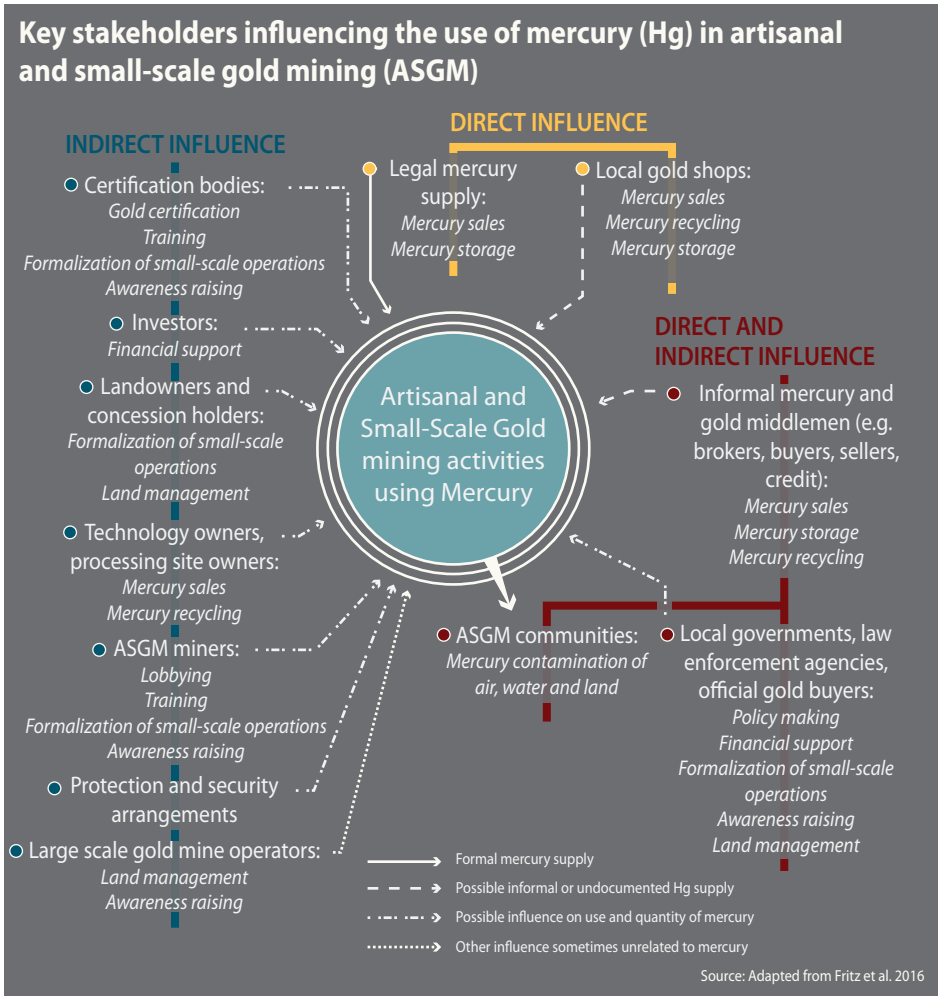


Figure 3: Key stakeholders influencing the use of mercury in ASGM

Determining the scale of illegal trade

Figure 4 provides an overview of worldwide consumption of mercury by geographic region and major application. East Asia and South-East Asia are the largest consumers with most of their consumption in vinyl chloride monomer (VCM) production in China and ASGM. South America and sub-Saharan Africa are the next largest with most of their consumption being for ASGM. The mercury consumption figures here include both legal and illegal mercury supplies.

The determination of the scale of the illegal trade in mercury focuses on ASGM. The 15 countries identified in Table 3 each use an estimated average of at least 20 tonnes of mercury per year in ASGM, and account for over 85 per cent of all mercury used in ASGM. Although mercury may be traded several times before its end use, these are the most likely final destinations for mercury used in ASGM. Likewise, since most illegal mercury trade is for ASGM use, these are the key countries implicated, although there are more than 50 other countries using less than 20 tonnes of mercury per year in ASGM. Nine of these countries use an estimated average of 10–19 tonnes of mercury per year in ASGM, and another eight countries use 5–9 tonnes per year (Artisanal Gold Council 2017).

A look at the documentation of mercury imports and exports reveals that many of these countries are either not carefully recording mercury imports and/or not reporting such statistics to the Comtrade database, as their formal imports less exports do not correspond at all to the domestic use of mercury in ASGM. This permits a rough calculation of the annual net informal mercury imports of each country, where only three countries have zero net mercury imports.

Indonesia has a large internal supply of mercury from domestic mining. Bolivia transparently imports more mercury than it needs for its own substantial ASGM activities. And China not only has its own mercury mining industry, but also uses more than 1,000 tonnes of mercury in its vinyl chloride monomer industry, and hundreds of tonnes in the production of blood pressure measuring devices, thermometers, lamps, and other devices (UNEP 2017). Therefore, for China it is impossible to isolate possible informal mercury imports specifically for use in ASGM.

Apart from China, there is little industrial use of mercury in the countries listed in Table 3, although Indonesia, Colombia and the Philippines have small mercury cell chlor-alkali plants,

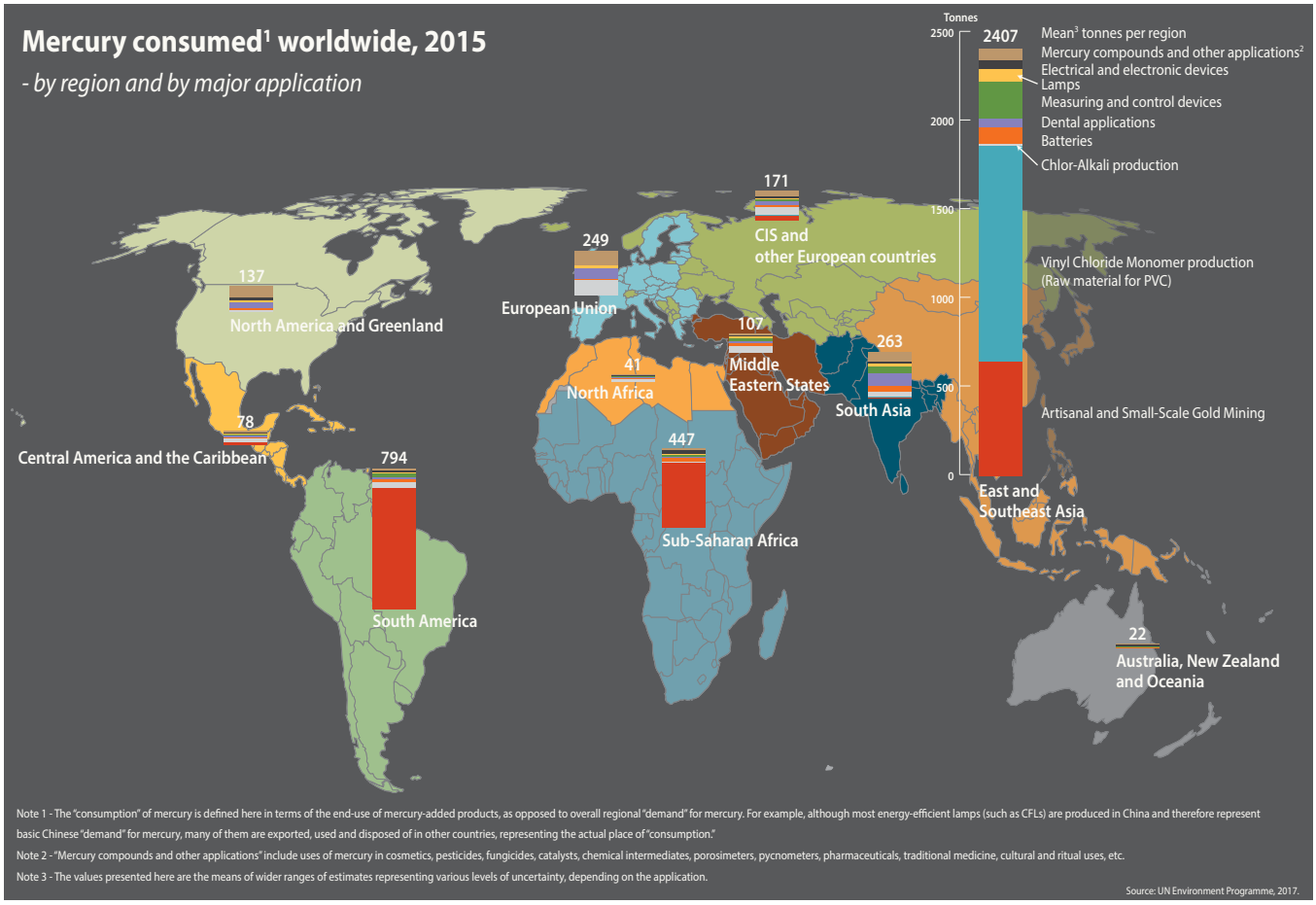


Figure 4: Mercury consumed worldwide, 2015

Table 3: Main countries informally importing mercury for ASGM

Countries using ≥20 MT per year (mean) mercury in ASGM	Mean mercury use in ASGM (tonnes)	Reported mercury imports 2015	Reported mercury imports 2016	Reported mercury exports 2015	Reported mercury exports 2016	Est. annual net informal mercury imports**
Indonesia	210-630	min.	0	284	311*	0
Colombia	90-270	133	119	9	0	0-150
Peru	73-218	12	0	2	0	60-200
Bolivia	84-156	140	238	0	0	0
China	25-175	0	0	0	0	0
Ecuador	43-128	min.	0	0	0	50-120
Sudan	63-103	79	0	0	0	50-100
Ghana	35-105	0	min.	0	0	40-100
Philippines	35-105	0	min.	0	0	40-100
Suriname	44-82	0	0	0	0	50-80
Brazil	23-68	3	18	0	min.	10-60
Burkina Faso	18-53	3	0	0	0	20-50
Tanzania	20-50	1	3	0	0	20-50
Zimbabwe	13-38	min.	0	0	0	15-35
Nigeria	10-30	0	min.	0	0	10-30
Total	**786-2211**	**371**	**378**	**295**	**311**	**365-1075**

* The Comtrade entry of 600 tonnes has been adjusted to remove 389 tonnes of unlikely exports to Japan

** Informal mercury imports net of those that may have been re-exported, i.e. informal imports for the country's own use

Sources: Artisanal Gold Council (2017) and Comtrade (2018)

each of which may typically use less than 5 tonnes of mercury per year. Peru and Brazil have somewhat larger mercury cell chlor-alkali facilities that may each require up to 10 tonnes of mercury per year. Apart from China, therefore, and some mercury used by these countries for dental purposes, the estimates for ASGM mercury use in Table 3 represent virtually all of mercury used in each of these countries.

The inescapable conclusion to be drawn from Table 3, as shown in Figure 5, is that about half of all mercury used in ASGM is traded illegally, and that for many of the individual countries involved, the use of illegal mercury is nearly 100 per cent. Even the mercury imports that are documented often follow informal pathways to arrive at the mining areas where the mercury is used. Much of the mercury that is documented when it is imported into Togo or South Africa, for example, is not documented as it is re-exported to ASGM areas in neighbouring countries (World Bank 2016).

Researchers report that the price of mercury sold onsite to ASGM operations may easily be two to three times higher than the market value of bulk mercury (World Bank 2016). This suggests that the cost of mercury to ASGM operators could be US $150,000–200,000 per tonne. If half of all mercury supplied to ASGM worldwide is illegally traded, as estimated above, the value of that illegally traded mercury is likely in the range of US $100–215 million annually, but since the ASGM use of mercury is merely an intermediate step in the production of gold, this illegally traded mercury is directly responsible for the production of gold with a market value of US $20-30 billion.

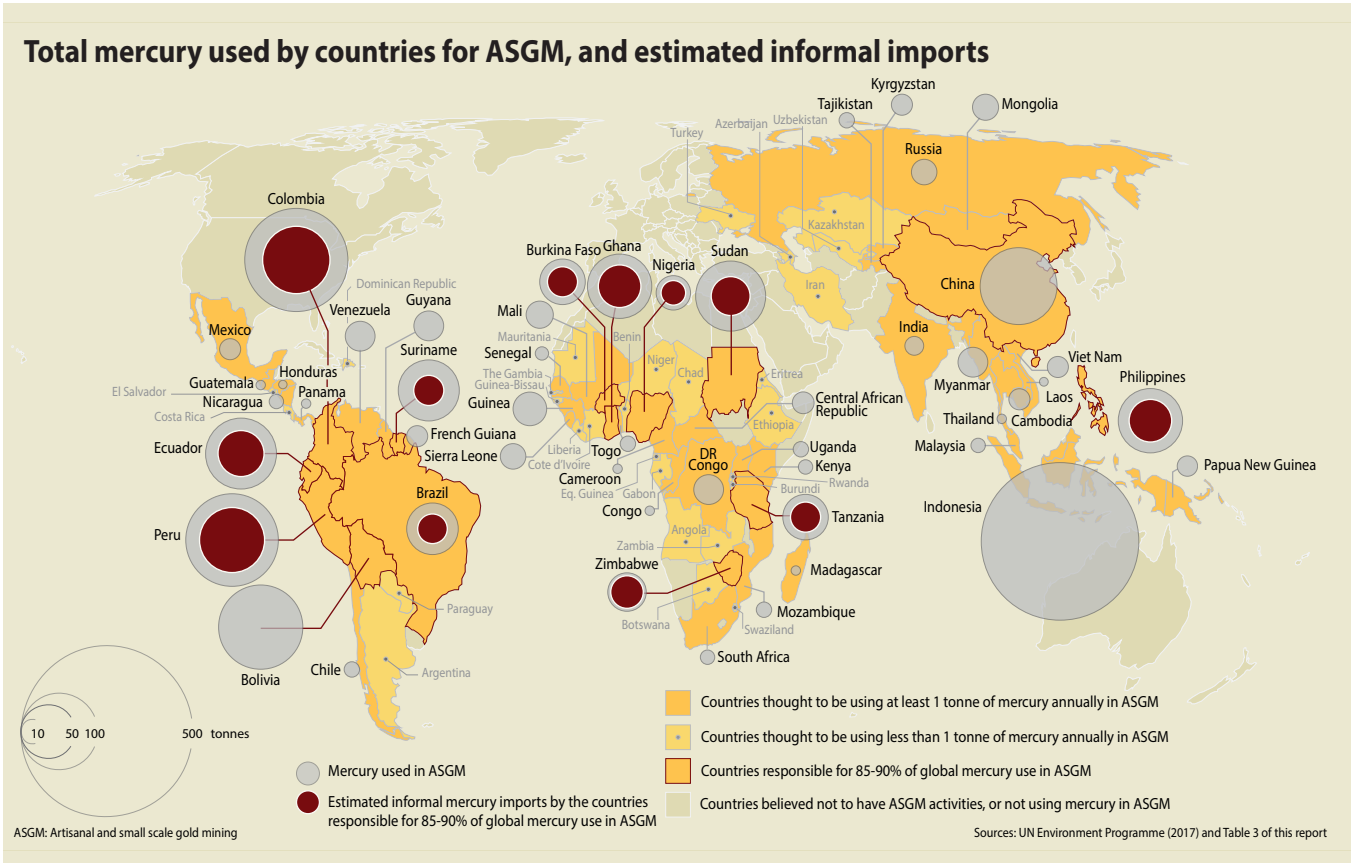


Figure 5: Total mercury used by countries for ASGM, and estimated informal imports

Sources of mercury

Prior to the EU mercury export ban under the 2008 EU Mercury Regulation, 800–1,000 tonnes of mercury or more were available every year from Mayasa's Almadén mercury mine in Spain and from the chlor-alkali industry. As the deadline for the EU export ban approached in March 2011, Mayasa exported its remaining stocks of mercury out of the country, some of them to Singapore, but also 102 tonnes to Panama, to a company registered in the name of the Commercial Director of Mayasa (El Confidencial 2016). Once outside the EU, these stocks were no longer subject to the export ban and were gradually sold to other buyers over the ensuing years. In a similar manner, much larger stocks of mercury were moved, mostly to Singapore, from various warehouses in the EU (Rotterdam, Antwerp and others) before the EU export ban took effect.

