

ORGANIZED CRIME INDEX
BACKGROUND PAPER



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ORGANIZED CRIME

MEASURING THE SCOPE AND SCALE OF WASTE MANAGEMENT CRIMES

Shirleen Chin

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ABOUT THE SERIES

In the run-up to the launch of the second iteration of the Global Organized Crime Index in September 2023, we are publishing a series of 13 discussion papers. These cover each illicit market considered during the development of the Index. The papers, written by international experts, have been commissioned to help move forward the debate around definitions and measurements used in analyzing transnational organized crime markets, and thus support responses to organized crime.

ABOUT THE AUTHOR

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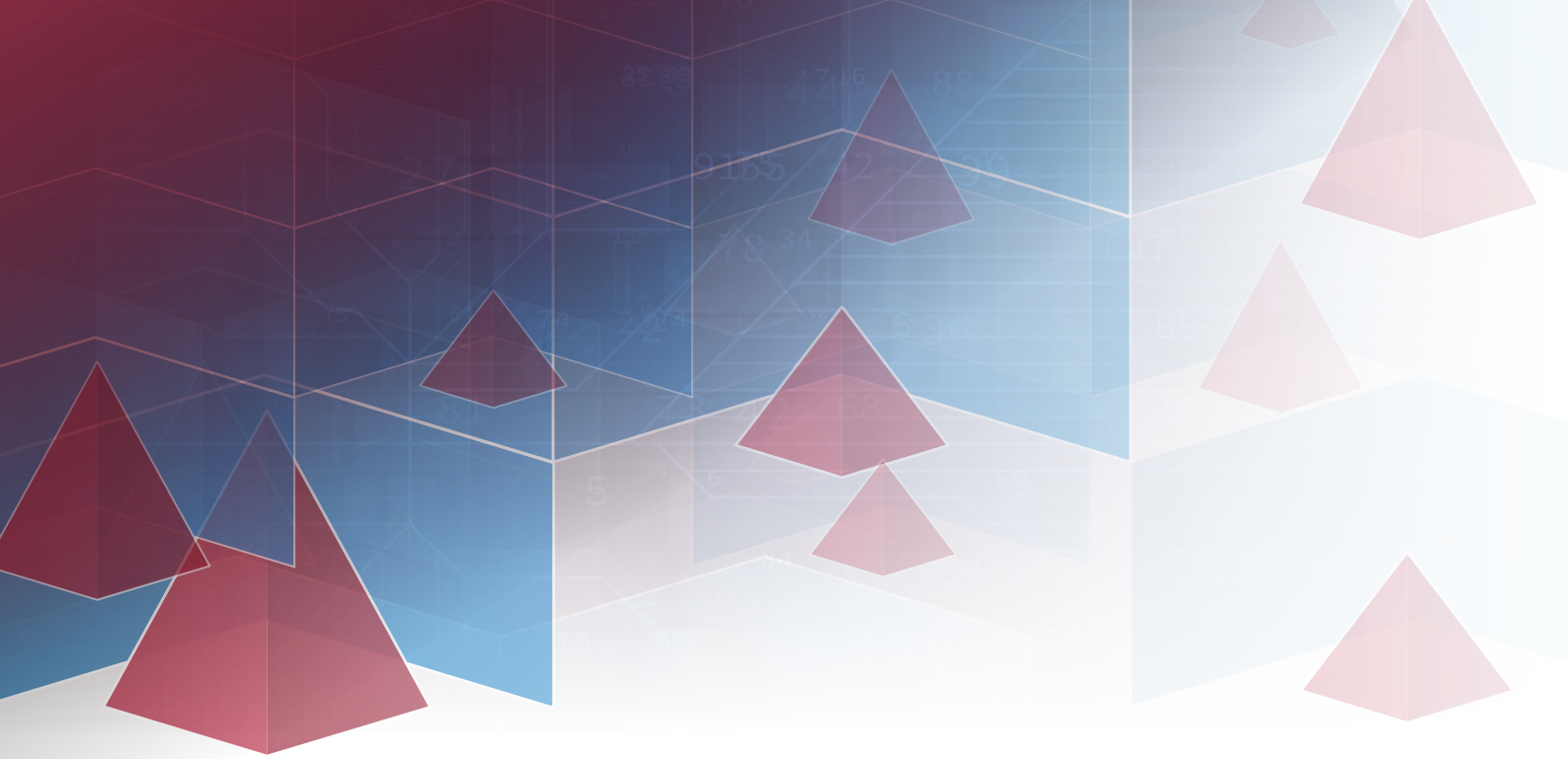
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INTRODUCTION

As populations continue to increase worldwide, particularly in urban areas, waste is literally piling up. In the 1970s, the developed or industrialized countries started to identify that waste can pose health and environmental risks if not managed properly. Increased regulation ensued, but as developed countries try to keep up with the growing pace of urban and industrial-type waste, it becomes a traded commodity as a way for developed countries to 'deal' with the problem. Inherently, waste possesses negative value but to the developing countries on the receiving end, waste has considerable secondary value (e.g. recycling potential or as a source of raw materials). Legislative and enforcement efforts have been sporadic and although they help to prioritize sounder waste management at the governmental level, implementation has been hard to tackle as increased legislation only leads to more incentive for businesses to cut costs and explore markets that are less regulated. Just as organized crime is hard to define, so is waste crime. The scale of criminality in this sector is prevalent, but fighting it would require an understanding of the larger context (e.g. legal, economic and social) and strategic intervention.

This paper is based on existing research, together with the author's broader knowledge of environmental crime.



DEFINING THE WASTE CRIME MARKET

For an act or a person (natural or legal) to be called criminal, one must assume that certain criminal laws have been broken. In the waste sector, laws that can be violated include civil, administrative and criminal law. However, the laws that regulate the waste sector can be complex, irregular and ambiguous.

Morganti observes that crime and illegal behaviour in the waste sector can be traced back to the problematic definition of waste types and rules related to waste management.¹ In other words, efforts to steer and strengthen the regulatory framework and improve enforcement capabilities at the national, regional and international levels have not been effective. This section will examine the definitional difficulties of the waste sector and demonstrate the types of criminality that typically occur. It will then offer an overview of existing definitions as used by international and regional legislations, various intergovernmental bodies and scholars. The section will end with a proposed definition to address the identified gaps.

