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An analysis of the costs of dismantling and cleaning up synthetic drug production sites in Belgium and the Netherlands

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Introduction

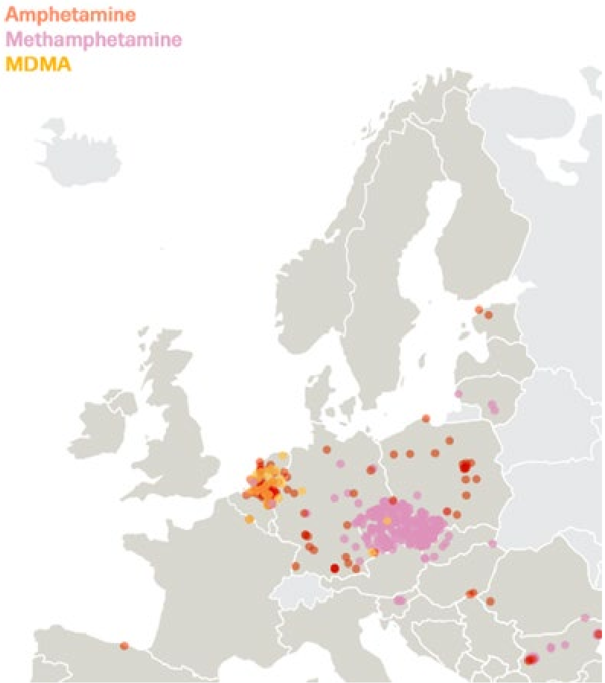
The production of synthetic drugs, measured by the number of manufacturing sites identified and the amount of drugs seized, shows an increasing trend (EMCDDA and Europol, 2011, 2016a). In the Netherlands, Schoenmakers and Mehlbaum (2017) recorded a rise in the number of sites used for the dumping of toxic waste from synthetic drugs manufacture, from 35 in 2010 to 177 in 2016. Boerman et al. (2017) reported an increase in the number of synthetic drug laboratories (production sites) identified, from 30 in 2012 to 59 in 2016. Furthermore, the European Reporting Instrument on Sites related to Synthetic Production (ERISSP) database (Van den Besselaar and van Grootel, 2017) identified 61 labs, 84 storage sites and 177 dumping sites in the Netherlands in 2016 (*N* = 322).

In Belgium, the number of identified sites related to synthetic drug production almost tripled between 2002 (*N* = 8) and 2015 (*N* = 22) (Clanlab Response Unit, 2017). In recent years, however, there has been a more stable trend. In 2015, a total of 15 labs, six storage sites and 15 dumping sites (*N* = 36) were identified. These figures remained relatively stable in 2016, with 10 labs, six storage sites and 26 dumping sites *(N* = 42) identified.

Synthetic drugs are produced using a variety of production techniques, involving a range of different chemical precursor substances (EMCCDA and Europol, 2016). These techniques may involve the use of additional chemicals and processes that are inherently dangerous. The waste generated by the production process is often disposed of unsafely, causing environmental harm and risks to public health and safety. The production of 1 kg of 3,4-Methylenedioxymethamphetamine (MDMA), also known as ecstasy, is estimated to result in anything between 6 kg and 10 kg of waste. If amphetamine (speed) is considered, this figure is considerably higher with the waste per kilogram of product estimated to be between 20 kg and 30 kg. These waste products have been dumped in forests and fields, left in abandoned premises, loaded into stolen vehicles, and buried underground.

As can be seen in Figure 1, the northern part of Belgium and the southern part of the Netherlands are two regions in the European Union (EU) facing a synthetic drug production problem. This research focuses on the north of Belgium and the south of the Netherlands (south) as two of the most important suppliers of MDMA and amphetamine in the EU, even globally (POD Wetenschapsbeleid, 2008; Soudijn and Vijlbrief, 2011; EMCDDA and Europol, 2016b; Van De Wiel, 2016; De Middeleer and De Ruyver, 2017; Europol, 2017; Schoenmakers and Mehlbaum, 2017). Because the synthetic drug production problem faced by Belgium and the Netherlands can be considered to be a transnational problem of both countries (Boerman et al., 2017), a combined study of the two countries is highly relevant for this exploratory research.

Figure 1: The distribution of production sites for different synthetic drugs (EMCDDA and Europol, 2016a)



Because of their illicit nature, the number of production sites officially recorded is likely to represent only a small proportion of the actual figure (KLPD — Dienst Nationale Recherche, 2012; Schoenmakers et al., 2016; Van De Wiel, 2016). This is more so in the case of discharges of discarded waste, where hazardous substances fade away into the soil, watercourses or sewers, often unseen.

Once identified, production and dumping sites, whether active or abandoned, must be dismantled and cleaned. The hazardous and toxic waste generated by synthetic drug production creates health risks and causes environmental damage, resulting in significant costs related to the clean-up and remediation of labs/dumping sites (EMCDDA and Europol, 2016a). The clean-up, transport, storage, destruction and remediation of the substances and tools present at a production/dumping site require the intervention of various services and actors, all of which make use of specific resources and act in accordance with fixed procedures (e.g. providing round-the-clock security at the location).