Before the US export ban in 2013, the US chlor-alkali industry, which held large quantities of excess mercury after it converted to a mercury-free process, was also a major source of mercury export to other countries, along with by-product mercury from the processing of ferrous metal ores and concentrates. As the US export ban approached, many of these stocks were also exported to Singapore, and resulted in massive stocks that were sold to other buyers over the subsequent years (UNEP 2017).

In recent years, the main mercury sources have been Chinese, Indonesian and Mexican mining, by-product mercury, chlor-alkali mercury from some facilities outside the EU and the US, and recycling of mercury-added products and wastes, especially the depleted mercuric chloride catalyst from the VCM industry in China (UNEP 2017). Other sources or stocks sometimes arise, such as 14,000 flasks of "former Kyrgyz" mercury offered to traders by a Russian source in 2016 (Maxson 2016a). And there were substantial stocks of mercury exported by Mayasa from the EU (especially to Singapore, Peru and Panama) just before the 2011 effective date of the 2008 EU export ban (Comtrade 2018).

Any of these sources may be linked in some way to illegal mercury trade, but the least transparent sources now are the quantities of mined mercury informally leaving Indonesia and Mexico, excess mercury from the chlor-alkali industry in parts of the world not subject to EU and US export bans and, to some extent, the mercury recovered from artisanal recycling of VCM catalyst in China (UNEP 2017).

In other parts of the world, in rough order of importance, Singapore, Hong Kong, Turkey, the United Arab Emirates, Panama, India and Vietnam serve as the main mercury supply hubs for both legal and illegal mercury trade. These hubs may be used sequentially or independently for a given shipment, depending on customer needs and the motivations of traders.

Figure 6: Evidence of illegal mercury trade in Latin America

Singapore, as an example, is known for its relatively relaxed regulatory, pro-business environment. The downside of this strategy, however, is that illicit activities may have more scope in which to flourish. According to an October 2016 comparison of major commercial trading hubs by the Economist Intelligence Unit, Singapore scored well on its customs environment (EIU 2016), with clearance and inspection times among the best in the region for goods with Singapore as the final destination. Singapore, however, received a relatively low ranking overall, largely as a result of its particular laxity with regard to transparency and free trade zone governance. For transparency, Singapore received a poor rating for government cooperation with stakeholders. With regard to free trade zone governance, Singapore received a score of only one out of four on the basis of such observations as insufficient monitoring or checks on warehouses for smuggled goods. The results of the 2016 assessment suggested that Singapore pays much less attention to goods transiting the country than it does to goods coming into the country to stay.

The Economist Intelligence Unit published an updated and expanded illicit trade environment index in June 2018. This is the most recent comparative assessment of the extent to which 84 countries enable (or inhibit) illicit trade through their policies and initiatives to combat illicit trade. The 2018 assessment confirmed the 2016 findings, with a poor score for "transparency and trade" not only for Singapore, but also for the UAE and Colombia, with Singapore and the UAE rated especially low on the criterion of free trade zone governance. Figure 6 provides an overview of some of the illegal mercury trade in Latin America.

CASE IN POINT

Kenya

The Centre for Environmental Justice and Development, a non-governmental organization in Kenya, conducted surveys of mercury suppliers and distributors during field visits to ASGM sites in Migori and Kakamega to collect information on mercury use in gold mining – the main reason for the mercury trade in the country. Since Kenya does not produce mercury, it relies on imports.

The field research found that the distributors and suppliers have a fairly low level of awareness of the origin of their mercury, but they did identify Chinese companies doing gold processing in the country as a main source. Some suppliers reported getting mercury from Mt. Elgon National Park, implying a potential smuggling operation from other East Africa countries. The main routes of the illegal mercury trade in Kenya include the Port of Mombasa, Jomo Kenyatta International Airport and Mount Elgon. Some mercury enters the country through Busia towns along the Kenya–Uganda border.

Suppliers of illegal mercury change every year and are drawn from Busia, Nairobi, Migori, Mombasa, Mt. Kenya, Tanzania, and Kitale among other places, but most suppliers and distributors of mercury prefer to work with specific suppliers due to lack of trust in the market. The survey further revealed that mercury suppliers and distributors usually work with 2–4 sources of mercury per year.

Both the suppliers and distributors of mercury are well aware of the illegal mercury trade. Some reported that they acquired the information regarding illegal mercury trade on the Internet and in workshops organized by regulators. They indicated, however, that they are in the mercury business because they still lack alternatives to mercury use in ASGM. This points to a low awareness level of the existing alternatives to mercury use in ASGM applications in the country.

The survey revealed that mercury packages are usually unlabeled and sealed by suppliers so that the contents are hard to identify. Suppliers sometimes repackage the mercury into smaller containers – plastic bottles, medicine containers or plastic bags – which they then sell to distributors. Where the mercury packages have labels, they are often written in Chinese, suggesting that most of Kenya´s mercury originates in China.

Trade strategies

Mercury may be shipped in containers of 1 tonne, in small plastic bottles containing less than 1 kg, or in various intermediate sizes such as the traditional mercury flasks of about 2 litres and containing 34.5 kg of mercury. As such, the space needed to hide mercury, despite its weight, may be quite small. There have also been cases, especially with regard to the high-grade cinnabar available in Indonesia, of traders shipping illegally mined cinnabar to other countries for refining.

The literature (UNEP 2017; CEC 2017) and expert knowledge suggest that the most common strategies or motivations for illegally moving mercury tend to include:

- Falsifying documents by declaring the wrong classification of goods, as in the case of sacks of cinnabar shipped from Indonesia to the Philippines, or by shipping commercial quality mercury disguised as low-value mercury or waste
- Transporting mercury without documentation
- Evading tariffs or tax payments by double invoicing schemes whereby the shipper fills out two sets of invoices – one showing the true value of the sale, and one showing a false value for submission to Customs (overstated in some cases and understated in others)
- Shipping goods through third countries expressly to disguise the country of origin, simply producing a false declaration of origin of the goods, changing markings after importation to falsify the country of origin, or repackaging goods from a container that was supposed to remain sealed, e.g. in a bonded warehouse
- Failing to obtain the required permits or licenses
- Smuggling goods via an unauthorized point of entry
- Disguising controlled goods within a shipment of uncontrolled commodities, or simply hiding mercury among other goods
- Using substandard, non-certified flasks for mercury shipments

In addition to illegal trade, a number of individuals and companies claiming to have mercury for sale have engaged in scams of less sophisticated customers, such as shipping low quality mercury as virgin mercury; filling flasks with some other heavy material topped off with a small amount of mercury; or advertising very low prices in an attempt to get a deposit in advance, after which the "supplier" disappears with the deposit.

Trade routes

Trade routes for illegal mercury typically follow the trade routes of other contraband – until the last leg of transport to the gold fields. At this point the mercury often follows the opposite route of the gold that is produced, and often the groups buying gold from miners are the same ones who are selling mercury to miners. A selection of typical trade routes follows (World Bank 2016).

Africa

Trade data reveal that India, Singapore, the United Arab Emirates, and China and/or Hong Kong appear to be the main sources of mercury shipped into sub-Saharan Africa (Comtrade 2018). A 2016 World Bank report on mercury trading and use in ASGM in sub-Saharan Africa relied on relatively sparse national statistics officially reported to the Comtrade database, as well as local information on informal mercury trade collected mainly by field researchers. The findings show that Togo is the main mercury supply hub for most of West Africa, while Kenya and South Africa serve as the main supply hubs for Central and East Africa, especially the Democratic Republic of Congo, Uganda, Tanzania, Zimbabwe, Mozambique and South Africa itself (World Bank 2016).

The World Bank report reveals that the majority of the transboundary trade between the countries in sub-Saharan Africa is undocumented and does not appear in any official statistics. The total estimated mercury demand for ASGM in sub-Saharan Africa – where ASGM activity is concentrated mostly in the Democratic Republic of Congo, Uganda, Tanzania, Zimbabwe, Mozambique and South Africa – is 55–160 tonnes per year. Apart from some formal records of mercury exports from South Africa to Zimbabwe and a few other countries, trade between all of these countries is largely undocumented. As an example, Kenya did not register any mercury exports at all during 2010–2015. Information gathered in the gold fields in northern Tanzania, Uganda and the eastern part of the Democratic Republic of Congo, however, confirmed that their mercury came mainly from Nairobi, likely after entering the country via the Kenyan port of Mombasa (World Bank 2016).

The port in Lomé, Togo, which opens a corridor for the import of many commodities to Ghana and other countries in the region, also serves as the main hub for the import of mercury into West Africa. In addition, a significant quantity of mercury is imported directly to Ghana and Nigeria. For the three major sub-Saharan ASGM countries – Senegal, Mali and Burkina Faso – hardly any mercury imports are documented. Moreover, no mercury exports to these countries from trading partners outside sub-Saharan Africa have been registered, confirming field research findings that mercury is informally imported from neighbouring countries, even while the origin of the mercury is unclear (World Bank 2016).

During the last 10 years Sudan has legally imported more mercury than any other country in sub-Saharan Africa, although contrary to other cases, there is little evidence of re-export, either formal or informal. In Sudan's case, the mercury appears to be used inside Sudan in extensive ASGM operations (World Bank 2016).

Mercury trade in Burkina Faso is handled by Burkinabé (people from Burkina Faso) who emigrated to Ghana many decades ago. They learned to use mercury in ASGM in Ghana, and later returned to introduce ASGM in Burkina Faso. Thus, these Burkinabé migrants to Ghana now supply mercury to artisanal miners in Burkina Faso and to many countries in West Africa. Conversely, these same mercury suppliers are the buyers of the gold produced by ASGM in Burkina Faso, which is sold covertly, outside the control of the mining administration.

The mercury used in ASGM in Burkina Faso comes from the ports of Togo or Ghana. The contacts at these ports receive the mercury and repackage it in 5-, 25- or 50-kg containers, which are then transported to Burkina Faso by truck, pickup, private car or motorbike, using unpaved bush roads or other roads where the police control is minimal. The transport may take three days to two weeks to arrive in Burkina Faso, where the mercury is stored in remote villages. When mercury is needed at an ASGM site, a container is sent from the village to that site. This a well-organized trafficking scheme managed by a number of key individuals, some of them evidently occupying rather high administrative or political positions in the country, especially considering the importance of the gold trade (World Bank 2016).

China, Hong Kong and the Philippines

There are many reports of mercury imported – both formally and informally – into other countries from China. It is virtually impossible to get a permit to export mercury from the mainland. A permit is not necessary to ship mercury from the mainland to Hong Kong, but such trade between the Chinese mainland and Hong Kong is not transparent. Mercury may be exported more easily from Hong Kong. Importers in other countries may be confused as to whether the mercury is coming from China or from Hong Kong (World Bank 2016), or possibly neither if the origin is misrepresented.

Although the import statistics of other countries show significant amounts of mercury apparently coming from China (64 tonnes in 2015 and 12 tonnes in 2016) and from Hong Kong (45 tonnes in 2015 and 11 tonnes in 2016), much of the mercury in transit does not show up in the statistics. Moreover, it is not clear where much of the mercury that does appear in the statistics actually originated. One possibility is

that Indonesian mercury sold by a Chinese company with an office in Indonesia may be accompanied by documents that suggest the mercury originated in China. Another possibility is that artisanal operations recycling VCM catalyst may sell some of the recycled mercury to individuals who transport it to Hong Kong for export.

China now operates artisanal gold mines in different parts of Africa (UNEP 2017). More than one source has mentioned hearing of mercury illegally imported into Africa and destined for Chinese operators, for example concealed among building materials (Maxson 2016b).

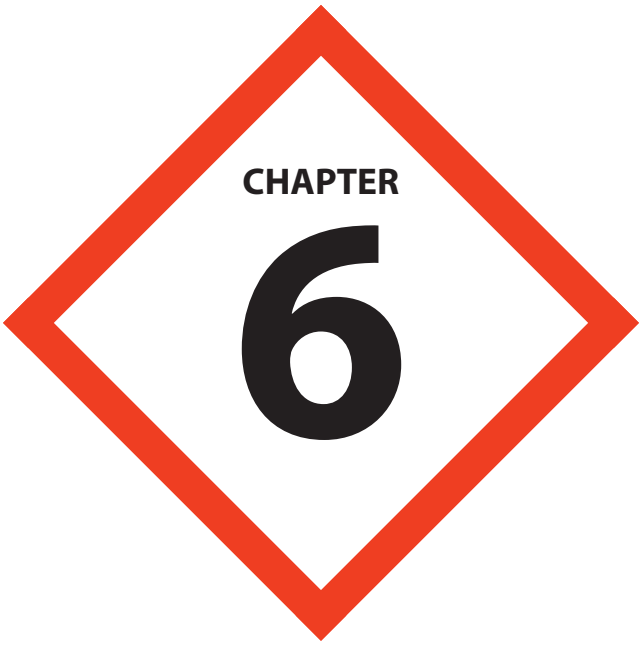
Based on interviews with importers and traders, illegal mercury enters the Philippines primarily through the main seaports such as Manila Harbor, hidden and undeclared in container vans filled with other legitimately imported items, and smuggled from neighbouring countries by small boats and outriggers, and unloaded at smaller seaports. A second route goes via Mindanao, the island closest to Malaysia and Indonesia, where smuggling of all sorts of goods occurs between the island of Sabah and Mindanao's three major fishing ports in Zamboanga, South Cotabato and Sarangani (BAN Toxics 2017).

Some miners in the Philippines have reported that relatively small quantities of mercury (about 500 kg per boat) are shipped illegally from Indonesia and Malaysia by fishing boats. The mercury is then transported to Davao, which acts as a hub for mercury traded to local gold mining areas. Customs officials are aware of this common activity but are hardly able to control it (BAN Toxics 2017).

Colombia, Suriname and Guyana

Some sources report that mercury comes illegally from Venezuela through border crossings in proximity to the Colombian border town of Cúcuta (see Annex 5). Authorities in the area may accept a certain amount of smuggling as long as it helps the local economy and is not accompanied by armed gangs.[8] Once inside Colombia, the mercury is transported into the city of Bucaramanga, which is the local distribution hub for mercury going to illegal mines in the area. As in the case of legal mercury distribution, the main Colombian distribution hub for illicit mercury is Medellín. The national ban on the use of mercury for gold mining, in effect since 16 July 2018, will likely influence the quantities and distribution routes of illegal mercury in the country (Colombiano 2018).

Both Suriname and Guyana are Parties to the Minamata Convention. In 2006, Suriname banned the import of mercury, but due to the difficulty of controlling the porous border between Suriname and Guyana, illegal trade is common. Quantities of illegally traded mercury are typically small. For example, in 2016, police in the Nickerie district of Suriname reported confiscating 128 kg of mercury that was imported illegally from Guyana (Basel Convention Regional Centre for the Caribbean Region 2016).



Enforcement

Illegal chemicals can be difficult to detect or distinguish from legal chemicals. The identification and interception of illegal chemicals is complicated by the vast number of chemicals on the market, a complex global supply chain, different shipment methods, diffuse oversight by various competent authorities and detection capacities of customs and other law enforcement agencies. In some countries, inadequate and unclear government enforcement responsibilities encourage non-compliance (UNEP 2005). Additionally, in many States, much of the import and sale of chemicals occurs beyond the control of government oversight.