Defining waste: ambiguities to a precise definition

Although the rationale for looking into the scale and scope of criminality in the waste sector is understandable, the groundwork involved in defining the criminal market is problematic, for two reasons. Firstly, the definition of waste, which is determined by source (e.g. municipal, household or commercial) and type (e.g. plastic, hazardous or non-hazardous), can be inconsistent, ambiguous or non-existent. Secondly, it depends on the stage at which the waste is regulated (e.g. storage, treatment or disposal). Take for example the categorization used by Interpol in their 2017 global enforcement action (see Figure 1).²

COLOUR CODE USED IN THE DATA DESCRIPTION	TYPES OF WASTE	DESCRIPTION	EXAMPLES OF WASTE REPORTED DURING THE OPERATION
	Biological and chemical waste	Waste containing mostly natural organic materials (remains of plants, animal excrement, biological sludge from waste-waste treatment plants and so forth) and industrial chemicals	Tanned leather, medical waste, sludges, waste water, paint, pesticides, etc
	Construction and demolition waste	Waste generated from the construction industry	Demolition waste and excavated earth and rock, asbestos, stone-cutting waste, buildings residues, wood waste, soil mass
	E-waste	Electronic waste that is not vehicle related (otherwise, classified as 'waste related to the car industry')	Computers, waste CRTV, fans, printers, monitors, batteries, speakers, wires, etc
	Glass waste	Material or waste composed of glass	Glass packaging
	Household waste	Waste generated from domestic and municipal sources	Cooking oil, used clothes, hazardous household waste, vegetable waste, organic waste, refuse derived fuel, etc
	Metal waste	Material or waste composed of metal	Ferrous waste, non-ferrous waste, iron, copper, wires, metal scraps
	Oil waste	All oil waste that is not clearly identified as related to the car industry (otherwise, categorized under 'waste from the car industry') or household uses (otherwise, it is categorized under 'household waste')	Used oil, combustible waste, etc
	Paper waste	Material or waste composed of paper	Paper, cardboard, etc
	Plastic waste	Material or waste composed of plastic	Plastic bottles, plastic packaging, plastic bags, etc
	Waste from the car industry	Waste generated by used vehicles. It includes end of life vehicles (ELV), car parts and vehicle oil	Car dismantling, ELV, motors, lead acid batteries, motor filters, accumulators, end of life tyres, wheel waste, tyres oil, motor oil, used vehicle oil, diesel, etc
	Mixed materials	Shipments, load or site containing different types of waste listed above	Several wastes, ELV, clothes, batteries, furniture, tractor, fridge, refrigerators, mixed dry recyclables, mixtures of waste, bulky refuse, electro waste, etc

FIGURE 1 Waste types uncovered by Interpol in its '30 Days of Action' campaign.

SOURCE: Interpol, Operation 30 Days of Action, <https://www.interpol.int/fr/content/download/5168/file/Operation%2030%20Days%20of%20Action%20Final%20Report.pdf?inLanguage=eng-GB>

It is evident that there are major overlaps between the categorization used by Interpol. Household waste, which can consist of glass, plastic and paper, is both generalized and specified in the list as separate types of wastes, whereas biological and chemical waste are grouped together although they require different treatment and disposal processes. The list demonstrates that a theoretical understanding of waste categorized by source and type is not viable in practice.

In the broadest sense, there are four types of waste: municipal, industrial, agricultural and hazardous waste. These can be further broken down into: household and commercial waste (municipal); construction and demolition waste (industrial); livestock and agro-industrial waste (agricultural); and, depending on source or type, household and industrial waste (hazardous). Alongside the typology of waste is the operative activity; the gamut of waste management typically includes the collection, handling, storage, treatment and disposal of waste.³ Furthermore, these activities apply to all types of waste, which can vary in specificity and are subjected to different methods of management depending on whether the waste is solid, liquid or gaseous. Waste crime can occur anywhere along the chain of management, but wide definitional disparities, along with differences in regulatory, resource, capacity and economic factors, make it even harder to control.

For the purposes of this paper, we will not be looking at 'waste management' as a crime but rather, more broadly, consider crime with regard to the type of waste managed: non-hazardous and hazardous waste. To elaborate, the type of waste that is managed and regulated by countries worldwide is both non-hazardous and hazardous municipal and industrial-type waste. Without uniform definitions on waste, the loopholes provided by treaties such as the 1989 Basel Convention,⁴ on second-hand goods, and vague criteria for 'hazardous' waste mean that municipal and industrial-type waste can end up in the trade market.

Opportunities for crime and illegal behaviour

Urbanization and globalization could be considered to have given rise to health and environmental concerns, which have led to increased and evolving norms and regulatory approaches to more sound waste management. However, waste management is a huge economic sector and opportunities inevitably arise at various stages for illegal activities enabled by the complexities of waste definitions and legislative loopholes. These opportunities are compounded by the fact that waste possesses negative value. This means that it costs money to treat and dispose waste in a way that is safe and does not harm the environment.⁵ Unfortunately, these costs usually come from increased regulation, particularly in developed countries. In addition, as a costly operation, it is common for businesses wishing to avoid such costs to engage with waste operators who know the market better, legally or illegally.

Although municipal waste management is regarded as a public sector affair,⁶ it can be dealt with either by public (municipalities) or private actors (waste operators) through public-private partnerships. The cost to manage waste, both in up-front investment and operational costs, means a growing reliance on such partnerships. The problem is that these private waste businesses contracted may be incentivized to cut corners to maintain profitable. Often the practice is to export unwanted waste to other countries with proper treatment facilities (which could mean facilities existing only 'on paper' to actual, fully functioning ones), or more relaxed regulations or environmental standards. As municipal and industrial-type waste, whether non-hazardous or hazardous, are two of the most managed and

traded types of waste, waste operators can take advantage of the legal loopholes in their countries of interest. Transborder crime is therefore a logical offshoot of waste management.

Common forms of criminality in waste management include corruption (e.g. bribery), fraud (e.g. falsification of documents), organized crime (e.g. involvement of gangs) and economic crime (e.g. tax evasion). Corporations and individuals in the waste business can cut corners if they are assisted by organized criminal groups or illegal services. Here, violations of the law by one actor might be invisible to others. This can also be compounded by the complex connections at different stages of the waste business. For example, legitimate corporations could contract other unscrupulous waste operators (brokers, subcontractors and intermediaries) at different stages (e.g. collection, storage or disposal) to manage their waste.⁷ In addition, these legitimate corporations could also contract waste operators as a means to launder money or use the latter as fronts for trade in other illicit goods, such as drugs. If these business practices are knowingly committed by the corporation, it would be committing corporate crimes, but owing to some overlap, it can also be associated with or converge with other areas of organized crime.⁸ This will depend on the *who* and *what* of organized crime.⁹ Bisschop and Huisman describe the *who* notion as stable partnerships of criminals who systematically engage in crime (organized crime groups), while the *what* notion is serious criminal activities in more loosely organized structures.

The forms of criminality mentioned here are typical in the context of the illegal trade in waste transported across jurisdictions for either treatment or disposal. Following the arrival of waste in the destination country, other unlawful activities can be carried out as well, such as illegal recycling and disposal.