This study seeks to identify the cost categories linked to dismantling and cleaning up synthetic drug production sites. Once the cost categories are established, the study sets forth a robust methodology to estimate the scope of each cost category. Data were collected from stakeholders active in the synthetic drugs field in order to (1) identify the different cost categories; (2) collect available data for Belgium and the Netherlands; (3) identify any missing links in the data that prevent, at present, the calculation of some cost categories; and (4) estimate the cost related to dismantling and cleaning up synthetic drug production and dumping/discharge sites in Belgium and the Netherlands.

In the next section we present the methodology used for this study. In Section 3, we identify the different cost categories linked to dismantling and cleaning up synthetic drug labs, which is followed by a process description in Section 4 of how synthetic drug labs or dumps are dismantled and cleaned up in Belgium and the Netherlands. We then provide in Section 5 an overview of the data that we required, the data we were able to collect and the formulas devised to calculate the different costs. We then present the actual cost estimate (Section 6), before concluding with some reflections on the report and on the limitations of our study.

Methodology

This research applies a mixed-method study design, including a literature review, stakeholder interviews and a social cost analysis of the costs associated with dismantling and cleaning up synthetic drug production and dumping sites in Belgium and the Netherlands.

Literature review

We searched both electronic peer-reviewed bibliographic databases (Web of Science) and 'grey literature' sources (Google, Google Scholar). We used the following search terms: synthetic drug lab(s)(oratories), harms synthetic drug lab(s)(oratories), costs related to synthetic drug (production), synthetic drug dumping, environmental harms synthetic drugs, synthetic drug markets, synthetic drug(s) Belgium, synthetic drug(s) the Netherlands. We also used the Dutch translation of the search terms in order to reach more local studies.

We specifically searched for literature on the costs related to the dismantling and cleaning of synthetic drug production sites. The search identified a large number of general studies, the majority of which focused on synthetic drug (mis)use and not on production. The latter were excluded. Also excluded were studies highlighting possible consequences of synthetic drug production that were unrelated to the dismantling and cleaning up of production sites, such as studies on property value downgrades (Wortham, 2007; Dealy et al., 2017) or societal undermining (KLPD — Dienst Nationale Recherche, 2012).

The search resulted in 28 studies (see Annex 1) that identify costs related to dismantling and cleaning of synthetic drug production sites/dumps, eight of which were carried out in the Netherlands and three in Belgium; the remaining were not limited to particular geographical areas. Only three studies performed their own cost calculation.

Stakeholder interviews

After a thorough literature search we approached stakeholders working on the Belgian and Dutch synthetic drug production problem. In the initial phase of our research we approached a small number of experts (six in Belgium and three in the Netherlands) and expanded our network using snowball sampling. This method identifies potential respondents through referrals from previous respondents (Biernacki and Waldorf, 1981). Figures displaying this study's snowball sampling can be found in Annex 2.

We conducted semistructured interviews with a set of logically structured questions about the topic in hand. We used the questions to guide the interview, but we were not limited by them, and, when relevant, we allowed the conversation to digress (Beyens and Tournel, 2010). An overview of the question protocol can be found in Annex 3. For the most part interviews were conducted by telephone, with only seven carried out face to face.

In total we conducted 30 formal semistructured interviews: 18 with stakeholders in Belgium and 12 with stakeholders in the Netherlands. Interviews sought to obtain information about the stakeholder's specific role (or the role of their service), possible costs, missing links in the data that had already been collected, etc. Information on the interviewees can be found in Annex 4. The total number of interviewees is lower than the number of people accounted for in Annex 2 because not all those identified were interviewed. Some people could not be reached, some did not have any relevant information to share and referred us to another person, while others had already been interviewed following referral by another participant. Furthermore, Annex 2 includes informal contacts that referred us to one or more respondents but who were not themselves interviewed (and hence not included in Annex 4).

Social cost analysis

We calculated the social cost of dismantling and cleaning up synthetic drug production sites in Belgium and the Netherlands by applying a social cost methodology (Lievens et al., 2016). A social cost analysis estimates the total cost to the community of a given (social) problem. To estimate the costs for Belgium and the Netherlands, we asked stakeholders for data on the number of working hours spent cleaning up synthetic drug production sites, as well as the amount of equipment and supplies used, training costs and other expenses incurred.

A social cost study compares the situation of a particular problem (i.e. the synthetic drug production problem) with a counterfactual scenario in which there is no synthetic drug production/dumping problem. This allows us to identify the total cost of dismantling and cleaning up synthetic drug production sites in a given society for a given year, thus facilitating the development of policy strategies and reallocation of budgets (Lievens and Vander Laenen, 2016).

The illegal nature of drug production poses many challenges that call for a different research strategy (Neve et al., 2007; Lievens and Vander Laenen, 2016). We have used an incidence-based social cost study as the starting point for the cost estimate. Incidence refers to the number of new cases of a given social problem occurring in a given time period (Single et al., 2003). This means that all costs that are linked to crimes committed and processed in a particular period of time are measured, even if these costs exceed this time period (Moolenaar, 2009).