Awareness and cooperation

Many of the soft initiatives intended to combat the illegal trade in waste and chemicals are targeted at increasing a country´s capacity to prevent illegal international traffic. Awareness of the trade in hazardous waste and other waste, particularly between countries with economies at different stages of development, is growing. Reports to the Basel Convention by the Parties confirm cases of transboundary movements of hazardous waste (BRS Secretariat 2019b).

Difficulties associated with the large number of chemicals on the market makes chemical control challenging. Knowledge and awareness of the scale of the illegal trade in chemicals is not well established among customs and competent authorities. Interviews with individuals coordinating enforcement suggest that the key challenge is that the frontline law enforcement officers are rarely trained to detect and recognize chemicals. In addition, frontline officers may simply not be aware that a substance in front of them is illegal.

Policymakers and enforcement agencies have limited awareness of the scale of the problem, and thus chemicals enforcement does not rank high in the national political agendas. A survey conducted by the Secretariat of the Parties to the Basel, Rotterdam and Stockholm Conventions reveals that only 11 out of 44 respondents were aware of illegal shipments of industrial or agriculture chemicals (BRS Secretariat 2019b). And the regulated community may be equally uninformed: a study on illegal pesticides in Laos, for example, found that most retail shop owners lacked a license to sell pesticides and were unaware of banned pesticides (PANAP 2013).

The main trade routes for illegal chemicals pass through places where regulation or monitoring is weaker. Many of the free trade zones set up to facilitate trade and offer incentives for business operations are also vulnerable to illicit trade and other illegal activities (EIU 2018). Monitoring of goods is limited considering the nature of the free trade zones. Local law enforcement authorities may not have authority to carry out checks or enforcement is limited.

Implementation and enforcement of the existing provisions of international conventions are based on established national coordination mechanisms to facilitate the exchange of information among relevant authorities. The information gathered from the Parties to the Basel, Rotterdam and Stockholm Conventions by their secretariats reveals that most of the countries have established national coordination mechanisms. This can be stipulated in national legislation or through established cooperation agreements between organizations such as national authorities responsible for the implementation of conventions, customs authorities, and police, among others. Eight countries out of 44 responding parties reported that they did not have national coordination mechanisms (BRS Secretariat 2019b).

The cooperation of informants may be a path to better enforcement results. According to a US Department of Justice audit released in 2016, the US Drug Enforcement Agency (DEA) used more than 18,000 human sources between 2010 and 2015. Most of these informants were criminals who, in exchange for lenient sentences for their own crimes, agreed to help the DEA gather information about targeted individuals and criminal enterprises (Bhattacharjee 2018).

Ineffective regulation

The lack of understanding of the provisions of the existing international conventions makes for challenges in implementation and enforcement. The reports of the Parties of the Basel, Rotterdam and Stockholm Conventions reveal the need for clarity in specific terms and labelling requirements. The Parties' definitions of pesticides, for example, may or may not include biocide, which can be classified under two categories – pesticides and industrial chemicals. This lack of clarity makes it difficult to identify the competent authorities and to proceed with implementation mechanisms (BRS Secretariat 2019b).

Another challenge arises when trade is relatively easy between countries with different regulations. The insecticide carbofuran, for instance, has been banned in Serbia since 2012, but was purchased there via the Internet, and exported from Turkey, Bosnia, Ukraine, Moldova and Israel among other countries where its sale is still allowed. The use of carbofuran ended up poisoning a large number of protected birds in Serbia (Republic of Serbia, Ministry of Agriculture and Environmental Protection 2017). In recognition of this type of challenge, pesticide regulators in the Southern African Development Community and in the East African Community are working on regional collaboration for pesticide management including implementation of regional strategies to address highly hazardous pesticides.

Clear procedures help the States deal with transboundary shipments of waste and chemicals. The prior informed consent procedure with strict requirements for transboundary movement of hazardous waste and other waste under the Basel Convention helps Parties grant permits for the export, import and transit of hazardous waste. Other conventions include similar, albeit much narrower, mechanisms. While custom officers may look out for specific chemicals, other chemicals of concern not subject to the PIC mechanism may slip past.

The combination of high disposal costs in wealthy nations and poor regulation in developing nations drives an illegal market for trade in chemicals fed in part by chemicals that are permitted under convention exemptions and diverted for other purposes. Methyl bromide, for example, is exempted from the Montreal Protocol ban for quarantine and pre-shipment applications, and may be acquired on the illegal market for other applications. When States have agreed to allow many exemptions, such as those permitted for perfluorooctane sulfonate and related compounds under the Stockholm Convention, customs officials have an even more challenging task in determining whether the chemical will be used for an acceptable purpose.

The effectiveness of the international regulation of trade in harmful chemicals is also hampered by the failure of States to enforce their obligations under the agreements. Despite the complete ban on certain POPs under the Stockholm Convention, for example, many POPs continue to be manufactured by specific States that have been unable or unwilling to convert the Convention into domestic action (UNEP 2013). Similarly, in violation of their obligations under the Montreal Protocol, not all countries have fully implemented import and export licensing systems that control methyl bromide.

The regulation of the trade in illegal chemicals is also challenging due to limited domestic export controls. Many countries permit the export of chemicals that have been banned for domestic use. The United States, for example, does not require pesticides intended solely for export to be registered. Some unregistered pesticides that are exported have been banned or severely restricted in the United States (US EPA 2017).

Online trade

Virtual trade platforms are yet another challenge for enforcement authorities. The trade is widespread across formal trading platforms, social media and similar forums. Research papers and reports on environmental crime mention the online trading of illegal goods (Yeo, McCrea and Roberts 2017; INTERPOL and IFAW 2013). Until now, research has focused on the trade in wildlife, particularly elephant ivory, which is the wildlife product most traded over the Internet (INTERPOL and IFAW 2013). While the chemical trade receives less attention, some examples indicate its importance. The US Environmental Protection Agency (EPA) has made a positive step by working out an agreement with Amazon to combat the illegal trade in pesticides on the basis of inspections and monitoring evidence (US EPA 2018a). And the private sector initiative, China Checkup, has attempted to warn customers about fraudulent suppliers on Alibaba (China Checkup 2015).

Selected regional enforcement efforts

INTERPOL and the European Union Agency for Law Enforcement Cooperation – Europol – have each conducted sweeping enforcement actions in recent years. The illegal trade in waste and chemicals can occur both between and within regions. Intra-regional trade is common, for example, in South-East Asia and the Pacific, Central and Southern Asia, North Africa, the Caucasus and the Middle East, but is less likely to attract attention, and may indicate that awareness of the illegal chemical trade remains low among enforcement authorities.

Operation Silver Axe

Europol conducted Operation Silver Axe I, II, III and IV a series of four enforcement actions against the illegal trade in chemicals. The first of these, over 12 days in late 2015, included the participation of seven countries and the seizure of 190 tonnes of illegal or counterfeit pesticides (Europol 2015). The violations included infringements of intellectual property rights, false declarations and unknown products potentially containing unauthorized chemicals. The subsequent operations focused on the same types of violations.

For Operation Silver Axe I, Europol cooperated with CropLife International, the European Crop Protection Association and the European Crop Care Association in the preparation and execution of the operation. In the next two operations, the cooperating parties expanded to include the Directorate General on Health and Food Safety, the European Anti-Fraud Office, INTERPOL and FAO.

Operation Silver Axe II included the participation of 17 countries over 10 days, and resulted in the seizure of 122 tonnes of illegal pesticides (Europol 2017). Operation Silver Axe III grew to include 27 countries over 20 days, and netted 360 tonnes in seizures (Europol 2018). The 2019 operation yielded 550 tonnes of seizures of pesticides (Europol 2019), and the violations included infringements of intellectual property rights, false declarations and unknown products potentially containing unauthorized chemicals. Overall, Operation Silver Axe stands as example of successful international cooperation among law enforcement agencies.

Reporting on the prosecution of cases remains difficult as appeals drag on. The European Network of Prosecutors for the Environment work mostly within the context of non-compliance with waste shipment regulations, while global analyses and regional enforcement efforts such as Operation Silver Axe demonstrate that the illegal trade in pesticides and mercury is widespread.

Operation 30 Days of Action

INTERPOL is the world's largest international police organization, facilitating cross-border police cooperation among its 194 member countries to prevent and combat international crime. In combating environmental crime, INTERPOL provides technical assistance, law enforcement contacts and operational and investigative support to disrupt illegal transboundary movements of waste and marine pollution crime, among other environmental crimes.

In 2017, INTERPOL coordinated Operation 30 Days of Action, the largest law enforcement operation ever led against waste crimes. The Operation was initiated by the INTERPOL Pollution Crime Working Group in response to a call from the global law enforcement community to gather more information on waste crimes and to encourage international cooperation in the fight against illegal waste activities.

The operation targeted illegal waste and chemical shipments including expired medicines, paint and pesticides. This global operation involved police, customs, and border and environmental agencies from 43 countries (INTERPOL 2017).

The operation uncovered 664 cases of criminal and administrative waste violations, of which 238 were cases of on-site waste activities and 423 were cases of waste shipments (3 cases were unspecified). As a result of the operation, 483 individuals and 264 companies were reported and over 1.5 million tonnes of illicit waste were detected (INTERPOL 2017).

Most of the INTERPOL Operation 30 Days of Action cases were in the illegal waste trade. The successes here reflect the positive result of global awareness of illegal waste trade, particularly regarding e-waste, and of all the efforts in training, information exchanges and capacity-building of enforcement authorities. These successful criminal investigations, however, focused on waste, and consequently shed little light on the illegal trade in chemicals.

The results of the Operation 30 Days of Action reveal some emerging trends in the illegal trade in waste and chemicals, in particular, criminal and administrative violations related to fuel, hazardous medical waste, and pharmaceutical waste among other illegal shipments (INTERPOL 2017).


TCNU 873642 45G1
MSCU 930782 45G1
GLDU 768585 45G1
DRYU 934919 45G1
FCIU 948748 45G1
MSCU 706624 45G1
TGHU 923064 45G1
BMOU 595631 45G1
TCNU 542962 45G1
TRLU 704420 45G1
TCNU 714428 45G1
TCLU 533579 45G1
TCNU 567964 45G1
MEDU 717645 45G1
MSCU 939039 45G1
MEDU 883992 45G1
CAXU 934956 45G1
659073 45G1
BMOU 550357 45G1
MSCU 846427 45G1
MEDU 801722 45G1

Selected national enforcement efforts

The United Nations Office for Drugs and Crime together with the World Customs Organization implements the Container Control Programme with the aim of assisting Governments in creating sustainable enforcement structures in selected seaports, airports and land border crossings in order to minimize the risk of cargo containers being exploited for illicit drug trafficking, transnational organized crime and other forms of black market activity. The reports from the custom units on the interception of illegal shipments of chemicals are few compared to the activities related to global transboundary trade in chemicals, possibly as a result of a lack of knowledge and awareness, but the programme reports regular seizures of a wide range of contraband including precursor chemicals and goods that are counterfeit or otherwise violate intellectual property rights (UNODC 2015; UNODC 2016; UNODC 2017).

Annex 3 includes a summary of media accounts of recent national enforcement cases where chemicals were intercepted.

Brazil

According to SINDIVEG, the Brazilian agrochemical industry trade association, the Brazilian authorities seized 496 tonnes of illegal pesticides between 2001 and 2013. In 2016, this amount reached 654 tonnes, and in July 2018 the SINDIVEG website reported 1,125 tonnes of seizures (SINDIVEG 2018).

News reports suggest a wide variation in seizures of illegal pesticides:

- From a few kilograms to tens of tonnes
- From ordinary cars to large trucks, ships, boats and airplanes
- In transit and in storage
- Illegal imports and clandestine factories
- Illegal, clandestine, counterfeited and smuggled products

The Toxisphera Environmental Health Association notes that the illegal products do not meet the legal requirements regarding limits of impurities (and therefore, could not be registered in Brazil). Some products may not even have active ingredients, and in one case the product had 25 active ingredients of different chemical groups, classes of use and risk, and included insecticides, acaricides, formicides, termicides and fungicides, and even a growth regulator and herbicide (Tosato 2017).

A study based on expert reports produced by the Brazil Federal Police between January 2012 and October 2017 (Lemos, Carvalho and Ortiz 2018) points out that:

- Eighteen per cent of seizures had no active ingredients, or had ingredients other than those described on the package
- Metsulfuron-methyl was the active ingredient most frequently present in pesticides seized and analyzed, followed by imidacloprid, emamectin benzoate and fipronil
- Four active ingredients prohibited or banned in Brazil – Metalaxyl, Benomyl, Methamidophos and Monocrotophos – were detected
- The toxicity of the seized chemicals ranged from extreme (13%); to high (22%); moderate (53%); and low (9%)

Indonesia

According to a high ranking official at the Criminal Investigation Agency, between September 2017 and March 2018, Indonesian police confiscated about 35 tonnes of mercury and 36 tonnes of cinnabar, and identified 125 suspects in the illegal trade in mercury. An official statement reported 40 tonnes of mercury and 26 tonnes of cinnabar confiscated in 2017 (TribrataNewsNTB 2017).

The largest mercury raid in Indonesia occurred in Semarang harbour in central Java in September 2017, and involved a Sudanese citizen ultimately sentenced to prison for one year and fined about US $68,000. This illegal trader bought mercury in lots and stored them in boxes in a rented warehouse in the Semarang Port, Tanjung Mas. One lot of 10 tonnes came from an Indonesian trader via the Internet at a price of almost US $30,000. Another purchase came from the city of Bekasi, and was trucked to storage in the Semarang warehouse.

When the local police raided the warehouse on the basis of suspicious movements, they found 21 tonnes of mercury in boxes. Police confiscated the mercury, and found no proof of origin, no licence, no permit. The Sudanese citizen, a warehouse worker and the warehouse owner were all charged and convicted under Indonesian law for the illegal trade in mercury. The warehouse worker was sentenced to two years in prison and fined about US $10,000, and the owner was sentenced to seven months in prison and fined about $3,400 (CNN Indonesia 2017).

The United States

Early in 2018, the US Environmental Protection Agency announced an agreement with Amazon, the largest US e-commerce platform, on unregistered and mislabeled pesticides sold through Amazon's website between 2013 and 2016 (US EPA 2018a). These sales violated the US Federal Insecticide, Fungicide and Rodenticide Act (FIFRA).

The US is not a Party to the Basel, Rotterdam and Stockholm Conventions, but FIFRA set up strict rules regarding the registration, labelling and sales of pesticides in the US in order to protect public health and the environment. The EPA is responsible for the enforcement of FIFRA, and controls the import of pesticides and inspects the labelling of those products.

Late in 2014, the EPA started investigating online sales of pesticides through several retailers. After discovering that Amazon was distributing unlicensed pesticide products, the EPA issued several removal orders to prohibit the sales, whereupon Amazon stopped the sales and cooperated with the EPA. The EPA (2018a) estimates that, "Amazon committed nearly 4,000 violations of the Federal Insecticide, Fungicide and Rodenticide Act dating back to 2013." The illegal sales were carried out through a service called Fulfillment by Amazon that enables third parties to use Amazon's facilities in order to sell products, among which illegal pesticides were discovered.

Following the stop sale orders, the company increased the monitoring of its website for illegal pesticides, identified and made contact with the consumers who had purchased the illegal products between 2013 and 2016, refunded them the cost of the products and signed an agreement with the EPA.

The agreement provides for the development of an online training course in order to spread the awareness of the danger of illegal pesticide sales. This online training set up by Amazon LLC is available in English, Spanish and Chinese. According to the EPA, the illegal pesticide traffic is especially a danger for non-English speaking consumers who use some pesticide products that are illegal in the US, but that have been used for a long time in Asia. The completion of the training is a sine qua non condition for every person wishing to sell pesticides on Amazon. The agreement also provides for the payment of an administrative penalty of $1,215,700 by Amazon LLC.