Waste-related crimes can also happen within the micro-environment of an urban area. For example, solid waste management challenges in many African cities stem from weak law enforcement and policies or non-regulation, as waste is rarely collected, transported and disposed of properly.¹⁰ As a result, organized crime groups can take advantage of the market, making inroads into the informal business sector, which employs violence to intimidate and eliminate naysayers.¹¹

Overview of existing definitions of waste crime

There have been various attempts to describe waste crime, but, as some of the examples that follow will show, waste crime runs the gamut; from regulatory breaches attributable either to individuals (fly-tipping) or corporations (transboundary movement) committed anywhere along the waste chain. There is no straightforward definition per se. However, a higher standard of care is seen to apply to hazardous waste, but this can be further categorized. General descriptions of waste crime known collectively as pollution crime are also used where pollution or harm to the environment and humans are key factors. Reference to organized crime seems to appear only where a study has been conducted.

The following definitions of waste crime have been put forward:

- Bisschop and Huisman define waste crimes as ‘the trade, treatment or disposal of waste in ways that breach international or domestic environmental legislation and cause harm or risk to the environment and human health’.¹² They also define organized crime as ‘complex criminal organizations that aim to control illegal markets – and even branch out to legal markets – and attain control by means of violence and/or corruption’. Yet, they call for a degree of flexibility when defining waste crime as organized owing to the blurred policy divide between organized crime and serious crime.
- Article 2(1) of the 1989 Basel Convention defines waste generally as ‘substances or objects

which are disposed of or are intended to be disposed of or are required to be disposed of by the provisions of national law'. It then refers in article 2(2) to waste management as 'the collection, transport and disposal of hazardous wastes or other wastes, including after-care of disposal sites'. There must also be 'transboundary movement', defined in article 2(3) as 'any movement of hazardous wastes or other wastes from an area under the national jurisdiction of one State to or through an area under the national jurisdiction of another State or to or through an area not under the national jurisdiction of any State, provided at least two States are involved in the movement'. Hazardous waste follows a listing technique under the Convention (Article 1 referring to Annex I) and such waste, possessing chemical characteristics in Annex III, should only cross borders if prior informed consent is obtained, as per Article 6.

- The 1991 Bamako Convention¹³ on the Ban of the Import into Africa and the Control of Transboundary movement and Management of Hazardous Wastes within Africa mirrors the Basel Convention in this regard, except where it defines waste management under article 1(3) as 'the prevention and reduction of hazardous wastes and the collection, transport, storage, and treatment either for the reuse or disposal, of hazardous wastes including after-care of disposal sites'. Despite the Convention, the occurrence of many chemical-related accidents has led to its effectiveness being questioned.¹⁴
- The EU Waste Framework Directive¹⁵ defines waste as 'any substance or object which the holder discards or intends or is required to discard' and hazardous waste using a listing technique. Waste management is defined as 'the collection, transport, recovery (including sorting), and disposal of waste, including the supervision of such operations and the after-care of disposal sites, and including actions taken as a dealer or broker'. The Directive introduces member states to the waste hierarchy (Article 4), the 'Polluter Pays' principle and the Extended Producer Responsibility scheme. As with all EU Directives, this Directive gives member states a consideration margin on how to meet their obligations.
- Interpol considers waste crime under the umbrella term of 'pollution crimes'.¹⁶ Other crimes under this umbrella include marine pollution crime, illicit trafficking in chemicals, carbon trading crime and illegal mining activities. According to Interpol, these crimes are tied together by the high-reward/low-risk business model.
- A study by the UK Department for Environment, Food and Rural Affairs in 2018 describes waste crime to include 'fly-tipping, illegal dumping or burning of waste, deliberate misdescription of waste, operation of illegal waste management sites and illegal waste export'.¹⁷
- A 2015 report by the United Nations Environment Programme¹⁸ looks into international (Basel, Rotterdam and Stockholm conventions) and regional legal frameworks (Bamako and Waigani conventions) to zoom in on the illegal transboundary movement of waste (hazardous or other) from developed countries to developing countries. The report emphasizes that 'the evolution of crime, even transnational organized crime[,] in the waste sector is a significant threat'.¹⁹ It also confirms that serious crimes can happen anywhere along the waste chain, but that they receive little attention because of the large-scale nature of the economic and transport sector.²⁰
- In the US, the Department of Justice works through a department called the Environment and Natural Resources Division to enforce federal civil and criminal laws. 'Pollution cases' comprise violations of the Clean Air Act, Clean Water Act and hazardous waste laws. Notably, the US is not a signatory to the Basel Convention.²¹

These examples are not representative of actual existing definitions of the waste crime market, but were chosen to highlight some of the overlaps in definitions, mainly the focus on hazardous waste

and the 'acts' required to qualify as a violation. There is no uniform definition of what constitutes waste crime, but the focus on hazardous waste is indicative of an understanding that waste is an environmental, health or trade problem.

Proposed definition

This criminal market is defined by the activities of exporters, importers or local waste operators, with the characterization of waste as the enabler. In relation to illegal trade in waste, stringent regulation in a country of export does not solve the problem of waste criminality if there is lax regulation in the destination country. International and regional treaties regulating trade struggle with the effective implementation of their provisions, as can be observed by the persistent problem of trade in illegal waste. In relation to local management of waste, criminality arises where waste operators exploit loopholes (e.g. weak law enforcement, ineffective policies or non-regulation).

A broader distinction of waste (non-hazardous and hazardous) forms the basis of this paper because most of the waste being managed and regulated worldwide is municipal and industrial-type waste, both non-hazardous and hazardous. In tackling criminality in this area, it would be useful to look at the type of waste most traded and found by enforcement authorities. Given the upcoming global treaty on plastic (see section on future trends) and the amendment adopted by the Basel Convention to include plastic waste to the current prohibition on transboundary movement of hazardous waste, it is strategic to define waste crime in a way that reduces current and future technical loopholes. Although it is tempting to provide a definition that is narrow (e.g. e-waste/plastic crime), one based on source (i.e. municipal, industrial, agricultural) or type (e.g. e-waste/plastic) may further compound the difficulties of analysis of the criminal market; the primary concern remains the wide health and environmental impacts of both illegal trade in waste and failure to properly manage local waste.

A proposed definition that can be used in a global index is therefore as follows:

Waste crime can happen anywhere along the gamut of waste management (e.g. collection, handling, storage, treatment and disposal). The types of waste with the most impact on communities and the environment include both non-hazardous and hazardous waste, with the former potentially transforming over time to hazardous waste when mixed with other types (e.g. the mixing of non-hazardous biodegradable waste and plastic). Furthermore, criminality in waste is often made possible by mixing waste types to bypass definitional difficulties or to take advantage of the insufficient knowledge of enforcement authorities. A criminal act in this area is characterized either as an action or an omission by waste operators, including the complicity of other actors (either official or non-official), such as customs officials or organized crime groups involved in non-waste businesses. Conscious inaction can be regarded as a crime by omission.