We used a bottom-up approach since no data on overall budgets were made available by public authorities. The known costs of activities linked to dismantling and cleaning up synthetic drug production sites were multiplied by the total number of the offences registered.

A distinction is made between *direct*, *indirect* and *intangible* costs. Direct costs are the costs of goods or services that are used or delivered to deal with the social problem — in this case, costs incurred by the police when dismantling and cleaning up synthetic drug production sites and their surroundings. Indirect costs relate to productivity losses for society that are caused by the social problem. For example, a specialised drug officer who dismantles synthetic drug labs may become unwell because of toxic fumes present in the labs. The officer may be unable to work or may die at a younger age than expected had there been no such exposure (premature mortality). Intangible costs are non-financial costs borne by individuals. Although these costs are difficult to measure, they should not be ignored. An example of these costs is the environmental degradation caused by chemicals that alter the pH level of the soil (Lievens and Vander Laenen, 2016; Lievens et al., 2017).

As can be seen in Figure 2, in this study we *focus on the direct costs*[1] related to dismantling and cleaning up synthetic drug production sites. Given the professional training and know-how of the services that attend synthetic drug production/dumping sites, the negative health impact is expected to be fairly low. Expert opinion revealed that work-based accidents related to cleaning up synthetic drug labs/dumping sites are rare, but no information is available at the Fund for Accidents at Work/Occupational Diseases[2] (Fedris, nd). For this reason, indirect costs are not included in our social cost estimate. Although intangible costs cannot be considered as costs linked to the dismantling and cleaning up of synthetic drug production/dumping sites, their importance should not be disregarded: significant damage is caused to the environment by the hazardous materials released from labs and in dumps and discharges.

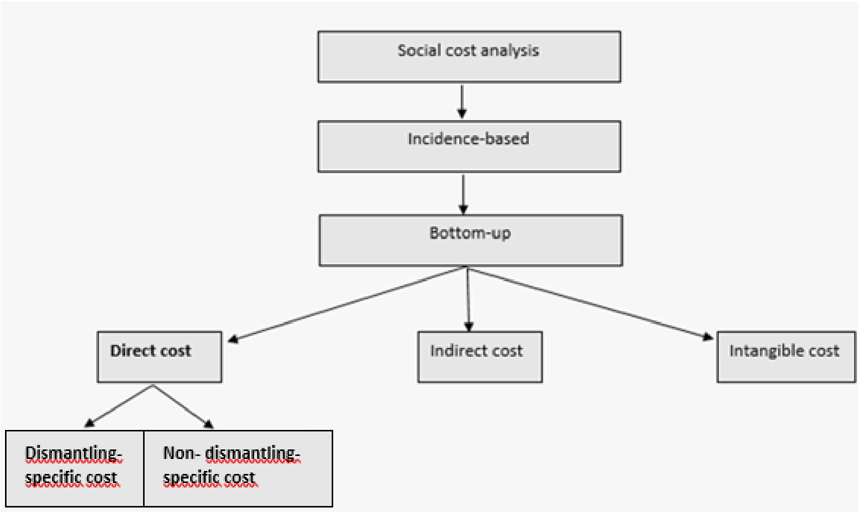
Within the direct costs, a distinction is made between *dismantling-specific* and *non-dismantling-specific* costs. Dismantling-specific costs are directly and solely incurred in the dismantling of synthetic drug production or dumping sites. Examples are specialised dismantling services such as the Clanlab Response Unit in Belgium and the Central Support Unit for Dismantling (LFO) in the Netherlands, and the private contractors that dismantle/transport/store/destroy the synthetic drug waste. Despite the fact that the Clanlab Response Unit and the LFO are specialised dismantling services (resulting in dismantling-specific costs), they are part of the police in both Belgium and the Netherlands. Their budgets are not directly derivable from the global police budget and therefore also need to be estimated.

[1] Cost categories highlighted in bold.

[2] The International Classification of Diseases (ICD) has a number of codes, for example ‘accidental poisoning by drugs, medicinal substances, and biologicals’ and ‘accidental poisoning by other solid and liquid substances, gases, and vapors’, but it is not possible to link these to the cleaning up of synthetic drug labs.

Non-dismantling-specific costs are those linked to additional procedures, such as the provision of 24-hour security at the crime scene by the local police force, or assistance in securing the safety of the crime scene by the fire brigade's 'advisors on dangerous substances' (AGS). These costs are non-dismantling specific because they are also incurred in circumstances other than the dismantling and cleaning up of synthetic drug production or dumping sites. These costs are not directly measurable and need to be estimated with a formula. An overview of the formulas can be found in Tables 1 and 3 for Belgium and Tables 2 and 4 for the Netherlands.

Figure 2: Social cost analysis[3]



Literature review

Direct costs

Cost categories related to synthetic drug production sites and chemical waste dumping sites have been identified in a reasonable number of studies (see Annex 1). Most provide an indication of some possible costs and harms. Yet they do not describe the different cost categories in a systematic or exhaustive way, nor do they calculate the costs that are identified. They are nevertheless relevant here because they specify costs that need to be examined to develop our own cost estimate.