This Amazon agreement falls within the EPA policy based on good faith effort. Indeed, EPA encourages companies to self-disclose and remedy any environmental violation in exchange for the mitigation or cancellation of the penalties. In December 2015, the EPA announced the launch of a new portal, eDisclosure, which modernizes implementation of self-disclosure policies by creating a centralized web-based portal to receive and automatically process self-disclosed civil violations of environmental law (US EPA 2018c). The goal is to make the disclosure procedure easier, faster and more efficient, saving time for the companies and the EPA (US EPA 2018b).

CHAPTER

7

Considerations for policymakers

A review of the knowledge gaps and enforcement challenges in the illegal trade in chemicals reveals some weaknesses in the existing regulatory systems and some of the difficulties in enforcement. The findings of this report inform a set of considerations for policymakers and competent authorities at the national, regional and international levels of engagement, and for communities and users of these chemicals and related products.

National strategies on reducing environmental and human health risks must take into account that countless consumer products – cosmetics, drugs, toys, paint, food and others – contain hazardous chemicals. National policies should therefore target the production and distribution of safe consumer goods and products, and should encourage the involvement of all stakeholders in decisions regarding the safe management of chemicals based on knowledge and credible evidence. National legislation should prioritize the prevention of the illegal trade in chemicals, and policymakers should recognize that strengthened enforcement is likely to reduce the illegal production, trafficking and use of chemicals.

The illegal trade in pesticides is a global problem that threatens the environment and human health, and while comprehensive estimates of the scale of the trade are not available, some estimates for specific areas suggest the seriousness of the situation. FAO and WHO, for example, estimate that 30 per cent of the pesticides sold in developing countries are substandard. Similarly, India reports that the illegal trade represents about 25 per cent of the value of pesticides used in the country.

This trade is quite often connected with other criminal activities, including smuggling and illegal trafficking, and traders use trade routes similar to those used for trafficking of other illicit products. Corruption among law enforcement, customs and registration authorities is a factor in many cases. In addition, the significant growth of online marketing of pesticides coupled with anonymous parcel deliveries is making a major contribution to the market share of the illicit products, particularly where small packages reach small-scale farmers.

The underpinnings for the illegal trade in mercury are different from those for pesticides. The illegal mercury trade serves primarily the Artisanal and Small-scale Gold Mining market, and about half of all mercury used in ASGM is traded illegally. For many of the individual countries involved, the rate reaches nearly 100 per cent. Even the mercury imports that are documented often follow illegal pathways to the mining areas where the mercury is used. Much of the mercury that is documented when it is imported into Togo or South Africa, for example, is not documented as it is re-exported to ASGM areas in neighbouring countries. ASGM operators rely heavily on mercury and many are not aware of its toxic effects. The mercury-free alternatives are either unknown to them or perceived as inconvenient.

In recent years, the main mercury sources have been Chinese, Indonesian and Mexican mining, by-product mercury recovered during the mining of other ores, mercury recovered from closing chlor-alkali facilities, and recycling of mercury-added products and wastes, especially the depleted mercuric oxide catalyst from the vinyl chloride monomer industry in China.

Challenges in the regulation of the international trade in chemicals include enforcement and implementation, differences among domestic regulations across borders, an abundance of complex exemptions allowed under multilateral agreements, and gaps in international regulations. MEAs are targeted and focused in nature and accordingly Parties choose a focused group of chemicals of the highest priority for the environment. As a result, trade in many harmful chemicals is unregulated by international law.

Progress in combating the illegal trade in chemicals can build on the SAICM Global Plan of Action and the overall orientation and guidance for achieving the 2020 goal of sound management of chemicals. The SAICM objectives related to risk reduction, knowledge and information, governance, and enforcement offer a logical structure for organizing the considerations.

What to do about pesticides

Considerations at the global and regional levels

One way to compensate for gaps and differences in regional and international environmental law is for the relevant authorities to cooperate with each other to the extent possible. Even with ample evidence of successful cooperation to date, policymakers at the global and regional levels can strengthen coordination among United Nations agencies and others involved in preventing the illegal trade in chemicals. This group includes agencies such as the United Nations Environmental Programme, INTERPOL, Europol, the United Nations Office on Drugs and Crime, the World Customs Organization, FAO and OECD, and regulatory bodies such as the secretariats of multilateral environmental agreements.

Improving technical cooperation may also strengthen the capacities of key players. As interviews with those responsible for coordinating enforcement suggest, frontline law enforcement officers are rarely trained to detect and recognize illicit chemicals, and may not know that a substance in front of them is illegal. And given the absence of comprehensive baseline data, even customs and competent authorities lack the knowledge and awareness of the scale of the illegal trade in chemicals.

The development of baseline data on the existing illegal trade could markedly improve the ability of authorities to target their efforts and to measure the effectiveness of current responses in terms of the problem as a whole. Likewise, a deeper understanding of the broader socioeconomic impacts of the illegal trade could potentially enable authorities to integrate the fight against illegal trade in chemicals with progress towards the related Sustainable Development Goals. In addition, combating illegal trade in chemicals can be intensified by institutional cooperation together with sufficient resource allocations. More narrowly, the gaps in the coverage of the existing multilateral environmental agreements potentially create confusion among national authorities and while the processes for closing the gaps are cumbersome, the gaps offer a target-rich environment for specific actions.

Constructive steps in the right direction might include understanding the obligations for international movements of chemicals and regulating the trade in chemicals within the prior informed consent procedure of the Rotterdam Convention.

In addition, developing joint regional action plans to fight the illegal trade in chemicals and waste, and harmonizing national pesticide management frameworks could strengthen regional cooperation and improve enforcement. In any case, policymakers at the global and regional levels can encourage the development of comprehensive baseline data on the illegal trade so that enforcement agents can measure progress, and so that the key organizations and agencies, as well as political leaders, understand the full scope of the problem.

Operation 30 Days of Action and Operation Silver Axe are concrete examples of the value of this type of awareness in the law enforcement community, and demonstrate how cooperative efforts can succeed in their enforcement mission while also uncovering more information about the illegal trade. These successes suggest that international organizations, national authorities, and partners in industry and civil society can support the fight against the illegal trade in chemicals while also supporting capacity-building and awareness-raising activities.

Placing the illegal trade in pesticides into the larger context of environmental crimes offers a path for even wider cooperation – including sharing information and best practices with those combating animal trafficking or biodiversity crimes, for example. Short of making environmental crimes the organizing principle for law enforcement agencies, policymakers can encourage collaboration within and across jurisdictions, and high-ranking law enforcement officials can – on their own authority – initiate cooperative enforcement, training and the exchange of best practices. Efforts of this kind can reveal more about the regional dynamics of the illegal trade.

Intensive production and use of pesticides correspond to the needs of the global agricultural industry, and the illegal trade varies according to the conditions in domestic and global markets. The illegal marketing of effective, but extremely toxic, restricted and banned pesticides, tends to expand with pest outbreaks, and the use of pesticides is projected to increase in light of climate change. Illegal pesticide use may also increase as agriculture expands. A better understanding of these dynamics would help policymakers respond effectively – yet another reason to develop baseline data.

Considerations at the national level

National policy options include improving the monitoring and understanding the supply chain – national reporting of chemical movements from source to end use and disposal – and communicating the findings and consequent policy advice in appropriate documents.

Risk reduction strategies

Risk reduction strategies at the national level should follow the same capacity-building strategies as the global level, and address the production and distribution of illegal, toxic and dangerous

consumer goods in national markets by strengthening the human capacities to perform the regulatory functions, and by strengthening national regulations and enforcement.

Countries that have no empty container management system enable illegal traders to buy used containers, fill them with substandard or obsolete stocks, and sell them to unsuspecting buyers. National legislation can provide for measures to ensure that hazardous waste and pesticide containers do not return to the market in a new supply chain, and to require due diligence national reporting on the generation and management of hazardous waste. These measures may include collection schemes, deposit systems or something similar.

The development of toxic-free alternatives may reduce the demand for toxic, hazardous and banned or severely restricted chemicals, especially the demand served by illegal trade, and national policymakers may find ways to encourage this approach with special projects through agricultural or environmental ministries or agencies in collaboration with NGOs and civil society partners. This same type of partnership may also help raise awareness among vendors, local farmers, rural communities and private landowners about the health and environmental risks associated with pesticides.

Knowledge and information strategies

National policymakers can adopt knowledge and information strategies that focus on the needs of consumers and communities in ways that support the fight against the illegal trade in chemicals and contribute to public health and environmental protection. Both men and women who are directly exposed to chemicals should receive specific attention in domestic knowledge and information strategies. In concert with risk reduction strategies to raise awareness, countries can support stewardship programmes on organic and ecosystem-based approaches to agriculture with the participation of industry, NGOs and others. Agricultural extension services can assist in this work, and developing or strengthening extension capacities to assist micro-, small- and medium-scale farmers is a logical complementary strategy. National leaders may also have opportunities to fashion information and education products and programmes tailored to the specific needs of their communities and end users and targeted at the most relevant health and environmental effects of concern. Policymakers at the national level can follow the same approach as global and regional policymakers, and can encourage the development of comprehensive baseline data and support further study of the global and regional dynamics of the illegal trade in chemicals.

Governance strategies

In conjunction with other efforts to reduce the illegal trade in chemicals, national policy can support strategies for the seizure and proper disposal of illicit pesticides as a sound approach to removing material from the illegal market. This approach may also encourage the development of a norm that seized illicit pesticides be treated as waste, but it requires that countries have a clear system in place to handle the waste in an environmentally sound manner.

The developing trend of marketing of pesticides online is global in scope, but national policy – as demonstrated by the efforts in China and the US – can intervene effectively to protect uninformed buyers simply by encouraging service providers to combat the illegal trade. Further steps may include establishing an effective regulatory policy on online pesticide marketing and negotiating an ultimate ban on marketing of unregistered or banned plant protection products.

Enforcement strategies

National enforcement strategies are likely to benefit from the use of education and awareness campaigns targeted to authorities who may come into contact with illegal products, but who are unaware of the criminality or associated health and environmental risks. Even among customs and competent authorities, the scale of the illegal trade in chemicals is not well understood, and a key challenge to effective enforcement is that frontline officers are rarely trained to detect and recognize chemicals. Appropriate law enforcement training to sensitize agents to the illegal trade in chemicals at all levels is a potentially effective response to this situation. Similarly, national strategies may include programmes intended to enable national stakeholders (i.e. enforcement authorities, customs, regulators, civil society) to identify illegal supply chains.

The rationales for cooperation and coordination at the global level apply equally to the national level, and national strategies for strengthening coordination may include concrete mechanisms for exchange of information among law enforcement agencies and competent authorities. Likewise, the rationale for capacity-building applies at the national level, and policymakers can work to ensure that sufficient human resources are available on the front lines, and that officers have the technical means necessary to combat illegal trade. Additional cooperation strategies may include the development of intelligence systems for sharing information among agencies and the coordination of transnational enforcement operations similar to Operation Silver Axe.

What to do about mercury

The Minamata Convention has resulted in the implementation of a range of regulations and restrictions related to the trade in mercury, and the higher costs and increased scrutiny associated with regulatory compliance have created an unfortunate incentive for traders to avoid official channels, particularly where enforcement is weak. In addition, the quickest and cheapest ways to deliver mercury to remote ASGM operations are often undocumented or illegal. In general, then, even the simplest measures to improve monitoring and reporting of mercury stocks and movements can make a big difference. But the transition to mercury-free ASGM calls for bold moves – legalization and regulation of ASGM as part of the formal economy.

As in the pesticides section above, the structure for organizing the policy considerations concerning the illegal trade in mercury includes the categories of risk reduction, knowledge and information, governance, and enforcement.

Risk reduction strategies

In the context of the increased scrutiny of the use of mercury for ASGM, illegal trade is expected to increase. Reducing ASGM mercury use will thus depend in large part on the willingness and ability of governments at the national, provincial and local levels in each ASGM country to be vigilant with regard to the mercury trade. At the same time, mercury source countries may be equally or even more responsible for encouraging illegal trade, and should assume a key role in controlling mercury supplies at the source, particularly at mercury mines, chlor-alkali facilities, and companies producing mercury as a by-product of mineral or gas processing.

The Minamata Convention requires the phase-out by 2025 of the use of mercury in the chlor-alkali industry, and ensuring the implementation of the phase-out and supervising the disposition of the recovered mercury would complement and reinforce the other steps governments can take. Likewise, ongoing primary mercury mining should be phased out as quickly as possible, particularly in China, Indonesia and Mexico. In addition, further efforts to promote mercury-free mining practices might include:

- Building capacity and targeting financial resources to encourage mercury-free alternatives
- Rewarding miners with tax incentives and other commercial benefits for using reduced mercury or mercury-free processes

Knowledge and information strategies

A review of the documentation of mercury imports and exports shows that many countries are either not carefully recording mercury imports and/or not reporting the statistics to the Comtrade database. The monitoring and reporting of mercury movements from source to end use and disposal need to be further improved so that the organizations charged with enforcing trade regulations are better informed, and countries need a well-considered structure for sharing relevant information among agencies and with other countries. Innovative uses of information technology such as blockchain may prove useful in tracking mercury movements and in identifying illegal trade. All the authorities concerned with the illegal trade in mercury can benefit from further research into the nexus of illegal gold mining, the trade in mercury and transnational organized crime.

ASGM operators continue to rely largely on mercury, and many remain unaware of its toxic effects. Small-scale mercury-free mining processes exist but they are either unknown to many miners, or inconvenient for a number of reasons. Moreover, even where ASGM communities have been educated about the health and environmental risks of mercury, this knowledge has not led to a significant move away from the mercury process, mostly for economic reasons. While not ignoring the need for enhanced health and environmental awareness, the best approach to convince ASGM operators to change their practices, based on a range of project experiences worldwide, appears to include: 1) the legalization and regulation of ASGM in order to better understand the scope of the activity, as well as to provide a framework for the delivery of training and education services; 2) the promotion and demonstration of alternatives to mercury use, and especially those processes that are able to recover a significantly greater percentage of the gold content of the ore; and 3) the promotion of ASGM associations and cooperatives that are better able to implement the more efficient mercury-free gold recovery processes.

Governance strategies

Parties to the Minamata Convention are developing National Action Plans that will outline how they intend to phase out the use of mercury in ASGM, among other measures. As these plans become available, authorities across agencies and regions may find in them possibilities for measures to adopt for their specific situations. Countries dealing with mercury use in ASGM may benefit from better control of the production and marketing of gold and the harmonization of gold-export regimes to the extent possible to reduce the drivers of illicit cross-border trade. Other governance strategies may include:

- Standardized regional mercury-specific trade frameworks
- Anti-corruption campaigns at the local and national levels

Enforcement strategies

The Parties to the Minamata Convention have agreed that implementing the mercury supply restrictions in primary mining and chlor-alkali and other prescribed controls are priority measures. As the countries focus on implementing these measures, they may advance the cause by improving the capacity of customs and law enforcement officials – especially at the field level – to deal with illegal mercury trade. As in any enforcement function, the fight against the illegal trade in mercury requires adequate human resources and the necessary technical and legal means. The legal measures might include:

- Criminal and civil liabilities or penalties along the entire illegal supply chain
- Seizures of property or equipment used to conduct illegal activities

Seaports that serve as import and export hubs are choke points in the regional mercury supply chains, and coordinated regional trade control strategies that focus resources on these hubs may be an effective enforcement strategy. Devoting special attention to the role of organized crime and other armed groups in the mercury trade is likely to be an effective complementary approach.