MEASURING THE WASTE CRIME MARKET

According to the Financial Action Task Force (FATF), differences in national definitions of environmental crime complicate quantification of crime types and data collection. The way countries collect and use data is also not always comparable. This also applies to waste crimes. However, more studies appear to be done in developed countries than in developing countries. This may be due to discrepancies in awareness, capacity or regulation. This section will distinguish between the waste crime markets and actors in developed and developing countries through a series of comparisons. An argument will be made to focus on the illegal trade in waste based on descriptions of experience from other projects. As such, this section will propose a trade-related assessment as the best model, as it is already heavily regulated and may be more pliable to solutions.

Prior considerations

The role of developed and developing countries

While the generation of waste alone creates many opportunities for criminal intervention, it is important to first recognize the roles of developed and developing countries in major regions (see Figure 2). For decades, high-income regions such as North America and Western Europe have been the major exporters of non-hazardous and hazardous waste, while lower-income regions such as sub-Saharan Africa, South Asia and Southeast Asia have been the primary receivers of such waste. Most notably, when China banned all waste imports in late 2017, developing countries such as Vietnam, Malaysia, Laos and Turkey rushed to receive the diverted stream.²² Although there are several reasons for this decades-long trade (e.g. capacity problem in developed countries versus income opportunities for sorting waste in developing countries), it can be distilled to lower costs and less stringent regulations in developing countries.

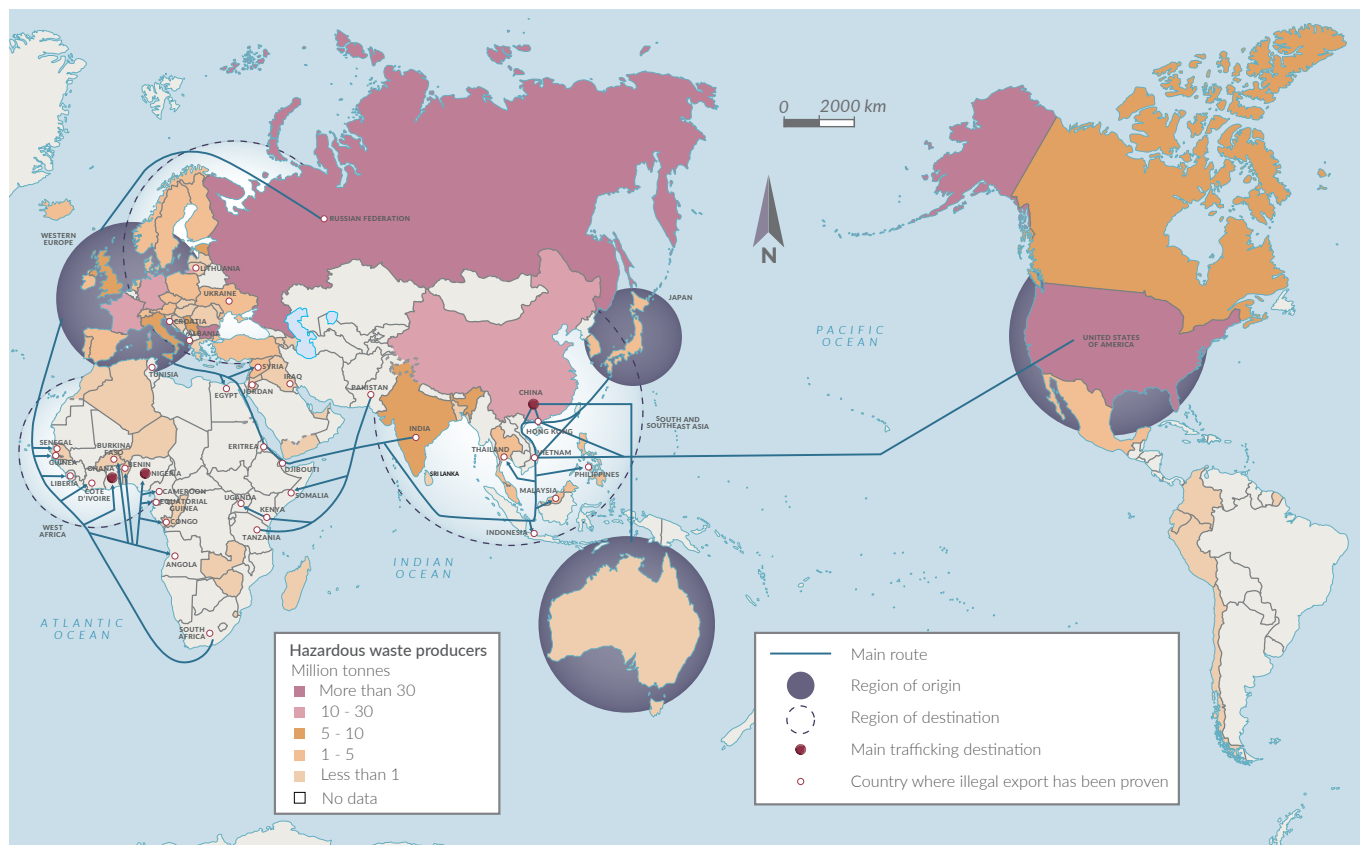


FIGURE 2 Global waste trade routes.

SOURCE: United Nations Statistical Division, 2011; UNODC, Transnational Organised Crime in East Asia and the Pacific, 2013; Impel-TFS, 2006, Threat Assessment Project, and World Customs Organisation (2009) Operation Demeter final report, supplemented with data from the Dutch national audit, appeared in the Coordinated audit on the enforcement of the European Waste Shipment Regulation

NOTE: There is lack of sufficient data to create a more recent representation of waste routes.

However, apart from managing imported waste from developed countries, developing countries also need to manage their own local waste. The irony is that, in reality, most of them are not sufficiently equipped to deal with their own waste in a safe and environmentally friendly manner, much less other countries' waste.

Defective legislations

Despite more robust legislation existing in some of the waste-exporting countries, defective implementation creates economic incentives to send waste to receiving countries where pertinent environmental laws are either equally or more defective, or non-existent.

In the UK, businesses are encouraged to either recycle locally or send their waste away for recycling, particularly plastic, through a government subsidy called a packaging recovery note (PRN), a form of extended producer responsibility (EPR) also encouraged by the EU. A tonne of plastic, with contaminants, thus hazardous, can either go through expensive processes locally (subsidy minus cost of recycling) or be shipped off by an exporter who will earn the full PRN price. This defective process is weighted towards the exporter and does not account for eventual checks as to whether the waste is recycled at all or how much recycled plastic is produced. Although the PRN subsidy was meant to

solve a capacity problem in the UK by encouraging more responsible waste management, it created opportunities for waste exporters to fraudulently misdeclare their tonnage to earn a profit at the beginning of the process.