The limited availability of precursors results in the use of different production techniques, which in turn generate different kinds of waste. Irrespective of production method and synthetic drug produced, the creation of by-products and contaminants is unavoidable (Vogt, 2001). The production of 1 kg of methamphetamine can generate 5-7 kg of waste, while the production of 1 kg of MDMA can create 6-10 kg of waste and the production of 1 kg of amphetamines may result in 20-30 kg of waste (Scott, 2002; Caldicott et al., 2005; Scanga, 2005; Wieman, 2007; KLPD — Dienst Nationale Recherche, 2012; Kates et al., 2014; Dealy et al., 2017; EMCDDA and Europol, 2011, 2016b).

Producers of synthetic drugs need to dispose of the waste they generate, which brings us to the problem of synthetic waste dumps and discharges. It is important to differentiate between *dumping* and *discharge*. Dumping occurs when the synthetic drug waste is abandoned in a package or casing. Discharge occurs when fluids leak out of the package, or are directly spilled onto land or into water (Schoenmakers and Mehlbaum, 2017). The environmental impact of discharges is believed to be greater because the contaminants come into direct contact with a surface. When these chemical substances come into contact with the soil or waterways, they change the pH level, which may cause causes living organisms in the soil and waterways to die (Schoenmakers et al., 2016).

[3] Only costs highlighted in bold are included in our formulas and cost estimate.

Unfortunately, discharges are difficult to spot and go undetected more often than not. Those that are identified appear not to be recorded by law enforcement (Schoenmakers et al., 2016). The lack of records may contribute to an underestimation of the extent and seriousness of discharges, and to an inadequate awareness of their negative impact. This in turn may result in a lack of political will to prioritise responses (EnviCrimeNet, 2016). Because of the lack of a separate record of dumps and discharges, we are not able to make a distinction between the two in this study. In the next sections of the report, references to dumps include discharges, although it is safe to presume that the number of discharges is largely underestimated.

Schoenmakers et al. (2016) distinguished between the following direct cost categories in relation to cleaning up dumping sites: personnel, necessary equipment, safety precautions, the actual cleaning, transport, storage and waste disposal. Based on the interviews, we believe that the same categories can be extrapolated to dismantling and cleaning up synthetic drug production labs. The next chapters will further interpret these cost categories.

In addition to the cost categories suggested by Schoenmakers et al. (2016), we will also include training costs. Included in training costs are both the basic training that the different actors receive and refresher courses. Basic training is, for example, the specialised education that fire brigade AGS receive and the training of officers in the Clanlab Response Unit. These are training costs that are incurred before employees can perform their job. This cost category also includes the cost of shorter (repeat) courses to keep up with new developments in the field.

Indirect costs

Dumping and production sites have a considerable effect on, and cost for, environmental- and health-related elements (EMCDDA and Europol, 2016a). Regarding environmental effects, there are differences in the negative effects that these substances have, depending on the place where the contaminants are released into the environment. The environmental harm of synthetic drug production is, for the most part, caused by the dumping and discharge of chemicals used in the production process. This is sometimes done by discharging contaminants into the soil. Contaminants are then broken down by the fauna and flora that live in and on the soil. The problem with chemical waste is that it usually has either a very high or a very low pH (Tytgat et al., 2017), while the organisms living in the soil (e.g. earthworms or millipedes) need a neutral environment — a soil that is too acidic will kill them (Commissie Bemesting Akkerbouw/Vollegrondsgroententeelt, nd; Schoenmakers et al., 2016; Boerman et al., 2017).

Discharging into surface water causes water life to die, creates hazards such as possible contamination of cattle (thus affecting the human food chain) and risks further infiltration of chemicals in the soil or waterways (Kates et al., 2014; Schoenmakers et al., 2016; Boerman et al., 2017). Ecosystems and the fauna and flora in them damaged by discharges can be seen as direct victims of drug crimes (EnviCrimeNet, 2016). Chemical waste causes the water pH levels to change oxygen levels and poisons fish and plants (UNODCCP, 1999; Schoenmakers et al., 2016).

Another method of dumping synthetic drug production waste in water is by discharging it into the sewers. This creates a risk for sewers, the nearby residents (through drinking water) and water treatment plants (Boles and Wells, 2010; Schoenmakers et al., 2016; Boerman et al., 2017). The sewer can become blocked as a result of clogging, and the waste can disturb the working process of the water treatment plant (Schoenmakers et al., 2016).

Intangible costs

The effects of dumping and discharge on the health of professionals who come on site, residents living nearby or accidental bystanders differ depending on the condition of the lab (Schoenmakers et al., 2016; Owens, 2017; Schoenmakers and Mehlbaum, 2017). Fumes and liquids released during synthetic drug production contaminate surfaces, presenting health risks if such surfaces are not decontaminated/remediated (Hammon and Griffin, 2007; Boles and Wells, 2010; Dealy et al., 2017; Owens, 2017).