An array of monitoring and control measures is available to enforcement authorities, and depending on the circumstances and resources available, further monitoring and control measures may include surveillance, electronic controls, obligatory reporting and other appropriate steps. Policymakers everywhere should encourage the wide sharing of best practices among enforcement authorities.

Annexes

Annex 1: Definitions

Pesticides

The table below provides the definitions and sources for the terms used in this report.

Term	Definition	Source
Banned pesticide	A pesticide all uses of which have been prohibited by final regulatory action in order to protect human health or the environment including those that have been refused approval for first-time use or have been withdrawn by industry either from the domestic market or from further consideration in the domestic approval process, and where there is clear evidence that such action has been taken in order to protect human health or the environment.	FAO and WHO 2016
Counterfeit or fake pesticides	Pesticides with ingredients, chemical components or manufactured products the origin or contents of which are deliberately misrepresented through false labelling and other forms of misidentification or fraudulent presentation. This category also includes products that do not properly label active ingredients or include unlabelled and potentially illegal or banned chemicals or other combinations of unidentified chemicals and unknown substances.	UNICRI 2016
Pesticide	Any substance, or mixture of substances of chemical or biological ingredients intended for repelling, destroying or controlling any pest or regulating plant growth.	FAO and WHO 2016
Pesticide legislation	Legal instruments specifically designed to control pesticides. The term may refer to a primary instrument, often a law, act or ordinance, as well as a number of secondary or subsidiary legal instruments, such as regulations, decrees, rules or notices.	FAO and WHO 2015
Pesticide management	The regulatory and technical control of all aspects of the pesticide life cycle, including production (manufacture and formulation), authorization, import, distribution, sale, supply, transport, storage, handling, application and disposal of pesticides and their containers to ensure safety and efficacy and to minimize adverse health and environmental effects and human and animal exposure.	FAO and WHO 2016
Regulatory framework	The full set of legislation governing the management of pesticides. This may include legislation on environmental protection, public health, occupational health, water, food safety, wildlife, marine protection, plant protection and general chemicals management. The regulatory framework also includes obligations under international instruments.	FAO and WHO 2015
Spurious pesticides	Improperly registered pesticides or pesticides with lower or higher quantities of prescribed active ingredients.	FICCI and TATA 2015
Substandard pesticides	Pesticides that do not conform to the approved active ingredient tests.	FICCI and TATA 2015
Unauthorized pesticides	Pesticides formulated for other markets, or for any reasons not authorized for use in a particular country.	UNICRI 2016

Mercury

This report uses "illegal," and "illicit," interchangeably to mean any export or import of mercury that does not comply with all legal requirements including:

- Trade without an export or import permit
- Legal export of mercury mined without a mining permit
- Export of mercury in a form that is prohibited from export
- Export or import without any formal documentation
- Export or import with falsified documents

Even so, there are grey areas such as otherwise legally traded mercury that happens to be shipped in flasks that do not meet the United Nations Hazardous Material Shipping Requirements or equivalent transport safety standards.

The term "informal" refers to economic activities that occur outside the mainstream economic activities that are subject to routine regulation and reporting. Informal activities may simply be undocumented, but they may also be illegal. "Undocumented" means that the transactions have not been reported to any authorities.

Annex 2: Comparison of Basel, Rotterdam, Stockholm and Minamata Conventions, and the Montreal Protocol

	Basel	Rotterdam	Stockholm	Minamata	Montreal
What is covered?	Hazardous and other listed wastes, or as defined by domestic legislation	Chemicals listed in Annex III of the Convention and/ or those that have been banned or restricted by an exporting party	Chemicals listed in Annexes A and B	Mercury and mercury compounds	Ozone depleting substances and high global warming potential hydrofluorocarbons (HFCs) listed in annexes
What are the export requirements?	State of export notifies states of transit and import Further limitation may become effective should the Ban Amendment enter into force (As of August 2019, two more ratifications were needed)	For chemicals listed in Annex III, exporting country must verify that importing State has consented If the chemical is banned or severely restricted by exporting country, exporting country must send notification to importing country and importing country must acknowledge receipt of notification	Importing country must qualify for an exception, or export must be for the purpose of environmentally sound disposal If exporting to a non-Party, the non-Party must provide an annual certification specifying the intended use of the chemical and committing to protect human health and the environment and comply with relevant provisions of the convention	Must obtain consent from country of import, must be for use allowed by convention or for environmentally sound interim storage	Mandatory export license, no trade with non-Parties from a certain date, must comply with phase-out/ phase-down schedules or meet requirements for exemptions, voluntary iPIC mechanism
What are the import requirements?	States of transit and import must consent	Party has submitted decision that is consent to import to the Secretariat	Must be for the purpose of environmentally sound disposal or for a use/purpose that is permitted for that Party under Annex A or B	State of import must consent considering the permitted use of mercury	Mandatory import license, no trade with non-Parties from a certain date, must comply with phase-out/ phase-down schedules or meet requirements for exemptions, voluntary iPIC mechanism

Annex 3: Media accounts of recent national enforcement actions

Africa

Cameroon (2018)
Counterfeit fuel is becoming a problem in Cameroon. On 23 April 2018, authorities seized 6,000 tons of illegal fake fuel on the road from Douala to Yaoundé.
Source: 123Actu (2018). Cameroun contrefaçon: 6000 tonnes de carburant frelaté et toxique saisis sur l'axe douala-yaoundé, 4 May. https://237actu.com/index.php/pid/3744

Morocco (2014)
Theft, smuggling and illicit sale of petrol is taking place on the Algerian-Moroccan border. The uncovering of transnational organized criminal networks shows the challenge faced by industry and governments.
Source: The Global Initiative (2014). Petrol Smuggling, Oiling the Wheels of Organised Crime, 14 August. https://globalinitiative.net/oil-smuggling/

Tunisia (2018)
The Tunisian government's tightened control near the Libyan border has resulted in the shutdown of smuggling routes for illegal goods and fuel.
Source: Reuters (2018). Pasta and petrol: smuggling crackdown stirs dissent in Tunisia's south, 29 October. https://www.reuters.com/article/us-tunisia-libya/pasta-and-petrol-smuggling-crackdown-stirs-dissent-in-tunisias-south-idUSKCN1N30KL

Uganda (2018)
A raid organized by the police and government officials in Uganda uncovered hundreds of containers of fake fuel, agrochemicals and lubricants.
Source: Chimpreports (2018) Police raid stores of fake products in Kampala, 30 March. https://chimpreports.com/police-raids-stores-of-fake-products-in-kampala/

Asia

Cambodia (2015)
About 10 tonnes of fake pesticides were seized and a few criminals detained during a Chinese–Cambodian police operation.
Source: Freshnewsasia (2015). Police identified more than 10 tonnes of counterfeit pesticides in front of airport, 11 December. http://www.freshnewsasia.com/index.php/en/localnews/13905-2015-12-11-07-42-12.html

China (2017)
During supervision and sampling activities, the China Ministry of Agriculture uncovered the illegal addition of chemical pesticides to bio-pesticides in order to improve performance and cost-effectiveness.
Source: China Pesticide Information Network (2016). China's bio-pesticide industry faces a dilemma, 25 February. http://www.chinapesticide.org.cn/hydt/3793.jhtml

Iran (2016)
A number of people were arrested for the distribution of unregistered highly hazardous pesticides. The application of the pesticides resulted in production failures in dates and citrus fruit.
Source: Mehr News Agency (2016). Pesticides that kill the tree/Golan counterfeit toxins in the market, 11 May. https://www.mehrnews.com/news/3612617/

Mongolia (2017)
In order to identify illegal trade routes for counterfeit products, a private company associated with Lehman Lee & Xu (one of the largest law firms in China) announced their request for support.
Source: LehmanLaw (2017). Tracking Manufacturer of Imported Counterfeit Product in Mongolia, 2 May. http://lehmanlaw.mn/blog/tracking-manufacturer-of-imported-counterfeit-product-in-mongolia/

Pakistan (2015)
At Wain Bodla village, potato farmers protested against a local pesticide dealer who allegedly supplied fake pesticides that destroyed their potato crops. In support of the protest, the Head of the Kisan Ittehad district demanded stern actions against the criminals.
Source: Dawn (2015). Potato farmers protest fake pesticide sale, 8 February. https://www.dawn.com/news/1162214

Vietnam (2015)
Owners of establishments selling pesticides hired labourers to repackage products bearing famous foreign trademarks. The police seized machines, equipment and a large quantity of pesticides.
Source: Vnexpress (2015). 'Lò' thuốc trừ sâu giả ở Sài Gòn, 24 December. https://vnexpress.net/tin-tuc/phap-luat/lo-thuoc-tru-sau-gia-o-sai-gon-3332719.html

Europe

Poland (2016)
Polish customs uncovered 660 litres of illegal pesticide during an X-ray check of a Ukrainian truck at the Korcowa checkpoint.
Source: Agropolska (2016). Celnicy wytropili 660 litrów nielegalnych pestycydów, 17 October. https://www.agropolska.pl/aktualnosci/polska/celnicy-wytropili-660-litrow-nielegalnych-pestycydow,2757.html

Poland (2019)
A shipment of 25 tonnes of illegal refrigerant was intercepted by the authorities in Lodz, Poland. The refrigerant was estimated at a market value of around €600,000.
Source: Cooling post (2019) Poland stops huge shipment of illegal refrigerant, 4 April. https://www.coolingpost.com/world-news/poland-stops-huge-shipment-of-illegal-refrigerant/

Portugal (2016)
The Food and Economic Security Authority seized 25,000 units of illegal plant protection products. The seizure was part of an investigation carried out in the areas of Greater Lisbon, Oeste and Alentejo.
Source: Sapo (2016). Operação da asae apreende 25 mil unidades de pesticidas ilegais, 16 July. https://lifestyle.sapo.pt/saude/noticias-saude/artigos/operacao-da-asae-apreende-25-mil-unidades-de-pesticidas-ilegais

Spain (2015)
Agents of the Nature Protection Service of the Civil Guard arrested 28 people in Operation FRESON against the illegal use of phyto-sanitary products. The agents seized over 10,000 kilos of various substances and a large quantity of phyto-sanitary products.
Source: Sur (2015). Detenidas 28 personas por comercio ilegal de pesticidas, 18 April. http://www.diariosur.es/nacional/201504/18/detenidas-personas-comercio-ilegal-20150418162226-rc.html

Ukraine (2017)
The Security Service of Ukraine in cooperation with the Police and the Prosecutor's Office stopped the production of counterfeit agricultural chemicals in the Kharkiv region. Three illegal workshops and six storage facilities with finished products were uncovered, and a large quantity of equipment and products seized.
Source: Security Service of Ukraine (2017). Kharkiv region – SBU stops scale production of counterfeit agricultural chemicals, 11 May. https://ssu.gov.ua/en/news/1/category/2/view/3316#.CxA8mfRp.dpbs

Ukraine (2018)
An illegal import channel for plant protection products from China to Ukraine was blocked during the conduct of an authorized search. Some 139 tonnes of pesticides were discovered and seized.
Source: Prosecutor's Office of Kyiv Region (N/A). https://kobl.gp.gov.ua/ua/news.html?_m=publications&_c=view&_t=rec&id=231662

United Kingdom, Ireland (2011)
Revenue officers and armed Gardaí seized 160,000 litres of illicit fuel in a series of raids targeting petrol stations.
Source: The Journal (2011). Almost 160,000 litres of illicit fuel seized in countrywide raids, 4 November. https://www.thejournal.ie/almost-160000-litres-of-illicit-fuel-seized-in-countrywide-raids-271087-Nov2011/

Latin America

Brazil (2016)
During Operation "Lavoura Limpa", an organized crime group producing fraudulent agrochemicals was targeted and 23 people arrested. The group carried out production on an industrial scale in collaboration with illegal distributors in ten States.
Source: Globo (2016). Prejuízo com fraude do agrotóxico em Franca pode chegar a R$ 100 milhões, 16 June. http://g1.globo.com/sp/ribeirao-preto franca/noticia/2016/06/prejuizo-com-fraude-do-agrotoxico-em-franca-pode-chegar-r-100-milhoes.html

Colombia (2015)
The Directorate of Criminal Investigation and Interpol of Colombian Police dismantled an organization producing 3 tonnes of agrochemicals a week, and selling it to small rice farmers in southern Tolima.
Source: HSB Noticias (2015). Cae banda que falsificaba agroquímicos para venderlos a arroceros del Tolima, 25 August. http://hsbnoticias.com/noticias/judicial/cae banda que falsificaba-agroquimicos-para-venderlos-arro-155026

Annex 4: Summary of mercury cases

Brazil (2018)
IBAMA, Receita (customs) confiscated 430 kg mercury, importer listed a false destination.
Source: http://ibama.gov.br/noticias/422-2017/1354-ibama-apreende-430-kg-de-mercurio

Brazil (2018)
IBAMA, Receita (customs) confiscated 1,700 kg mercury, importer concealed the mercury.
Source: https://www.nsctotal.com.br/colunistas/dagmara-spautz/receita-e-ibama-fazem-a-maior-apreensao-de-mercurio-ilegal-no-brasil-no

China (2018)
Hong Kong Customs seized about 660 kg smuggled mercury.
Source: https://www.info.gov.hk/gia/general/201805/15/P2018051501044.htm

Indonesia (2015)
Indonesian customs confiscated 13.1 tonnes of cinnabar ore at Tanjung Priok Port.
Source: http://ianwollff.com/indonesia-is-the-worlds-largest-exporter-of-mercury-but-without-documentation/

Indonesia (2015)
Indonesian customs confiscated cinnabar ore, quantity not specified.
Source: http://setkab.go.id/en/directorate-general-of-customs-and-excise-thwarts-illegal-import-and-export/

Philippines (2014)
Custom authorities confiscated 360 kg mercury.
Source: https://www.rappler.com/business/g overnance/78864-customs-seize-china-mercury-port

Mexico (2014)
Mexican authorities seized 4,980 kg mercury arriving from Guatemala.
Source: http://todochiapas.mx/chiapas/decomisan-cinco-toneladas-de-mercurio-en-comalapa/47278

Annex 5: Mercury trafficking for illegal gold mining in Colombia

Scope of the problem

The use of mercury in Colombian illegal gold mining projects[1] has become a common practice: up to 180 tonnes of mercury per year have been used, according to a recent assessment of the Artisanal Gold Council.[2]

In 2011, widespread artisanal and small-scale gold mining (ASGM) in Colombia was identified as the source of significant per capita mercury pollution. A scientific study within the Antioquia department identified Segovia and Zaragoza as the world's most mercury-contaminated municipalities.[3] Researchers found mercury concentrations in the air of up to 1,000 times the WHO limit, and an investigation by the University of Antioquia revealed many cases of acute mercury poisoning and chronic toxicity in persons working in ASGM activities.[4]

Since the late 2000s, revenues from illicit mining have gradually managed to exceed Colombia's infamous cocaine economy (J. Wyss and K. Gurney, "Dirty gold is the new cocaine in Colombia—and it's just as bloody," Miami Herald, 16 Jan 2018, updated 23 Jan 2018). In the mining region of Barbacoas, for example, the Commander of the National Police Force's Illegal Mining Unit said that various armed groups are all seeking control of the gold trade and the riches that go with it.[5]

Recent estimates suggest that illicit mining operations have become a $2.4 billion industry in Colombia.[6] In this informal sector, about 200,000 subsistence miners provide for their families,[7] but they represent only a fraction of those whose health is at risk because of mercury contamination. A recent study by the United Nations Office on Drugs and Crime (UNODC) shows that 14 of the 32 departments in Colombia were affected by illegal mining projects in 2016, accounting for 80 per cent of the country's gold production.[8]

Official responses to illegal mining and mercury trafficking

In line with its recent ratification of the Minamata Convention, Colombia prohibited the use of mercury in all mining operations as of 16 July 2018. This measure is part of a more comprehensive plan to combat mercury trafficking and illegal use, which will require some years to fully implement. According to the plan, all industrial applications of mercury will be banned by 2023, and the current mercury import quota of 100 tonnes per year will be reduced to 5 tonnes per year, destined primarily for the health sector (e.g., thermometers, blood pressure measuring devices, laboratory chemicals, etc.).