In another case of defective legislation, the lack of a domestic statutory authority in the US prevents the country, firstly, from becoming a party to the Basel Convention and, secondly, even if it does, from being able to implement all the provisions of the Convention. As one of the largest exporters of waste in the world, the US not only lacks the capacity to process waste,²³ but the power of lobbying by trade negotiators also blocks it from effectively curbing the export of waste. For example, *The New York Times* reported that 'an industry group representing the world's largest petrochemical makers lobbied for United States trade negotiators to press Kenya, one of Africa's largest economies, to continue importing foreign plastic garbage'.²⁴ Essentially, the US can persist in exporting waste and trade data has thus far not shown an inversion.²⁵

Once waste gets shipped away, it is 'out of sight, out of mind'. A combination of weak environmental legislation and poor labour standards in developing countries means waste operators have been enjoying the gain of profits to the detriment of others by externalizing these hidden costs.

Level of industrialization

One of the other important factors to consider when studying waste trade is the level of industrialization of particular regions. It is a simple demand-and-supply scenario. For example, there is a higher tendency for waste to be exported from Europe to Asia than to Africa because of the higher numbers of manufacturing sectors in the former. 'Extractable' minerals and metals, as well as recyclable materials (e.g. plastic and paper), from developed countries' waste all have market value sought by businesses and, indirectly, those living below the poverty line. In Indonesia, despite mistreatment, poor human rights oversight or stigmatization, informal waste workers in cities and villages sort through waste in landfills for a living. The scrap that they collect are turned in at recycling centres for money.

Decentralization

In both developed and developing countries, there is a tendency to decentralize waste management from the state to the local level. Despite the justification for this, it leads to disharmony and difficulties with the coordination needed to implement regional and international obligations under the Bamako or Basel conventions. Parallel to this are calls for more private-sector involvement to offset the costs. This could counter the fight against criminality in the waste sector, especially if there is no effective central oversight at the state level.

Local waste management

In a different case of potential criminality, waste management in the Middle East, North Africa and sub-Saharan Africa is spurred by insufficient legislation, lack of control and a lack of technical and financial resources.²⁶ For example, many African cities struggle with weak infrastructure and governance, including poor enforcement, inadequate equipment for collection and transportation and the dominance of a few private service providers, characterized by poor oversight and low awareness among the public.²⁷ This leads to increased criminality, which can involve violence (such as extortion), the use of guns and convergence with other criminal activities such as illicit drug trade.²⁸

Described thus far were only legal, economic and institutional enablers of waste crime. Yet both public and private actors are the gatekeepers of implementation and observation of the laws. Therefore, who are the enablers of waste crime?

Actors managing waste

There is active participation of both public and private actors in the realization of waste trade and criminal waste activities within a country's jurisdiction. While most municipal waste (household and commercial) is managed publicly by municipalities (70% according to a 2018 study by the World Bank²⁹), engagement through public-private partnerships is commonplace (up to one-third) to offset the high costs involved. The amount of waste collected also differs according to a country's income level. High-income countries have up to 96% of their waste collected, whereas low-income countries struggle to collect even half of their waste (see Figure 3). Waste can enter the trade market, whether in fragments or as a whole, as long as there is value to be reaped, particularly where waste ends up being categorized as non-hazardous or recyclable goods. The same is true for locally collected waste that does not enter the trade market; the secondary value contained in waste, as well as cheaper ways of disposing waste, open up opportunities for criminal behaviour.

Private actors

The waste sector is rife with private actors (e.g. waste companies, transport and shipping companies, brokers, intermediaries and subcontractors) who are paid to collect waste to be transported. These private actors also know how to circumvent the legal requirements and thus cut costs along the waste management chain. As mentioned earlier, violations of the law by one actor might be invisible to others and this is the gap that needs to be addressed. However, for this, legislators and enforcement authorities need to stay ahead of the game, acknowledge the loopholes and know where and when to intervene.

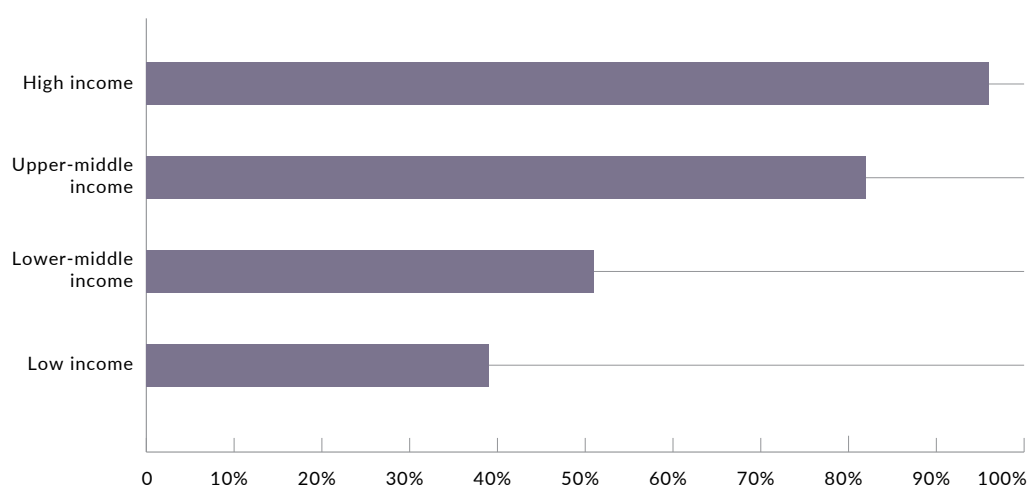


FIGURE 3 Rates of municipal waste collection according to countries' income level.

SOURCE: World Bank, What a Waste 2.0: Trends in solid waste management, 2018, https://datatopics.worldbank.org/what-a-waste/trends_in_solid_waste_management.html

Public actors

Whether waste is managed locally or traded across jurisdictions, public authorities are the ones who sign off on things. Unfortunately, research and enforcement actions do not adequately shine light on the role or potential complicity of public actors. This is demonstrated by the countless interviews conducted on waste problems worldwide, where public authorities lament the arrival of waste from other countries or that certain types of waste were not supposed to have been dumped at a particular site. Perhaps the reluctance to look into the role of public actors is due to incomparable evidence or data, or because the onus is on businesses to do the right thing in the first place. Regardless, the roles of competent authorities, compliance officers, customs officials, port authorities and the likes run parallel to businesses doing the right thing. It is a public authority's task to uncover falsification of documents or misdeclaration of waste and conduct checks on the possible infractions at ports or on landfills, such as the explicit dumping of hazardous waste. This is not an easy task for any public actor, because of, among other reasons, the lack of prioritization relative to other crimes, difficulty in proving (or admitting) collusion, absence of verifiable data, problems coordinating amongst officials and a lack of capacity.