A distinction can be made between a lab in production and a non-producing lab (Parket Limburg, 2016). The biggest risks linked to dismantling and cleaning up synthetic drug labs are the risks of fire, explosions, toxic inhalation and chemical burns (UNODCCP, 1999; Hughart, 2000; Scott, 2002; Boerman et al., 2017). Inactive labs pose the least threat to all involved (Cameron, 2002). Significant risks concern unlabelled/mislabelled packages, incompatible chemicals stored next to each other, open packages, spilling and exterior contamination (Tytgat et al., 2017).

Cost estimate studies

Only one Dutch study (Schoenmakers et al., 2016) outlined all the costs related to cleaning and processing synthetic drug waste dumping sites, based on a literature review, a case study, a system analysis and interviews. The authors carried out a detailed analysis of eightcases of dumps, with a total of 19 dumping cases between 2003 and 2015. The total cost of the damage caused by all these cases was EUR 222 137. The lowest cost for cleaning up one dumping case was EUR 3 766, and the highest cost was EUR 30 680, giving an average cost of EUR 12 453per dumping case. These figures include the cost of personnel, material resources, safety precautions (which imply additional personnel costs), contracting out to private firms (e.g. transport), cleaning, transport, storage, destruction, environmental recovery, reporting and administration.[4] These cost categories are distinct, but can overlap. Personnel will need to take safety precautions (which might mean more staff and more equipment), and contracting out might overlap with transport if a private firm carries out the transport. But, for clarity, Schoenmakers et al. (2016) outlined them separately.

A limitation in the research by Schoenmakers et al. (2016) is that the cost study is based on police records of dumps/discharges, which means that the figures are an underestimate of the actual number (KLPD — Dienst Nationale Recherche, 2012; Schoenmakers et al., 2016). In addition, the selection of cases was based on the availability of the police files, so they are not necessarily generalisable to all dumps/discharges. Finally, the procedure varies significantly between police regions and units in different parts of the country, rendering it difficult to calculate costs in the same way in every case.

A second study in the North Brabant province estimated that there were 200 dumping incidents in the Netherlands in 2014, with a total clean-up cost of around EUR 3 million (Provincie Noord Brabant, 2015). This results in a cost of about EUR 15 000 per incident, which is higher than the figure given by Schoenmakers et al. (2016). However, the authors do not provide details on the cost categories, the available data, the methods used and the possible restrictions of the study and, for this reason, we cannot compare this study with Schoenmakers et al. (2016).

Finally, we found an American study by Scott (2002), who estimated that the average cost of cleaning hazardous materials from an average-sized illegal drug lab was USD 2 500-10 000 (EUR 2 115-8 463), and that the costs for dismantling a 'super-lab' could be up to USD 150 000 (EUR 126 954). The study does not specify the criteria used to distinguish an average-sized lab from a super-lab. Furthermore, thorough decontamination (remediation) of an average-sized lab has a possible cost of around USD 50 000 (EUR 42 368). Again, the author did not provide details on the cost categories, the available data, the method used and the possible limitations of the study.

[4] In contrast to Schoenmakers et al. (2016), we do not include the time spent on administrative tasks and reporting by the police. We believe that including this work in our cost calculation would lead us too far into the investigation linked to the discovery or prosecution of a synthetic production or dumping site.

Description of the dismantling and cleaning up process

There are no country-wide documents or protocols, let alone EU-wide protocols, stipulating the procedure to be followed when a synthetic drug lab or dumping site is located (Van De Wiel, 2016). The following descriptions of dismantling procedures in Belgium and the Netherlands are therefore merely indicative and can differ according to the specific context.

Because there is no standard procedure, the actors and costs may differ from case to case, impacting on our ability to collect data in all regions and to develop robust national formulas for our cost estimate methodology.

Belgium

As mentioned, Belgium has no standard protocol stipulating the process for dismantling synthetic drug labs and cleaning dumps/discharges. The actors that attend the crime scene can differ depending on the region and situation. The public prosecutor's office in the province of Limburg has taken the initiative to develop a procedure for dismantling synthetic drug labs, which is similar to what is described below (Parket Limburg, 2016).

The **local police** are often the first present at a synthetic drug production or dumping site. The first actor on site is expected to perform a quick safety assessment and to alert specialised services: the **federal judiciary police**,[5] the **fire brigade** AGS, the **Clanlab Response Unit** and the **Civil Protection**. Which actors are present at a particular crime scene depends on the specific situation.

Once the local police are certain that they are dealing with a synthetic drug lab, they are required to notify the **federal police**. The federal police will take over the investigation, but the local police may remain responsible for some tasks, such as guarding the crime scene. The federal police will contact several departments and services according to need:[6] the prosecuting/investigating judge,[7] Clanlab Response Unit, fire brigade AGS, Technical and Scientific Police Lab (LTWP[8]), Civil Protection, private waste firms, environment officials from the **Public Flemish Waste Firm (OVAM[9])** and the Water Group.[10]

The Clanlab Response Unit is Belgium's specialised laboratory service team. The unit is part of the federal police and is composed of members of different services: federal police officers from the Directorate of the Fight against Serious and Organised Crime,[11] the National Institute for Criminalistics and Criminology (NICC[12]) and fire brigade AGS. They make sure that all the relevant actors can enter the crime scene in a safe way and that the dismantling and cleaning process can be safely executed. It is important to note that the Clanlab Response Unit does not attend the scene of every dumping case. Its decision to visit the crime scene will depend on the complexity of the case. For example, the Clanlab Response Unit will not visit the site of dumping of two 20-litre jerry cans of chemical waste.