In parallel there have been other efforts to combat the use of mercury. In 2016, more than 1,700 operations against irregular gold mining were undertaken, which led to 870 arrests. The police and military, often through joint task forces, carried out most of these operations. Depending on the operation, personnel from the Office of the Attorney General of the Nation, the Technical Investigation Team, the Regional Autonomous Corporations and others, like the National Army of Peru, also participated.[9]

Mercury sources and routes

For many years large quantities of mercury have come into Colombia, both legally and illegally, mostly for use in the growing number of small-scale gold mining projects. The sources and routes of imported mercury have adapted to the changing international environment.

Between 2004 and 2011, Spain, The Netherlands, the United States and Germany were the main sources or trading hubs for mercury imported by Colombia. Spain sold mercury from domestic mining until 2011. The Netherlands was a key international trading hub for mercury. And German and American industry sold mercury that originated largely from process changes in chlor-alkali production facilities. A 2011 regulation banning the export of mercury from the European Union effectively ended the European exports.[10] In 2012 and 2013, most of Colombia's 216 tonnes of legal mercury imports came from Mexico, with a smaller part coming from the US, which implemented its own export ban in 2013. From 2014 to 2016, according to data submitted by both Colombian and Mexican authorities to the Comtrade database, 75 per cent of Colombia's 379 tonnes of documented mercury imports continued to come from Mexico.[11]

One anomaly in the Comtrade data for this period (2014–2016) is that Colombia reported importing 43 tonnes of mercury from Spain and none from Switzerland, the UAE or Panama. Conversely, during the same period Spain reported zero exports of mercury to Colombia, while Switzerland, the UAE and Panama together reported exports of 37 tonnes of mercury to Colombia. The two most likely explanations, assuming the mercury was not exported directly from Spain in contravention of the EU mercury export ban (under the 2008 EU Mercury Regulation), would appear to be:

- Spanish mercury held in Switzerland, the UAE or Panama was exported to Colombia with shipping documents showing its original origin as Spain
- Mercury was exported to Colombia by an Internet company falsely claiming to be based in Spain, and falsely claiming that Spain was the origin of the mercury in order to give the appearance of a higher quality product

Between 2003 and 2013, more than 96 per cent of a total of 1,020 registered tonnes of mercury entered Colombia through its seaports, most of it via the port of Cartagena, and a smaller amount via the port of Buenaventura. The other 4 per cent of registered mercury imports entered the country by air transport. Of the total 1,020 registered tonnes of imported mercury, 55 per cent passed through Medellín, which has long been the major mercury distribution center within Colombia.

Fifteen different companies (of the 51 mercury importers) received 95 per cent of this legally imported mercury, and 3 of those companies received more than 60 per cent: Insuminer S.A., Villa Estrada Jose Santiago and Distribuidora de Quimicos Industriales Ltda.[12] Meanwhile, estimates of mercury use in ASGM by the Artisanal Gold Council suggest that hundreds of tonnes of additional undocumented mercury may have found their way into Colombia by different routes during the same period.[13]

A recent report[14] suggests that undocumented mercury imports come from several sources:

- China's mercury mines and recycled mercury from the Chinese vinyl chloride monomer industry
- Artisanal mercury mining in Mexico
- The United States, typically transshipped via Colombia's neighbouring countries
- Larger mining operations that recovered mercury as a by-product (e.g. in Chile and Peru)

Two investigators of the Colombian National Police Force identified the Colombian port city of Buenaventura, on the Pacific Coast, as an important entry point for mercury coming through Panama and mercury mined in Mexico, and cited recent information that suggests that other illicit mercury imports come from China (often via Peru),[15] South Korea and Venezuela.

Armed groups that benefit financially from smuggling a wide variety of goods now control much of the 2,219 km Colombian-Venezuelan border – Latin America's second longest. Mercury said to come illegally from Venezuela through border crossings in proximity to the Colombian border town of Cúcuta is then transported into the city of Bucaramanga, which is the final distribution hub for mercury going to illegal mines in the area.[16] As in the case of legal mercury distribution, the main distribution hub for illicit mercury is Medellín, which also has a reputation as a seat of organized crime.

Illegal mercury seizure in Turbo

On 25 May 2018, the National Police Force, under the authority of the Colombian National Tax and Customs Authority (DIAN), seized the biggest haul of mercury in the history of Colombia. Eight flasks containing about 272 kg of mercury were intercepted in Turbo, a port city in the Antioquia Department of Colombia on the coast of the Gulf of Urabá, 340 km north of Medellín.

The national police in the Turbo municipality were alerted by telephone by a source who claimed that some flasks of mercury would be transported by cargo truck in the vicinity of Turbo. It is not clear whether the source identified the kind of truck or what markings were on it. In any case the police stopped a truck that was supposedly carrying bananas, and when they searched it, they found the mercury and other contraband packaged and hidden beneath other goods. Each flask of mercury was packaged in a small wooden crate and wrapped with plastic film (see photo below). Closer examination of the packaging, the flasks and their labelling did not determine where the mercury might have come from. Together with the mercury, large quantities of cigarettes and liquor were seized.

It is too early to have all details of the seizure, and the criminal investigation is ongoing, but some details are known.

The driver who transported the mercury by truck was apprehended and questioned by the National Police. The DIAN is responsible for the full investigation, including a determination of the individual(s) responsible. The penalty is then determined by the DIAN in coordination with the national Prosecutor General in accordance with the Criminal Code, which calls for 48 to 144 months of prison and a fine of 133 to 30,000 times the monthly minimum wage. The monthly minimum wage is 781,242 Colombian pesos (the equivalent of around US $256), so the fine would apparently be between US $34,000 and US $7.7 million, in addition to the loss of the contraband goods.

Since the mercury appears to have arrived by ship on the coast of the Gulf of Urabá, the police speculate that the mercury most likely came through Central America – possibly from Panama.[17] Considering the subsequent transport by truck with no documentation for the goods, it is presumed that one of the criminal gangs operating in the region was responsible, and that the mercury was destined for illegal mining operations.[18]

At the time the truck was stopped and searched, the driver apparently contacted one of the smugglers by phone. According to the Urabá police, they were offered 2 million pesos (about US $650) if they were to let the truck go on its way. During the transfer of the truck and contraband to the police station, the offer was increased to 5 million pesos (about US $1,600), and eventually 30 million pesos (about

US $9,800) were offered in a call to the police station, but the police ignored this attempt at bribery.[19] At current prices, the mercury would be worth several times that amount in the gold fields.

The DIAN are temporarily storing the mercury in a secure and ventilated storage room where only mercury is stored, until a decision is made about a further transfer and/or the final fate of the mercury.

Eight flasks of seized mercury, 6 of them still in outer packaging

Notes

1. The ninth meeting of the Conference of the Parties to the Stockholm Convention in May 2019 listed two more chemicals – dicofol and perfluorooctanoic acid (PFOA), its salts and PFOA-related compounds. These additions will bring the number of POPs subject to the Stockholm Convention to 30.
2. The ninth meeting of the Conference of the Parties to the Stockholm Convention in May 2019 added two new chemicals, the pesticide phorate and the industrial chemical hexabromocyclododecane, to Annex III of the convention making them subject to the PIC procedure, through which countries can decide on future imports of these chemicals.
3. Tributyl tin compounds are listed as both pesticides and industrial chemicals in Annex III, hence Parties are obliged to submit Import responses for both categories of the same chemical in different use categories.
4. Parties adopted decisions BC-13/21, RC-8/14, SC-8/24 on the synergies in preventing and combating illegal traffic and trade in hazardous chemicals and wastes.
5. BC-14/5: Technical guidelines on transboundary movement of electrical and electronic waste and used electrical and electronic equipment, in particular regarding the distinction between waste and non-waste under the Basel Convention
6. http://pocketguide.pops.int/pguide/default.aspx?s=7
7. Pesticides can be reported under HS 3808 or in the HS 29** (active ingredients).
8. According to a 2018 interview of two investigators of the National Police (SIJIN) by the Dutch journalist, Mr. Bram Ebus.

Annex 5 notes

1. Illegal gold mining in Colombia is defined by the lack of a mining permit and/or the lack of an environmental permit. Since July 2018, an environmental permit may be obtained only if the mining operation does not use mercury, with an exception for operations where the ore is first concentrated.
2. See <http://www.mercurywatch.org/Default.aspx?PaneName=DATABASE> and <http://www.eltiempo.com/economia/sectores/mineria-ilegal-y-produccion-de-mercurio-en-colombia-85856>
3. Cordy P, Veiga M, Salih I, Al-Saadi S, Console S, et al. (2011) Mercury contamination from artisanal gold mining in Antioquia, Colombia: The world's highest per capita mercury pollution. Sci Total Environ 410-411: 154-160. Available at < http://wedocs.unep.org/bitstream/handle/20.500.11822/19959/Mercury_contamination_from_artisanal_gold_mini.pdf?sequence=1&isAllowed=y>
4. Investigación detectó mercurio en leche materna por minería en Antioquia, El Espectador, 24 may 2017. Available at <https://www.elespectador.com/noticias/nacional/antioquia/investigacion-detecto-mercurio-en-leche-materna-por-mineria-en-antioquia-articulo-695373>
5. Ibid.
6. Ibid.
7. Cordy P, Veiga M, Salih I, Al-Saadi S, Console S, et al. (2011) Mercury contamination from artisanal gold mining in Antioquia, Colombia: The world's highest per capita mercury pollution. Sci Total Environ 410-411: 154-160.
8. Alluvial gold exploitation: Evidences from remote sensing 2016. UNODC and Government of Colombia, May 2018. Available at <https://www.unodc.org/documents/publications/Evoa_2016_in_1.pdf>
9. Alluvial gold exploitation: Evidences from remote sensing 2016. UNODC and Government of Colombia, May 2018. Available at <https://www.unodc.org/documents/publications/Evoa_2016_in_1.pdf>
10. Questions and answers on EU Mercury Policy, European Commission, 10 October 2013, Brussels. Ref. <http://europa.eu/rapid/press-release_MEMO-13-871_en.htm>
11. Ref. <http://comtrade.un.org/data/>, accessed 8 August 2018.
12. Alluvial gold exploitation: Evidences from remote sensing 2016. UNODC and Government of Colombia, May 2018, citing data from Legiscomex. Available at <https://www.unodc.org/documents/publications/Evoa_2016_in_1.pdf> Estudio de Investigación: La cadena del mercurio con énfasis en minería aurífera en Colombia. Presentation by Unidad de Planeación Minero Energética (UPME), Subdirección de minería, September 2015.
13. Global Mercury Assessment (GMA) 2008; GMA 2013
14. Alluvial gold exploitation: Evidences from remote sensing 2016. UNODC and Government of Colombia, May 2018, citing data from Legiscomex. Available from: <https://www.unodc.org/documents/publications/Evoa_2016_in_1.pdf>. And personal communication with P. Maxson.
15. M Cabrera Leal, Colombia da pasos firmes en su batalla contra el mercurio, Semana, 25 July 2018. See <https://www.semana.com/contenidos-editoriales/colombia-sin-mercurio/articulo/colombia-da-pasos-firmes-en-su-batalla-contra-el-mercurio/576603>
16. According to a recent (2018) interview of two investigators of the National Police (SIJIN) by Bram Ebus.
17. Correspondence with the Policía Nacional, Departamento de Policía Urabá, 28 July 2018, facilitated by Bram Ebus. See also <http://caracol.com.co/emisora/2018/05/28/medellin/1527518704_199305.html>
18. Correspondence with the Policía Nacional, Departamento de Policía Urabá, 27 August 2018, facilitated by Bram Ebus.
19. Ibid.

References

Agro Portal (2016). Фальсификат на миллионы, 11 January. http://agroportal.ua/publishing/analitika/falsifikat-na-milliony/

AP News (2016). Singapore scores poorly in ability to prevent illicit trade, 12 October. https://www.apnews.com/8b793a8d618a420496091c442289c4a0.

Arnot, L.F., Veale, D.J.H., Steyl, J.C.A. and Myburgh, J.G. (2011). Treatment rationale for dogs poisoned with aldicarb (carbamate pesticide). Journal of the South African Veterinary Association, vol. 82, No. 4 (December). http://www.scielo.org.za/scielo.php?script=sci_arttext&pid=S1019-91282011000400009.

Artisanal Gold Council (2017). Mercury Watch. http://www.mercurywatch.org/.

Baldé, C.P., Forti, V., Gray, V., Kuehr, R. and Stegmann, P. (2017). The Global E-waste Monitor – 2017, United Nations University (UNU), International Telecommunication Union (ITU) & International Solid Waste Association (ISWA), Bonn/Geneva/Vienna.

BAN Toxics (2017). Mercury trade in the Philippines: An investigative research on mercury flows in the Philippines.
http://bantoxics.org/wp-content/uploads/2017/10/Mercury-Trade-in-the-Philippines.pdf.

Basel Action Network (2017). Repairing the "Repairables Loophole" in the e-Waste Technical Guideline. BAN.

Basel Convention Regional Centre for the Caribbean Region (2016). National inventory of Mercury Releases in the Republic of Suriname. BCR-Caribbean. http://www.bcrc-caribbean.org/download/public_project_documents/mercury/mercury_storage_and_disposal_project_in_the_caribbean_jamaica_suriname_and_trinidad_and_tobago/1._national_reports/Inventory-of-Mercury-Releases-SURINAME.pdf.

Basel, Rotterdam, Stockholm Conventions Secretariat (2019a). Development of Technical Guidelines on e-waste. http://www.basel.int/Implementation/Ewaste/TechnicalGuidelines/tabid/4237/Default.aspx.

Basel, Rotterdam, Stockholm Conventions Secretariat (2019b). Basel Convention National Reports – Year 2017. http://www.basel.int/Countries/NationalReporting/NationalReports/BC2017Reports/tabid/7749/Default.aspx.

Basel, Rotterdam, Stockholm Conventions Secretariat (2019c). Improving legal clarity. http://www.brsmeas.org/Implementation/Illegaltrafficandtrade/Improvinglegalclarity/tabid/7828/language/en-US/Default.aspx.

Basel, Rotterdam, Stockholm Conventions Secretariat (2019d). Technical Guidelines Archives. http://www.basel.int/Implementation/MercuryWastes/TechnicalGuidelinesArchives/tabid/2380/Default.aspx.

BBC News (2006). Customs raid illegal fuel plants, 6 February. http://news.bbc.co.uk/2/hi/uk_news/northern_ireland/4683680.stm.

BBC News (2017). The Indian farmers falling prey to pesticide, 5 October. https://www.bbc.com/news/world-asia-india-41510730.

Bhattacharjee, Y. (2018). The Man Who Captures Criminals for the D.E.A. by Playing Them. The New Yorker, 30 July. https://www.newyorker.com/magazine/2018/07/30/the-man-who-captures-criminals-for-the-dea-by-playing-them?mbid=nl_Magazine%20Daily%20List%20072318&CNDID=51623120&utm_source=Silverpop&utm_medium=email&utm_campaign=Magazine%20Daily%20List%20072318&utm_content=&spMailingID=13926234&spUserID=MjMxMTIwNDUwNDc3S0&spJobID=1441985646&spReportId=MTQ0MTk4NTY0NgS2.