Corporate crime and organized crime

The descriptions of private and public actors cannot be neatly organized under the typologies of corporate and organized crime. For example, if a small company was set up with criminal intent to manage waste for profit with others, it could be found guilty of certain corporate crimes but to associate it with organized crime can be difficult because there is no consensus on the definition. Notwithstanding the range of corporate crimes or the definitional difficulties of organized crime, one should, at the minimum, go beyond available data on administrative or civil fines imposed on those caught for circumventing the law, to analyse the potential connections with larger or organized crimes. It is for this reason that there is limited reporting on and investigation of waste crime. In relation to the illegal trade in waste, it is big waste businesses who can afford to deal with the bulk of waste and in many ways use this enormity to conceal illegal waste. Bigger companies can be charged with bigger fines and their wrongdoings are easier to align with corporate laws and obligations. However, they can also afford to pay fines or pay off authorities. It would also be relatively easier to connect bigger companies with the larger network of organized crime, but there is still much room for improvement with regard to getting the necessary data.

Overview of projects, databases and their shortcomings

Several projects have assessed, on an international, regional or national level, the scale and magnitude of the waste crime market, with a wide range of focus and methodologies (see Annex). Some of these studies focus on the more general subject of illicit trafficking and trade in waste, whereas others focus on specific waste types that are subject to such criminal activities. Methodologies include both quantitative and qualitative assessments, and criminological analysis and enforcement data are also applied to either demonstrate a set of data for further analysis or produce a report. A non-exhaustive list of existing assessment projects is provided as an annex, including information regarding projects' territorial scope, methodology and observations or shortcomings.

In listing these projects, it was observed that they are useful when considered as a whole and not singularly. On their own, they do not adequately provide an assessment of the global issue of waste management crime. Methodologies adopted by the projects also vary, which can be challenging to aggregate for consistency.

Targeted operations like the ones led by Interpol (Operation 30 Days of Action) and the European Anti-Fraud Office and the World Customs Organization (Operation DEMETER) may be lauded for their success, but they are not nearly enough to deter or reduce the illegal trafficking of waste as they are based on limited intelligence and time-restricted cooperation. Books or reports on the waste crime phenomenon are heavily concentrated on the problems and lack practical solutions that can be implemented when there is no political will or resources. They are also selective in the types of waste analyzed: general (municipal solid waste, agricultural waste, industrial waste, hazardous waste) or specific (waste regulated by the Basel Convention and Montreal Protocol; plastic). The waste databases available via Eurostat, Organisation for Economic Cooperation and Development (OECD) Statistics or national databases such as the US RCRAInfo Wiets and Statistics Canada are not updated frequently enough given the enormity of the transboundary movement of waste. Further, the data collected is rudimentary at best. It would require an analyst to collect data from various sources, reports and operations to hypothesize the problem to be solved. The lack of viable data can be attributed to the lack of reporting or data being too homogenous.

The regional reports listed suggest there to be a general call for more private sector involvement in developing countries to manage local waste, whereas the analysis discussed in this paper suggests that, in developed countries, public-private partnerships have been creatively using loopholes to move waste illegally. It would seem that in an effort to 'catch up' with sounder waste management practices of the developed countries, developing countries want to replicate a flawed arrangement without having first dealt with proper legislation.

With regard to the element of organized crime, it is noted that unless the study was carried out by a relevant authority (OLAF) or with the purpose of looking into convergence as an issue, information about it is far from ideal from a criminal analysis perspective. This makes it difficult to aggregate data on the presence of organized crime at a macro level.

Notwithstanding these peculiarities, an overview of these projects is useful nonetheless because they demonstrate that the enormity and complexity of waste management cannot be resolved without addressing local, regional or global capacities. They all acknowledge that waste management is out of hand because waste is increasing at a pace too fast for it to be handled properly and legally. Developing countries are dealing with the management of their own waste while simultaneously deciding how best to approach imported waste.

At the micro level in developing countries, dealing with own waste generation is solely under the purview of local governments. Since waste from developing countries mostly stays within their borders, criminality related to it may be best handled by improvements in law, policy and governance. At the macro level, the movement of waste across borders between developed countries, or from developed countries to developing countries has become more sophisticated and evolved to adapt to stricter and more complex regulation while exploiting limited oversight.

Proposal to conduct trade-related assessment

Although there is a level of criminality in local waste management, illegal trade in waste scores higher points. By looking into the latter, attention will have to be given to the former. Starting the reverse way is more difficult because it would be restricted to jurisdictions that have conducted studies on the phenomena. One may think of the involvement of the Italian mafia, but waste management has become an increasingly institutionalized market, with mafia-like groups becoming sophisticated and using companies as their mode of operation.

As a starting point, it is recommended that the criminal waste market be assessed from a broad regional perspective to ascertain the type of market in relation to supply and demand. This is because the trade in waste or, by implication, illegal trade in waste is already subject to regulation and thus enforceable if an infraction is found. For example, under the Basel Convention, hazardous waste from the most industrialized countries of the OECD are banned from exporting all forms of hazardous waste to non-OECD countries unless by prior informed consent. The loophole here is that non-hazardous waste and second-hand or 'recyclable' goods are not subject to the convention and will skip any customs checks. Both public and private actors can participate in falsifying documents to misdeclare a mix of hazardous and non-hazardous waste as fit for trade. Customs or port authorities who do not have the expertise to differentiate the waste can be easily hoodwinked. The bulk of illegal waste worldwide can be traced back to illegal trade, if not illegal waste activities at the local level. Troubleshooting from the trade perspective would be more strategic because by looking into the activities of exporters and importers, one would also gain insights into who the local instigators are.



DISCUSSION

Future trends

Trends in the waste sector can be categorized as legislative or institutional, or refer to growth in other 'harmful' types of waste.

Legislative changes: Will they be for the better?

In 2022, countries convened to agree on a framework for a new legally binding treaty on plastics,³⁰ focused on plastic production and product design, which is due to be finalized in the next two years. There has been an upsurge in awareness about plastic pollution recently, although awareness is not growing rapidly in developing countries. Between now and the introduction of the new treaty, the oil and gas industry will likely lobby to reduce any impact on themselves and the actors involved in illegal trade and management of waste are expected to devise creative workarounds. Besides, plastic is only a part of the waste problem; hazardous waste that harms the environment and health will still manifest itself through other forms.