The Clanlab Response Unit cooperates with the LTWP. The LTWP collects samples (samples are also collected by the Clanlab Response Unit if the LTWP is not present at the crime scene) and analyses them. The LTWP does not confiscate finished products — its main goal is to collect and analyse the evidence that is present at a crime scene (Parket Limburg, 2016; Jobpol, 2017).

The NICC, on the other hand, can confiscate finished products (in conjunction with the Clanlab Response Unit). The NICC provides a federal scientific service within the federal Department of Justice.[13] Its main goal when it comes to synthetic drug labs is to identify what production processes have been used and assess the danger posed by the products on site. The NICC also advises other services on how to professionally dismantle a lab, and assists in the process. Finally, it is responsible

5 In Dutch: Federale Gerechtelijke Politie.
6 They will decide based on the specific situation.
7 In Dutch: Onderzoeksrechter.
8 In Dutch: Labo voor Technische en Wetenschappelijke politie.
9 In Dutch: Openbare Vlaamse Afvalstoffenmaatschappij.
10 In Dutch: Watergroep — Vlaamse Maatschappij voor Watervoorziening.
11 In Dutch: Directie van de bestrijding van de zware en georganiseerde criminaliteit.
12 In Dutch: Nationaal Instituut voor Criminalistiek en Criminologie.
13 In Dutch: FOD Justitie.

for analysing evidence and for determining the method to be used for the forensic research (NICC, 2017).

Although the NICC and the LTWP have a crucial role to play in the forensic part of the investigation, the work they carry out is not included in our cost estimates. This is because, although representatives of these organisations may be present at the crime scene during the dismantling process, their role is to investigate the crime, rather than to participate in the dismantling process.

The Civil Protection dismantles the lab, cleans the waste and transports it to a specialised private contractor. Depending on the complexity of the case, the Civil Protection may choose to transport the waste themselves. It is also possible that a private contractor will visit the scene and collect the waste. The Civil Protection performs these tasks according to instructions by the Clanlab Response Unit. Whether the Civil Protection or a private contractor is responsible for dismantling and transport depends on the region in which the lab/dump is located. This should be taken into account when estimating the cost (Civiele Veiligheid, 2017).

Specialised **private waste disposal companies** may be responsible for all the work related to the transport, storage and disposal of waste, or for only one of these tasks, depending on which tasks have already been carried out by the Civil Protection. Sometimes it is necessary to store the waste, for example if samples need to be taken by the NICC. Once all necessary samples have been taken, the federal judiciary police will request a quotation from a specialised waste company for the destruction of the waste.

In less complex cases, when the Clanlab Response Unit' presence at the scene is not required, the Civil Protection will evaluate the safety of the situation and consult with the Clanlab Response Unit. It will also guard the crime scene if the presence of the Clanlab Response Unit is nevertheless needed. If the presence of the Clanlab Response Unit is not needed, the LTWP and a specialised private waste company are called to the scene for potential sampling and waste disposal. Again, if further sampling is needed, the private contractor will store the waste until the specialised services (Clanlab Response Unit, NICC, LTWP, etc.) have collected their samples.

It is possible that drug waste residues will still be present after all the different services have visited the crime scene and performed their tasks. This can be caused by the further penetration of the substances in the soil, watercourses or other surfaces. Should that be the case, the owner of the property (whether this is a public or private person/organisation) is required to guarantee a further remediation of the property. A private individual can choose a private company to perform this task. If this obligation is not fulfilled, the Flemish waste disposal firm OVAM[14] can perform the remediation with administrative authorisation. This obligation also rests on public institutions (e.g. municipalities) if the waste is located on public property, where the remediation procedure is mainly determined by an environmental official.

The Netherlands

In the Netherlands, the protocols for dismantling synthetic drug labs are different from those for cleaning dumps/discharges. The actors who attend the crime scene differ from region to region, which makes it hard to give a general description.

In a dumping/discharge case, the first actor at the scene is required to inform the police officer on duty of the incident and together they should agree who should be temporarily in charge of the crime scene. In consultation with the officer or the operational coordinator, the relevant actors are contacted: the **LFO**,[15] the Forensic Detection Team (FTO[16]) that secures evidence/traces and the unit coordinator for synthetic drugs.

[14] OVAM needs to follow fixed procedures before exerting this administrative power.
[15] In Dutch: Landelijke Faciliteit Ondersteuning Ontmanteling.
[16] In Dutch: Forensisch Technische Opsporing.

The unit coordinator is part of the police unit of the region, but has oversight of specific tasks performed by the unit and is a contact point for all members of that specific unit and external partners (Politie, 2017a).