Bodega Zugasti, D. de la, ed. (2016). Illegal Use of Poisoned-baits. Legal Analysis and Investigation. SEO/BirdLife-Proyecto Life+ VENENO project. Madrid. http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=home.showFile&rep=file&fil=VENENONO_Illegal_use_Manual.pdf.

Business (2018). Імпорт чи власне виробництво? Пестициди в стреci, 30 October. https://business.ua/biznes/item/4242-import-chy-vlasne-vyrobnytstvo-pestytsydy-v-stresi.

Business Censor (2018). Как на страну повлияет ввоз незарегистрированной агрохимии, 4 June. https://biz.censor.net.ua/resonance/3068820/kak_na_stranu_povliyaet_vvoz_nezaregistrirovannoyi_agrohimii.

Center for International Environmental Law (2015). Lowest Common Denominator. How the proposed EU-US trade deal threatens to lower standards of protection from toxic pesticides. CIEL https://www.ciel.org/wp-content/uploads/2015/06/LCD_TTIP_Jan2015.pdf.

China Checkup (2015). Banned on Alibaba – Gold Suppliers Blacklist, 21 January. https://www.chinacheckup.com/blogs/articles/banned-on-alibaba.

CNN Indonesia (2017). Polda Jateng Gagalkan Penyelundupan 20,9 Ton Merkuri. https://www.cnnindonesia.com/nasional/20170910003302-20-240675/polda-jateng-gagalkan-penyelundupan-209-ton-merkuri.

Colombiano, C. (2018). Desde hoy está prohibido el uso de mercurio en la minería de oro. 16.07.2018. https://www.elcolombiano.com/colombia/prohibido-el-mercurio-en-la-mineria-de-oro-en-colombia-NF9007096.

Commission for Environmental Cooperation (2017). Enhancing the Alignment of North American Trade Statistics on Elemental Mercury and Mercury–added Products. Montreal, Canada: Commission for Environmental Cooperation. http://www3.cec.org/islandora/en/item/11769-enhancing-alignment-north-american-trade-statistics-elemental-mercury-and-en.pdf.

Community Action for Pesticide Elimination (2005). Fact Sheet, Lindane´s Dirty Secret: Indian facilities dump toxic waste, May 2005. https://www.panna.org/sites/default/files/lindaneDirtySecret-2.pdf.

CropLife America (2018). 2018 Special 301 Review: Identification of Countries Under Section 182 of the Trade Act of 1974: Request for Public Comment and Announcement of Public Hearing; Docket ID No. USTR-2017-0024; 82 FR 61363 (December 27, 2017). https://static1.squarespace.com/static/59b55b2b37c581fbf88309c2/t/5aa9389a8165f594c09bf2bd/1521039515472/CropLife+America_2018+Special+301_Review_Comment+.pdf.

Dorfman, A. and Rekowsky, C.J. (2011). Geografia do contrabando de agrotóxicos na fronteira gaúcha. Revista Geográfica de América Central, Número Especial EGAL, Costa Rica. http://www.revistas.una.ac.cr/index.php/geografica/article/view/2127/2023.

Ecologist, The (2018). We were able to buy illegal and dangerous pesticides on eBay, 26 July. https://theecologist.org/2018/jul/26/we-were-able-buy-illegal-and-dangerous-pesticides-ebay.

Economist Intelligence Unit, The (2016). The Illicit Trade Environment Index. http://illicittradeindex.eiu.com/ECC%20Illicit%20trade%20paper%20V9_Oct12.pdf.

Economist Intelligence Unit, The (2018). The Global Illicit Trade Environment Index. Free Trade Zones Five Case Studies. http://illicittradeindex.eiu.com/documents/EIU%20Global%20Illicit%20Trade%20Environment%20Index%202018%20-%20FTZ%20June%206%20FINAL.pdf.

El Confidencial (2016). Cómo revender 8 millones de mercurio y que te pillen por faltar al trabajo, 29 February.

http://www.elconfidencial.com/espana/2016-02-29/como-revender-8-millones-de-mercurio-y-que-te-pillen-por-faltar-al-trabajo_1159598/.

Environment and Social Development Organization (2013). Study report on "Toxic Toys" Heavy Metal Content and Public Perception in Bangladesh. ESDO. https://ipen.org/sites/default/files/documents/ESDO%20Study%20Report%20on%20Toxic%20Toys%20in%20Bangladesh.pdf.

Environmental Investigation Agency (2011). System Failure, The UK's harmful trade in electronic waste. https://www.greencustoms.org/sites/default/files/public/files/EIA_E-waste_report_0511_WEB.pdf.

European Commission (2008). Regulation (EC) No 1102/2008 of the European Parliament and of the Council of 22 October 2008 on the banning of exports of metallic mercury and certain mercury compounds and mixtures and the safe storage of metallic mercury (hereafter referred to as the 2008 EU Mercury Regulation). EC. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32008R1102.

European Commission (2019). Procedure to apply for authorization of a PPP. https://ec.europa.eu/food/plant/pesticides/authorisation_of_ppp/application_procedure_en.

European Parliament (2016). Lindane (persistent organic pollutant) in the EU. http://www.europarl.europa.eu/RegData/etudes/STUD/2016/571398/IPOL_STU(2016)571398_EN.pdf.

European Union Agency for Law Enforcement Cooperation (2015). Huge seizures of 190 tonnes of counterfeit pesticides, 18 December. https://www.europol.europa.eu/newsroom/news/huge-seizures-of-190-tonnes-of-counterfeit-pesticides.

European Union Agency for Law Enforcement Cooperation (2017). 122 tons of illegal or counterfeit pesticides seized during Operation Silver Axe II, 6 July. https://www.europol.europa.eu/newsroom/news/122-tons-of-illegal-or-counterfeit-pesticides-seized-during-operation-silver-axe-ii.

European Union Agency for Law Enforcement Cooperation (2018). Largest-ever seizure of illegal or counterfeit pesticides in Europol Silver Axe operation, 11 July. https://www.europol.europa.eu/newsroom/news/largest-ever-seizure-of-illegal-or-counterfeit-pesticides-in-europol-silver-axe-operation.

European Union Agency for Law Enforcement Cooperation (2019). Operation Silver Axe strikes for the fourth time seizing over 550 tonnes of illegal pesticides, 18 June. https://www.europol.europa.eu/newsroom/news/operation-silver-axe-strikes-for-fourth-time-seizing-over-550-tonnes-of-illegal-pesticides.

European Union Intellectual Property Office (2017). The Economic Cost of IPR Infringement in the Pesticides Sector. https://euipo.europa.eu/tunnel-web/secure/webdav/guest/document_library/observatory/resources/research-and-studies/ip_infringement/study10/pesticides_sector_en.pdf.

Faheem, N., Iqbal, F., Waseem, A. and Mahamood, Q. (2015) Pesticide exposure through fruits and meat in Pakistan: A review. Fresenius Environmental Bulletin Vol. 24, No. 12, (January).

Farias, A.R., Mingoti, R. and Spadotto, C.A. (2017). Inteligência territorial no monitoramento da entrada de agrotóxicos ilegais no Brasil. Campinas: Embrapa Gestão Territorial, 22 September. https://www.alice.cnptia.embrapa.br/alice/bitstream/doc/1076156/1/20170922NotaTecnica11.pdf.

Farmworker Justice (2013). Exposed and Ignored. How pesticides are endangering our nation´s farmworkers. https://www.farmworkerjustice.org/sites/default/files/aExposed%20and%20Ignored%20by%20Farmworker%20Justice%20singles%20compressed.pdf.

Federation of Indian Chambers of Commerce and Industry (2015). Study on Sub-Standard, Spurious/Counterfeit Pesticides in India. http://ficci.in/spdocument/20641/Pestiside-Report.pdf.

Food and Agriculture Organization of the United Nations (2006). International Code of Conduct on the Distribution and Use of Pesticides: Guidelines Compliance and Enforcement of a Pesticide Regulatory Programme. http://www.fao.org/fileadmin/templates/agphome/documents/Pests_Pesticides/Code/Compliance.pdf.

Food and Agriculture Organization of the United Nations (2018). FAOSTAT. http://www.fao.org/faostat/en/#data.

Food and Agriculture Organization of the United Nations and World Health Organization (2014). International Code of Conduct on Pesticide Management. http://www.fao.org/fileadmin/templates/agphome/documents/Pests_Pesticides/Code/CODE_2014Sep_ENG.pdf.

Food and Agriculture Organization of the United Nations and World Health Organization (2015). International Code of Conduct on Pesticide Management. Guidelines on Pesticide Legislation. http://www.fao.org/3/a-i5008e.pdf.

Food and Agriculture Organization of the United Nations and World Health Organization (2016). International Code of Conduct on Pesticide Management. Guidelines on Highly Hazardous Pesticides. https://www.who.int/whopes/resources/9789241510417/en/.

Food and Drug Administration Philippines (2017). Public Health Warning Against the Use of Unnotified Cosmetic Products Found to Contain Toxic Mercury Levels (Batch 2). https://ww2.fda.gov.ph/attachments/article/472052/FDA%20Advisory%20No.%202017-289.pdf.

Forbes Kazakhstan (2016). How to "fertilize" the Kazakh economy, 24 November. https://forbes.kz/process/economy/kak_udobrit_kazahstanskuyu_ekonomiku.

Fritz, M.M.C., Maxson, P.A. and Baumgartner, R.J. (2016). The mercury supply chain, stakeholders and their responsibilities in the quest for mercury-free gold. Resources Policy, vol. 50 (October), pp. 177–192. https://www.sciencedirect.com/science/article/pii/S0301420716300721.

Gabizon, S., Ismawati, Y., (2017). Gender Dimensions of Hazardous Chemicals and Waste policies under the Basel, Rotterdam and Stockholm Conventions. Case Studies Indonesia and Nigeria, 2017. WECF International, BaliFokus Foundation and Women's Environmental Programme

Global March for Elephants and Rhinos (2018). What is your poison? The mass destruction of Africa's wildlife, 18 February. https://www.facebook.com/March4Elephants/posts/what-is-your-poisonthe-mass-destruction-of-africas-wildlife-in-zimbabwe-in-novem/2077437975607676/.

Haj-Younes, J., Huici, O. and Jørs, E. (2015). Sale, storage and use of legal, illegal and obsolete pesticides in Bolivia. Cogent Food & Agriculture (2015), 1: 1008860. https://www.cogentoa.com/article/10.1080/23311932.2015.1008860.

Heiss, R., Ruessink, H., Isarin, N., Koparova, M. and Grabiel, D. (2011). International Hazardous Waste Inspection Project at Seaports: Results and Recommendations. 9th International Conference on Environmental Compliance and Enforcement. Gerardu, J., Grabiel, D., Koparova, M., Markowitz, K. and Zaelke, D. (eds.) Whistler, British Columbia, 20-24 June 2011. Washington, D.C.: INECE. 181-192

Honkonen, T. and Khan, S.A. (2017). Chemicals and Waste Governance Beyond 2020: Exploring Pathways for a Coherent Global Regime. Denmark, Nordic Council of Ministers. http://norden.diva-portal.org/smash/get/diva2:1061911/FULLTEXT01.pdf.

Infoindustria (2018). Аналіз ринку пестицидів в І півріччі 2018 року, 26 September. http://infoindustria.com.ua/analiz-rinku-pestitsidiv-1-pivrichchya-2018-roku/

InforMEA (2018) Bamako Convention. https://www.informea.org/en/treaties/bamako/text.

International Criminal Police Organization and International Fund for Animal Welfare (2013). Project WEB, An Investigation into the Ivory Trade over the Internet within the European Union. https://s3.amazonaws.com/ifaw-pantheon/sites/default/files/legacy/Project%20Web%20-%20PUBLIC.pdf.

International Criminal Police Organization (2017). Operation 30 Days of Action, Final Report. http://172.16.100.211/en/Media/Files/Crime-areas/Environmental-crime/Pollution-Crime-Working-Group/The-Final-Report-of-Operation-30-Days-of-Action.

International Labour Office and World Health Organization (2007). Outline for the Development of National Programmes for Elimination of Asbestos-Related Diseases. ILO, WHO. https://www.who.int/occupational_health/publications/elim_asbestos_doc_en.pdf?ua=1.

International Labour Organization (2006). Resolution concerning asbestos. No. 95 (2006) (0/5) Geneva, June 2006. https://www.ilo.org/public/libdoc/ilo/P/09734/09734%282006-95%29.pdf#page=1.

International Labour Organization (2015). Global estimates of migrant workers and migrant domestic workers: results and methodology. Geneva: International Labour Organization.

Ismali, S.N.S., Mohamad, N.S., Karuppiah, K., Abidin, E.Z., Rasdi, I. and Praveena, S.M. (2017). Heavy metals content in low-priced toys. ARPN Journal of Engineering and Applied Sciences, vol 12, No. 5 (March), pp. 1499-1509. http://www.arpnjournals.org/jeas/research_papers/rp_2017/jeas_0317_5787.pdf.

Jepson, P.C., Guzy, M., Blaustein, K., Sow, M., Mineau, P. and Kegley, S. (2014). Measuring pesticide ecological and health risks in West African agriculture to establish an enabling environment for sustainable intensification. Philos Trans R Soc Lond B Biol Sci. 2014 Apr 5; 369(1639): 20130491. doi: 10.1098/rstb.2013.0491 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3928896/.

Kervegant, M., Merigot, L., Glaizal, M., Schmitt, C., Tichadou, L. and de Haro, L. (2013). Paraquat poisonings in France during the European ban: experience of the Poison Control Center in Marseille. Journal of Medical Toxicology, vol. 9, No. 2 (June), pp. 144-7.

Legg, E.D., Ouboter, P.E. and Wright, M.A.P. (2015). Small-Scale Gold Mining Related Mercury Contamination in the Guianas: A Review. https://cursos.campusvirtualsp.org/pluginfile.php/230585/mod_page/content/48/19.%20Legg%20et%20al%202015%20mercury%20contamination%20ASGM%20Guyana.pdf.

Lemos, V.F., Carvalho, A.C.B. and Ortiz, R.S. (2018). Perfil nacional de apreensões de agrotóxicos pela Polícia Federal. Revista brasileira de criminalistica. vol. 7, No. 1, Pp. 21-25. http://rbc.org.br/ojs/index.php/rbc/article/view/258.

Lincoln, E. (2018). Accountability for Pesticide Poisoning of Undocumented Farmworkers. Hastings Environmental Law Journal, vol. 24, No. 2 (January), pp. 383-412. https://repository.uchastings.edu/hastings_environmental_law_journal/vol24/iss2/12.

MarketsAndMarkets (2019). Official website. https://www.marketsandmarkets.com/.

Martin, P.L. (2016). Migrant workers in commercial agriculture. Geneva: International Labour Organization. https://www.ilo.org/wcmsp5/groups/public/---ed_protect/---protrav/---migrant/documents/publication/wcms_538710.pdf.

Maxson, Peter (2016a). Personal communication with Lambert Metals, 9 August 2016.

Maxson, Peter (2016b). Personal communications with two mercury traders and one consultant working with ASGM operators in Africa, August 2016.

Monkeyland (2015). Illegal poisoning of wildlife on the increase, 31 August. https://www.monkeyland.co.za/illegal-poisoning-of-wildlife-on-increase_article_op_view_id_2928.

National Geographic (2018). Why Poison Is a Growing Threat to Africa's Wildlife, August. https://www.nationalgeographic.com/magazine/2018/08/poisoning-africa-kenya-maasai-pesticides-lions-poachers-conservationists/.

National Bureau of Statistics of China. (N/A) Output of Industrial Products. http://data.stats.gov.cn/easyquery.htm?cn=C01&zb=A0E0H&sj=2015.