In the EU, efforts by the European Commission are underway to tighten compliance with EU environmental laws by drafting a new directive that will replace the previous one on environmental crime. The emphasis will be on the use of criminal law to better protect the environment through introducing new criminal offences (doubling the list from the previous directive from 9 to 18), increased penalties and better enforcement for cross-border cooperation. Although the draft directive refers to aggravating factors when sanctions are applied to an offence, it falls short of linking serious crime with a cross-border dimension (e.g. organized crime or money laundering) to the proposed increased penalties. The EU, by virtue of Article 83(1) of the Lisbon Treaty, could have 'establish[ed] minimum rules concerning the definition of criminal offences and sanctions'³¹ rather than leave it to member states to consider or reflect on. In effect, this may perpetuate the lack of prioritization and hence hinder coordination at the enforcement level, leading to the same problem it was meant to resolve.

Institutional additions

Public–private partnerships in developing countries will increase as municipalities struggle to manage growing urban waste on a tight budget. There are already calls for more private-sector involvement to offset the high costs in Africa. However, as the evidence base has shown, individuals and companies are the ones violating waste laws. The call for increased regulation may also happen in developing countries, thus risking the potential for unscrupulous actors to think of ways to bypass the law.

New ‘green deals’ and plans for a circular economy, which are trending in many developed countries, may give legitimate businesses more leverage with increased subsidies or improved EPR. However, this may add to the disparities that already exist and exacerbate the problem in developing countries, mainly regulatory, capacity and awareness.

Other ‘harmful’ wastes

Irrespective of a country’s level of development, the internet has spurred people to consume at a higher and faster pace. Increased consumption inevitably leads to an increase in both production and consumer waste. Unless subjected to rigorous EPR or standards, goods such as electronics, beauty products and clothes can perpetuate and exacerbate secondary demand in raw materials in developing countries, hazardous waste pollution through micro-pollutants and the physical pollution from fast fashion.

Ways to mitigate challenges of future trends

Prior to the plan for introducing a plastic treaty, it was proposed that the current prohibition on trans-boundary movement of hazardous waste under the Basel Convention be amended to include plastic waste (particularly mixed plastics). This amendment will help curb the illegal trade in waste because plastic, unlike the qualifier of ‘hazardous waste’, is easier to identify. Port or customs authorities will be able to single out containers that carry plastic-looking waste, thus address the loophole provided by the term ‘non-hazardous’ under the Convention. The amendment took effect on 1 January 2021.

As developing countries consider more private-sector involvement, it would be paramount for researchers and institutions such as Interpol, the World Bank and UNEP to fill the gap in research by emphasizing the potential for criminal behaviour by public actors who sign off on or monitor the illegal activities of the private sector. It would also be helpful to close the gap found in EPRs by ensuring a proper trail of how the subsidies are spent and encouraging export only in exceptional cases.

In relation to consumers’ increased purchasing power, greater awareness of waste is needed. Understandable and relatable information needs to be disseminated through all types of stakeholders. In an ever-integrated world, the time for siloed thinking is over. Institutions such as UNEP should create awareness more strategically. An example is the focus on plastic over the past few years, as the topic of waste management in general can be reduced to a conversation on plastic, with a rudimentary naivety about the need for a circular economy.

Lastly, changes to legislation and policy, which take into account stakeholder input, are needed. However, this cannot be initiated without highlighting the gaps (i.e. lack of comparable data from developing countries) and the presentation of more robust or comprehensive analysis, such as the nexus with criminal behaviour by all actors.

Conclusion

The waste crime market is prevalent, but cross-cutting disparities hamper useful assessments of the market or its actors. Strategic interventions at all levels will be required: consolidating definitional difficulties (e.g. simplifying versus overcategorization of waste); more data being collected on public actors; concentrated research on blind spots for a better overall picture (e.g. data on South America); and increased enforcement actions.

ANNEX: OVERVIEW OF PROJECTS, DATABASES

COMMISSIONING ORGANIZATION	PROJECT / INITIATIVE / RESEARCH	TERRITORY	WHAT	WITH / HOW	OBSERVATIONS
PEER-REVIEWED PAPERS	M Morganti, S Favarin and D Adreata, 2020, Illicit waste trafficking and loopholes in the European and Italian legislation, <i>European Journal on Criminal Policy and Research</i> , 26, 105-133	EU, with focus on Italy	Focus on illicit waste trafficking/illegal trade in waste	Crime proofing analysis	Generalization of actors; not specified as public or private
	K Muindi et al., 2022, Conflict and crime in municipal solid waste management: Evidence from Mombasa and Nairobi, Kenya, <i>Cities & Health</i> , 6, 1, 158-167.	Kenya	Focus on municipal solid waste management	Quantitative (surveys) and qualitative (discussions) assessment	Focus only on conflict and crime in the waste sector and calls for more private-sector involvement, which may encourage more criminality
	L Bisschop and W Huisman, Waste crime from three criminological perspectives: Implications for crime control and harm prevention, in T Spapens et al. (eds), <i>Green Crimes and Dirty Money</i> , London: Routledge, 2018: 148-176	Focus on Dutch and Belgian studies on waste crime	Focus on illegal trade in waste	Criminological analysis	Refers to corporate organized crime and both public and private actors, but in a trade context

Annex: Overview of projects, databases

	D Andreatta and S Favarin, 2020, Features of transnational illicit waste trafficking and crime prevention strategies to tackle it, <i>Global Crime</i> , 21, 2, 130–153	Focus on Italy	Focus on transnational illicit waste trafficking/ illegal trade in waste	Crime-script analysis	Italian context may not apply elsewhere
	AM Negm and N Shareef, <i>Waste Management in MENA Regions</i> , Cham: Springer Nature, 2020	Middle East and North Africa	Focus on municipal solid waste and partly agricultural waste	Experiences of a consortium of researchers, scientists and waste management experts	Emphasis on the need for more private-sector involvement to overcome resource and capacity problems; problems with grammar.
EUROPEAN COMMISSION	Eurostat – waste statistics	EU, including Norway and Turkey	Focus on municipal solid waste and industrial waste	Database	Regular data collection
EUROPOL	Serious and Organised Crime Threat Assessment (SOCTA) – every four years	EU	Focus on criminal networks/serious and organized crime, including different types of environmental crimes (illicit waste trafficking/illegal waste trade mentioned in 2017 version but not in that of 2021)	Quantitative and qualitative analysis	Much of the analysis fails to incorporate solutions at the corporate level
FINANCIAL ACTION TASK FORCE	Money Laundering from Environmental Crime (2021)	Global	Focus on other environmental crimes, including illegal waste trade in relation to money laundering/ illicit financial flows	Report	Follow-the-money method, but can be counterproductive if multiple actors are involved
INTERPOL	Operation 30 Days of Action (2017)	43 countries (North America, South America, Western Europe, Australia and parts of Africa, South Asia, East Asia, Southeast Asia)	Illicit waste (illegal shipments of hazardous waste; illegal disposal of hazardous waste; illegal landfill activities; unlawful recycling operations)	Enforcement action	Although violations by 483 individuals and 264 companies were identified, the operation failed to give details on violations by public actors, resorting to a general remark of ‘violations by national authorities’
	Strategic analysis report: Emerging criminal trends in the global plastic waste market since January 2018 (2020)	Global	Focus on criminality in the plastic waste market	Enforcement data on criminal trends related to plastic waste	Although comprehensive, using both publicly sourced data and enforcement data from Interpol member countries, the report did not anticipate the plastic waste generated during the two years of COVID-19 pandemic.