When a synthetic drug lab (production) or storage site is discovered, the relevant actors to be contacted are the chief of the unit for criminal investigation, the unit coordinator for synthetic drugs, the prosecution, the LFO, the FO and the reporting centre.[17]

Relevant actors that might also attend a synthetic production or dumping site (depending on the situation and the decisions made) include the **fire brigade AGS, environmental services,**[18] **regional police**, the police research unit, **transport** and **storage and waste disposal firms**.

The LFO is the specialised lab service team in the Netherlands, and its role is similar to that of the Clanlab Response Unit in Belgium (Van De Wiel, 2016). This central unit is part of the Operational Expertise Unit of the **central police**. The first task of the LFO is to conduct forensic and safety research at crime scenes possibly affected by chemical, bio-radiological or nuclear contamination. Other tasks include offering operational support and advice when dismantling operational production sites, leftovers from production sites, former/abandoned sites, bulky or complicated dumping sites or storage sites (Van De Wiel, 2016; Politie, 2017b).

The FO visits a site to secure possible evidence/traces of the materials present in and around the lab. This is important for further research once the lab is dismantled (Politie, 2017b). Afterwards, a private firm removes all waste and chemicals on behalf of the government.

The Dutch Forensic Institute (NFI[19]) is a forensic research organisation that visits only production or dumping sites that are very complex or disrupted. The NFI assists in the FO's research and conducts its own objective forensic research (NFI, 2017).

When all possible evidence and traces are secured, and the public prosecutor[20] has given permission for the destruction of all hardware and chemicals present in the lab (Openbaar Ministerie, 2017), a private contractor visits the site to perform these tasks. As in Belgium, the private contractor might also store the materials for a period of time under the supervision of the police/LFO (Van De Wiel, 2016).

The environmental services perform their tasks after all criminal actors (e.g. the police, LFO, fire brigade) have completed theirs. They play a central supervisory role, linking the municipalities, and will advise and facilitate the cleaning of synthetic drug labs/dumping sites. They investigate possible environmental pollution and supervise remediation when necessary. Depending on the tasks delegated by the municipalities, it is possible that they have administrative authorisation that is similar to the power of the Flemish waste disposal firm OVAM. The environmental services in the Netherlands are present only at crime scenes where chemicals come into contact with the environment.

Residues of the drug waste may still be present at a site following this initial work. As is the case in Belgium, the owner of the property (whether this is a public or private individual/organisation) is then required to arrange further remediation of the property. A private individual can choose a private firm to perform this task. This obligation also rests on public institutions (e.g. municipalities), with the remediation procedure being mainly determined by an environmental service.

[17] In Dutch: Meldkamer.
[18] In Dutch: Omgevingsdienst.
[19] In Dutch: Nederlands Forensisch Instituut.
[20] In Dutch: Officier van justitie.

Data on which cost estimates are based

In this section we present an overview of the calculations used to estimate the costs of dismantling and cleaning up synthetic drug production sites in Belgium and the Netherlands. A distinction is made between the two countries on account of procedural differences in dismantling, as outlined in the previous section. Table 1 provides an overview of the cost categories for Belgium, and Table 2 does so for the Netherlands. The data required for the cost estimate, however, are often not available.

As previously detailed in the dismantling process description, there are substantial roles for many different actors. These actors are at the forefront of our calculation approach: we provide sections for the police, fire brigade, Civil Protection and private firms and environmental organisations/services. To estimate the total cost of dismantling we measure costs related to *personnel*, *material* and *training* for each actor, except for private firms and environmental organisations, for which the categories are slightly different, as explained below.

The personnel cost is based on the hours spent by each group of actors in dismantling/cleaning interventions on an annual basis and their gross salary (gross salary cost). Material costs relate to the various equipment and other supplies required to clean and dismantle a synthetic drug lab or dumping site. People working in proximity to toxic liquids and fumes require special protective clothing and masks. Specialist packaging material (such as tubs) and specific vehicles/trucks are needed to dismantle and transport the waste. Services including the police, fire brigade, Clanlab Response Unit/LFO, Civil Protection and private firms and environmental organisations/services all require such specialised and protective equipment, whether disposable or otherwise. Disposable equipment includes packaging materials, masks, protective clothing, etc., that are used once or a small number times. Non-disposable equipment includes trucks, specialised analysing machines and other reusable resources. Our formula includes both types of equipment but does not distinguish between the two. When considering the cost of non-disposable materials it is important to use an adjusted value per year, which can then simply be added to the total cost of equipment. More information on how to calculate the adjusted value, based on a depreciation index for non-disposable materials, can be found in Annex 5.

Most staff attending synthetic drug production crime scenes have had specific training to prepare them for the risks at such sites (e.g. explosion, toxic fumes, acid burns). As mentioned in the literature review, training costs may include both basic training and refresher courses. Examples of basic training include the specialised education taken by fire brigade AGS and training provided for the officers of the Clanlab Response Unit/LFO. These are training costs that must be incurred before officers can perform their job. This cost category also includes the cost of shorter (repeat) courses to keep up to date with new developments in the field.