Organisation for Economic Co-operation and Development (2012). OECD Guidance on Pesticide Compliance and Enforcement Best Practices, Series on Pesticides No. 71. Paris: Environment, Health and Safety, Environment Directorate. http://www.oecd.org/env/ehs/pesticides-biocides/Pesticides_Compliance_Guidance.pdf.

Organisation for Economic Co-operation and Development (2018). Best Practice Guidance to Identify Trade of Pesticides. Series on Pesticides No.99. ENV/JM/MONO(2018)35. Paris: Environment, Health and Safety, Environment Directorate. http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=ENV/JM/MONO(2018)35&docLanguage=En.

Organisation for Economic Co-operation and Development (2019). Recommendation of the Council on Countering the Illegal Trade of Pesticides, OECD/LEGAL/0446. Paris. https://legalinstruments.oecd.org/en/instruments/OECD-LEGAL-0446.

Organization for Security and Co-operation in Europe (2015). Counteraction to Counterfeit and Contraband Pesticides. Methodology. Paris: OSCE, ENVSEC. https://www.osce.org/secretariat/192516?download=true.

People´s Republic of China, Ministry of Agriculture (2012). Ministry of Agriculture, Industry and Information Technology, State Administration of Quality Supervision, Inspection and Quarantine Announcement No. 1745, 5 April. http://jiuban.moa.gov.cn/zwllm/tzgg/gg/201204/t20120427_2613538.htm.

People´s Republic of China, Ministry of Agriculture (2017). The Ministry of Agriculture set up a new adjustment for the pesticide management system of the Pesticide Administration, 10 October. http://jiuban.moa.gov.cn/zwllm/zwdt/201710/t20171010_5836515.htm.

Pesticide Action Network Africa and International POPs Elimination Network (2009). Endosulfan in West Africa: Adverse Effects, its Banning, and Alternatives. https://ipen.org/sites/default/files/documents/ipen_endosulfan_westafrica-en.pdf.

Pesticide Action Network Asia and the Pacific (2008). Endosulfan. http://www.pan-germany.org/download/Endo_09_PANAP_monograph_2nd%20Edition.

Pesticide Action Network Asia and the Pacific (2012). Highly Hazardous Pesticides: Endosulfan. http://www.panna.org/sites/default/files/PAN%20AP%20pesticides-factsheet-hhps-endosulfan.pdf.

Pesticide Action Network Asia and the Pacific (2013). Illegal Pesticide Trade in The Mekong Countries: Case Studies from Cambodia and Lao PDR. http://files.panap.net/resources/Illegal-pesticide-trade-in-Lao-and-Cambodia.pdf.

Pesticide Action Network International (2017). PAN International Consolidated List of Banned Pesticides. http://pan-international.org/pan-international-consolidated-list-of-banned-pesticides/.

Pignati, W.A., de Souza Lima, F.A.N., Lara, S.S., Correa, M.L.M., Barbosa, J.R., Leão, L., da Costa, H. and Pignatti, M.G. (2017). Spatial distribution of pesticide use in Brazil: a strategy for Health Surveillance. Ciência & saúde coletiva, vol.22, No.10 (October), pp. 3281-3293. http://www.scielo.br/pdf/csc/v22n10/en_1413-8123-csc-22-10-3281.pdf.

Proconsul (2017). Основные характеристики земельного фонда Украины. https://proconsul.com.ua/konsultacii/pokazateli-rynka-nedvizhimosti/osnovnye_harakteristiki_zemelnogo_fonda_Ukrainy.print.

Public Eye, Pesticide Action Network UK and Pesticide Action Network Asia and the Pacific (2017). Adverse health effects caused by paraquat - A bibliography of documented evidence. https://www.publiceye.ch/fileadmin/doc/_migration/Syngenta/Paraquat/PE_Paraquat_2-17_def.pdf.

Republic of Serbia, Ministry of Agriculture and Environmental Protection (2017). Implementation of the Tunis Action Plan 2013–2020 in Serbia. https://rm.coe.int/implementation-of-the-tunis-action-plan-2013-2020-in-serbia/1680730d3a.

Reuters (2018). New York sues Target, Walmart over lead contaminated toys, December 13. https://www.reuters.com/article/us-new-york-lawsuit-toys/new-york-sues-target-walmart-over-lead-contaminated-toys-idUSKBN1OC2PC.

Rother, H.A. (2010). Falling Through the Regulatory Cracks. Street Selling of Pesticides and Poisoning among Urban Youth in South Africa. International Journal of Occupational and Environmental Health, vol. 16, No. 2, (July).

Sindicato Nacional da Indústria de Produtos para Defesa Vegetal (2017). SINDIVEG e o Setor de Defensivos Agrícolas. Palestra apresentada nas Faculdades Integradas Cantareira. São Paulo: 23 out. 2017.

Sindicato Nacional da Indústria de Produtos para Defesa Vegetal (2018). Diga não aos defensivos agrícolas ilegais. http://sindiveg.org.br/naoaosdefensivosilegais/.

Straková, J., DiGangi, J. and Jensen, G.K. (2018). Toxic Loophole. Recycling Hazardous Waste into New Products. Arnika Association, The Health and Environment Alliance, International POPs Elimination Network. ISBN 978-80-87651-45-2. https://ipen.org/sites/default/files/documents/TL_brochure_web_final.pdf.

Strategic Approach to International Chemicals Management, United Nations Environment Programme, and World Health Organization (N/A). Strategic Approach to International Chemicals Management. SAICM texts and resolutions of the International Conference on Chemicals Management. http://www.saicm.org/Portals/12/Documents/saicmtexts/New%20SAICM%20Text%20with%20ICCM%20resolutions_E.pdf.

Tosato, J.M.T. (2017). Resultados das Análises de Resíduos de Agrotóxicos em Vegetais e as Ações da ADAPAR em 2016, 9 March. http://www.consumidor.mppr.mp.br/arquivos/File/comite_alimento_seguro/09_03_2017/ADAPAR.pdf.

Transnational Alliance to Combat Illicit Trade (2018). Oil and Fuel Theft: an emerging global policy challenge. https://www.tracit.org/uploads/1/0/2/2/102238034/tracit_oil_and_fuel_theft_an_emerging_global_policy_challenge_april2018l.pdf.

TribrataNewsNTB (2017). Polisi Sita Barang Bukti Merkuri Total Seberat 40,04 Ton. http://tribratanews.ntb.polri.go.id/2017/10/30/polisi-sita-barang-bukti-merkuri-total-seberat-4004-ton/.

Ukraine Ministry of Agrarian Policy and Food (2018). #Grow Ukraine export for U. http://minagro.org.ua/docs/GrowInUkraine_2018.pdf.

United Nations Environment Programme (2001). Training Manual for Customs Officers, Saving the Ozone Layer: Phasing Out Ozone Depleting Substances in Developing Countries. http://wedocs.unep.org/bitstream/handle/20.500.11822/8352/-Training%20Manual%20for%20Custom%20Offices_%20Saving%20the%20Ozone%20Layer%20-%20Phasing%20out%20Ozone%20Depleting%20Substances%20in%20Developing%20Countries-20043556.pdf?sequence=3.

United Nations Environment Programme (2005). UNEP's Action to Meet the Challenge of Illegal Trade in Chemicals. https://wedocs.unep.org/bitstream/handle/20.500.11822/8343/-UNEPs%20Action%20to%20Meet%20the%20Challenge%20of%20Illegal%20Trade%20in%20Chemicals-20053717.pdf?sequence=3&amp%3BisAllowed=.

United Nations Environment Programme (2006a). Strategic Approach to International Chemicals Management. UNEP, SAICM, WHO. ISBN: 978-92-807-275-7. https://sustainabledevelopment.un.org/content/documents/SAICM_publication_ENG.pdf.

United Nations Environment Programme (2006b). Summary of Supply, Trade and Demand. Information on Mercury. https://wedocs.unep.org/bitstream/handle/20.500.11822/11610/HgSupplyTradeDemandJM.pdf?sequence=1&amp%3BisAllowed=.

United Nations Environment Programme (2010). Report of the Persistent Organic Pollutants Review Committee on the work of its sixth meeting. UNEP/POPS/POPRC.6/13/Add.

United Nations Environment Programme (2012). Global Chemical Outlook. Towards Sound Management of Chemicals. Trends and changes. ISBN: 978-92-807-3275-7

United Nations Environment Programme (2013). Global Chemicals Outlook – Towards Sound Management of Chemicals. Trends and changes. http://wedocs.unep.org/bitstream/handle/20.500.11822/8455/-Global%20chemicals%20outlook_%20towards%20sound%20management%20of%20chemicals-2013Global%20Chemicals%20Outlook.pdf?sequence=3&isAllowed=y.

United Nations Environment Programme (2015a). Compilation of information submitted by parties on their experiences in implementing the recommendations set out in the annex to decision POPRC-6/2 on the elimination of brominated diphenyl ethers from the waste stream and on risk reduction for perfluorooctane sulfonic acid, its salts and perfluorooctane sulfonyl fluoride. UNEP/POPS/COP.7/INF/12.

United Nations Environment Programme (2015b) IV/3 Highly Hazardous Pesticides, Report of the International Conference on Chemicals Management on the work of its fourth session, SAICM/ICCM.4/15.

United Nations Environment Programme (2016). Global Report on the Status of Legal Limits on Lead in Paint. https://wedocs.unep.org/bitstream/handle/20.500.11822/11348/Limits-Lead-Paint-2016%20Report-Final.pdf?sequence=1&isAllowed=y.

United Nations Environment Programme (2017). Global mercury supply, trade and demand. Geneva. http://wedocs.unep.org/bitstream/handle/20.500.11822/21725/global_mercury.pdf?sequence=1&isAllowed=y.

United Nations Environment Programme (2018). Fake pesticides, real problems: addressing Ukraine's illegal and counterfeit pesticides problem, 21 December. https://www.unenvironment.org/news-and-stories/story/fake-pesticides-real-problems-addressing-ukraines-illegal-and-counterfeit

United Nations International Trade Statistics Database (2018). UN Comtrade Database. https://comtrade.un.org/data.

United Nations Interregional Crime and Justice Research Institute (2016). Illicit pesticides, organized crime and supply chain integrity. http://www.unicri.it/in_focus/files/The_problem_of_illicit_pesticides_low_res1.pdf.

United Nations Office on Drugs and Crime (2013). Transnational Organized Crime in East Asia and the Pacific. A Threat Assessment. http://www.unodc.org/documents/southeastasiaandpacific//Publications/2013/TOCTA_EAP_web.pdf.

United Nations Office on Drugs and Crime (2015). Container Control Programme Annual Report 2015. https://www.unodc.org/documents/Container-control-programme/CCP_Annual_Report_2015_final_February.pdf.

United Nations Office on Drugs and Crime (2016). Container Control Programme Annual Report 2016. https://www.unodc.org/documents/Container-control-programme/CCP_Annual_Report_2016.pdf.

United Nations Office on Drugs and Crime (2017). Container Control Programme Annual Report 2017. https://www.unodc.org/documents/Container-control-programme/17-08688_CCP_AR2017_eBook.pdf.

United States Environmental Protection Agency (2004). Fact Sheet on Pesticides Sales in E-Commerce. https://www.epa.gov/sites/production/files/2014-01/documents/ecomfact.pdf.

United States Environmental Protection Agency (2009). Potential export of mercury compounds from the United States for conversion to elemental mercury. https://www.epa.gov/sites/production/files/2015-10/documents/mercury-rpt-to-congress-export-ban.pdf.

United States Environmental Protection Agency (2017). International Activities Related to Pesticides. https://www.epa.gov/pesticides/international-activities-related-pesticides.

United States Environmental Protection Agency (2018a). EPA Settles with Amazon for Distributions of Illegal Pesticides, 15 February. https://www.epa.gov/newsreleases/epa-settles-amazon-distributions-illegal-pesticides.

United States Environmental Protection Agency (2018b). EPA Announces Renewed Emphasis on Self-Disclosed Violation Policies. https://www.epa.gov/sites/production/files/2018-05/documents/refreshannouncementfordisclosures.pdf.

United States Environmental Protection Agency (2018c). EPA´s e-Disclosure https://www.epa.gov/compliance/epas-edisclosure.

United States Environmental Protection Agency (2018d). The State of knowledge of Crimes that have Serious Impacts on the Environment.

Vaagt, G. (2005). Twenty years of Code of Conduct: Lessons learned and future challenges. Asia Regional Workshop: Implementation, Monitoring and Observance, International Code of Conduct on the Distribution and use of Pesticides. Bangkok, Thailand, 26-28 July 2005. Bangkok: FAO. http://www.fao.org/3/af340e/af340e05.htm#bm05.1.

van den Berg, H., Manuweera, G. and Konradsen, F. (2017) Global trends in the production and use of DDT for control of malaria and other vector-borne diseases. Malaria Journal, vol 16. No 401, (October).

Veiga, M.M., Maxson, P.A. and Hylander, L.D. (2006). Origin and consumption of mercury in small-scale gold mining. Journal of Cleaner Production, vol. 14, No. 3-4, pp. 436–447.

Vijgen, J., Abhilash, P.C., Li, Y.F., Lal, R., Forter, M., Torres, J., Singh, N., Yunus, M., Tian, C., Schäffer, A. and Weber, R. (2011). Hexachlorocyclohexane (HCH) as new Stockholm Convention POPs - a global perspective on the management of Lindane and its waste isomers. Environmental Science and Pollution Research, vol 18, No. 2 (February), pp. 152-162.

Vijgen, J., Aliyeva, G. and Weber, R. (2013). The Forum of the International HCH and Pesticides Association – a platform for international cooperation. Environmental Science and Pollution Research, vol 20, No. 4 (April), pp. 2081-2086.

World Bank (2016). Mercury trade and use for artisanal and small-scale gold mining in Sub-Saharan Africa, final report. Denmark, COWI. http://cegemi.com/wp-content/uploads/2016/02/Mercury-Sub-Saharan-Africa-Trade-Report-12-December.pdf.

World Health Organization (2009). The WHO Recommended Classification of Pesticides by Hazard and Guidelines to Classification. https://www.who.int/ipcs/publications/pesticides_hazard_2009.pdf.

World Health Organization (2011). Preventing Disease Through Healthy Environments. Mercury in Skin Lightening Products. https://www.who.int/ipcs/assessment/public_health/mercury_flyer.pdf.

Yeo, L.M., McCrea, R.S. and Roberts, D.L. (2017). A novel application of mark-recapture to examine behaviour associated with the online trade in elephant ivory. PeerJ Biodiversity and conservation, vol. 5, No. 3048 (March).

Zero Hg Working Group (2018). Mercury-added skin-lightening creams. Available, inexpensive and toxic. Zero Hg, European Environmental Bureau (EEB). http://www.zeromercury.org/phocadownload/Developments_at_UNEP_level/zmwg_skin_lightening_cream_report_final_nov_2018.pdf.

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Chemicals provide important benefits to society and play a vital role in the global economy, but they also carry risks for the environment and human health. Chemicals can contaminate soil, air and water and can damage biodiversity, and human exposure to chemicals is implicated in a range of acute and chronic health effects. As industries have grown in recent decades, so too have environmental and health concerns, and now a range of multilateral environmental agreements together with initiatives, non-binding legal instruments, national legislation and policy frameworks regulate the trade in chemicals.

The international community has progressively addressed the challenges in regulating the international trade in chemicals as knowledge in the field has evolved. The multilateral environmental agreements currently in place regulate only a fraction of the tens of thousands of chemicals that are traded today, and target selected toxic substances dangerous to human health and the environment. In these regulatory frameworks, enforcement and implementation challenges abound – gaps in international regulations concerning trade of chemicals and waste, exemptions under multilateral agreements, and inconsistencies among domestic regulations. Many chemicals remain unregulated by international law.

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