Annex: Overview of projects, databases

ORGANISATION FOR ECONOMIC COOPERATION AND DEVELOPMENT	OECD Statistics (database on generation of waste by country, sector and type (i.e. municipal, industry, agricultural); updated every two years	Europe	Focus on municipal solid waste and industrial waste	Data from questionnaires to member countries' authorities and to Eurostat through the Waste Statistics Regulation	Difficult for a non-expert reader to interpret data; does not include latest data from 2020 for sectoral waste
EUROPEAN ANTI-FRAUD OFFICE AND WORLD CUSTOMS ORGANIZATION	Operation DEMETER VII (2021) – semi-annual enforcement action from 2009 onwards	Asia Pacific and Europe	Shipments of illegal waste regulated by Basel Convention and ozone-depleting substances controlled by Montreal Protocol	Risk indicators	Intensity of risk analysis and increased frequency of enforcement initiatives anticipated in the future
STATISTICS CANADA	Data on disposal of waste by source, updated every two years	Canada	Focus on residential sources (municipal waste) and non-residential sources (industrial waste)	Database	Difficult for a non-expert reader to interpret data; does not include latest data from 2020 for sectoral waste
UNITED NATIONS ENVIRONMENT PROGRAMME	Waste crime – waste risks: Gaps in meeting the global waste challenge (2015)	Global	Focus on regulated international and regional waste trade	A rapid-response assessment	Considers the economic consequences of waste crime
	Waste management in ASEAN Countries (2017)	Southeast Asia	Focus on municipal solid waste and industrial waste	Economic, regulatory and institutional overview	Most ASEAN countries lack implementable strategies and programmes on dealing with waste within a circular economy
	Africa: Waste management outlook (2018) – an off-shoot of the UNEP Global Waste Management Outlook (2015)	Africa	Focus on municipal solid waste	Economic, regulatory and institutional overview	Authors note that reliable and up-to-date data is lacking
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY	Advancing sustainable materials management: Facts and figures fact sheet	United States	Focus on municipal solid waste	Database and biennial reporting	Only summaries available
	Waste import export tracking system (RCRAInfo WIETS)	US waste exporters and importers	Focus on hazardous waste	EPA system for processing export and import notices by countries	Fairly new system introduced in January 2022
VERISK MAPLECROFT	Waste Generation Index	Global	Focus on municipal solid waste, plastic, food and hazardous waste production	Quantitative assessment of the rate of waste production by country	Country data for corporate audience
WORLD BANK	What a Waste 2.0 (2018)	Global	Focus on municipal solid waste	Report	Includes case studies
NON-GOVERNMENTAL ORGANIZATION: GREENPEACE	Trashed: How the UK is still dumping plastic waste on the rest of the world (2021)	UK and Global	Focus on plastic waste	Report	Does not address the issue of fraud, bribery, misdeclaration, tax evasion, etc.



NOTES

- 1 M Morganti, S Favarin S and D Adreatta, Illicit waste trafficking and loopholes in the European and Italian legislation, *European Journal on Criminal Policy and Research*, 26, 105–133.
- 2 Interpol, Operation 30 Days of Action: Final report, Interpol, 2017.
- 3 Within this, at the normative level, is the 3 Rs (reduce, reuse, recycle), or the 8 Rs (rethink, refuse, reduce, reuse, refurbish, repair, repurpose, recycle).
- 4 The 1989 Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal regulates the transboundary movements of hazardous and other wastes while obliging its 187 parties to ensure that wastes are managed and disposed of in an environmentally sound way.
- 5 Basel Institute on Governance, Illegal waste trade: What's driving this multi-billion dollar transnational crime and what could stop it?, 16 July 2021, <https://baselgovernance.org/news/illegal-waste-trade-whats-driving-multi-billion-dollar-transnational-crime-and-what-could-stop>.
- 6 Worldwide, waste collection, treatment and disposal is mostly provided by public entities.
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- 8 Reports have surfaced on people being trafficked to engage in modern slavery in recycling plants. See: A Gentleman, Three victims of trafficking and modern slavery to sue Biffa, *The Guardian*, 14 January 2021. <https://www.theguardian.com/law/2021/jan/14/three-victims-of-trafficking-and-modern-slavery-to-sue-biffa>
- 9 L Bisschop and W Huisman, Waste crime from three criminological perspectives: Implications for crime control and harm prevention, in T Spapens et al. (eds), *Green Crimes and Dirty Money*, London: Routledge, 148–176.
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- 11 Ibid.
- 12 L Bisschop and W Huisman, Waste crime from three criminological perspectives: Implications for crime control and harm prevention, in T Spapens et al. (eds), *Green Crimes and Dirty Money*, London: Routledge, 148–176.
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- 14 United Nations Environment Programme, Twenty years of the Bamako Convention: A time for more effective implementation, Ministerial segment meeting note from the Secretariat, 2018, COP-2 Bamako Convention, [https://wedocs.unep.org/bitstream/handle/20.500.11822/22556/Twenty Years of the Bamako Convention_A Time for More Effective Implementation.pdf](https://wedocs.unep.org/bitstream/handle/20.500.11822/22556/Twenty%20Years%20of%20the%20Bamako%20Convention_A%20Time%20for%20More%20Effective%20Implementation.pdf).
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- 17 UK Government, Department for Environment, Food and Rural Affairs, Independent review into serious and organised crime in the waste sector, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/915937/waste-crime-review-2018-final-report.pdf.
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Notes

- 19 Ibid., p 4.
- 20 Ibid., p 8.
- 21 As a non-signatory, the US creates room for export activities that would otherwise be considered illegal in other countries to be compliant with its own legislation, which incentivizes waste operators in importing countries to employ opaque methods to secure business.
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- 27 K Muindi et al., Conflict and crime in municipal solid waste management: Evidence from Mombasa and Nairobi, Kenya, *Cities & Health*, 6, 1, 158–167.
- 28 Ibid.
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- 30 For the Global Initiative's perspective on the new plastic treaty, see: V Comolli, An end to plastic pollution, 9 March 2022, <https://globalinitiative.net/analysis/end-plastic-pollution>.
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