Costs may also be incurred during special procedures to ensure the safety of all officers present at the scene, as well as the safety of bystanders and nearby residents. For example, a 24-hour guard is needed when a scene cannot be dismantled/cleaned before the end of the day. Special procedures as these are not detailed here as a separate cost category because they are included in the personnel and material cost categories for each actor or agency involved.

When considering private firms, efforts were made to address the cost of the ‘acts’ of dismantling, transporting, storage and/or destruction of synthetic drug production or dumping sites, while distinguishing, when possible, this cost from the cost of materials and the training required to perform the tasks.

Distinction is also made here between *remediation* and dismantling costs. Remediation seeks to address the considerable polluting effects of synthetic drug waste on plants and organisms living in the soil and water stream, water plants’ purification processes, cattle and the functioning of sewers. However, interviewees from both Belgium and the Netherlands indicated that remediation is an underexposed element of the synthetic drug problem and, indeed, few data on remediation costs were available to us.

The remediation of surfaces that have been contaminated with synthetic drug waste (e.g. soil, watercourses and sewers) is carried out by private organisations. In the case of negligence of a landowner, a public organisation subject to administrative authorisation will conduct an exploratory examination of the scene to assess the degree of contamination and determine necessary measures. Should the examination reveal a need for remediation, the organisation will appoint a private contractor to carry it out. Thus, despite the possible involvement of other actors, the actual remediation is always carried out by a private contractor.

For environmental organisations, the distinction between personnel, material and training costs was not made, because they will not perform the remediation themselves. Their main costs lie in the exploratory soil examination and, when needed, appointing a private contractor to carry out the remediation.

The breakdown shown in Tables 1 and 2 provides an overview by cost category of the data required, the data that are actually available and the formulas that can be used to calculate the costs for each category and actor. We provide more than one formula for each cost category. These should be taken not as complementary but as mutually exclusive, with the choice of formula to use being dependent on which data are available. Not all formulas are equally specific; using an average cost or time spent inherently has a larger margin of error than using exact budgets. The best formula is highlighted in bold and placed at the top of each section. Although this is the best option, the other formulas will also deliver a valuable and correct base for a cost estimate.

The formulas are used to calculate costs on a yearly basis. In the best-case scenario, in which we possess all the necessary data to make the cost calculation, we would be able to measure the total yearly cost for dismantling and cleaning up synthetic drug-related sites for Belgium and the Netherlands.

Last but not least, the personnel, material and training cost of the LTWP, the NICC, the FO and the unit coordinator are not taken into account in the cost estimates, because their focus is on the investigation of the crime (and their presence at the crime scene is linked to investigative purposes) and not on its dismantling.

Table 1: Overview of cost categories for Belgium

BELGIUM		
NECESSARY DATA	AVAILABLE DATA	FORMULAS FOR COST ESTIMATES
1. POLICE **1.1. PERSONNEL** • Hours spent by the local police: safety scan and guarding of the scene • Hours spent by the federal (judiciary) police: guarding the scene and coordinating the dismantling process • Hours spent by the Clanlab Response Unit: dismantling,	**1. POLICE** **1.1. PERSONNEL** • Hours spent by federal judiciary police, Antwerp, on three laboratories and three dumping sites • Hours spent by the Clanlab Response Unit on three dossiers	**1. POLICE** **1.1. PERSONNEL** • $\boldsymbol{Cost\ of\ local\ police\ per\ year} = \%\ \boldsymbol{of\ the\ total\ time\ the\ local\ police\ spent\ on\ all\ lab\ or\ dumping\ sites\ per\ year} \times \boldsymbol{the\ personnel\ budget\ of\ the\ local\ police\ per\ year}$ • $Cost\ of\ local\ police\ per\ year = (average\ number\ of\ hours\ spent\ per\ lab\ or\ dump) \times (number\ of\ labs\ or\ dumps\ per\ year) \times (gross\ salary\ cost)$* • $\boldsymbol{Cost\ of\ federal\ police\ per\ year} = \%\ \boldsymbol{of\ the\ total\ time\ the\ federal\ police\ spent\ on\ all\ lab\ or\ dumping\ sites\ per\ year} \times \boldsymbol{the\ personnel\ budget\ of\ the\ federal\ police\ per\ year}$ • $Cost\ of\ federal\ police\ per\ year = (average\ number\ of\ hours\ spent\ per\ lab\ or\ dump) \times (number\ of\ labs\ or\ dumps\ per\ year) \times (gross\ salary\ cost) *$ • $\boldsymbol{Cost\ of\ Clanlab\ Response\ Unit\ per\ year} =$

support for dismantling and coordinating **1.2. MATERIALS** • Materials used by the local and federal police: protective clothing and transport to the crime scene • Materials used by the Clanlab Response Unit: protective clothing and transport to the crime scene **1.3. TRAINING**	**1.2. MATERIALS** • Some information on materials used by the Clanlab Response Unit	$\boldsymbol{\%\ of\ the\ total\ budget\ of\ the\ federal\ police\ stipulated\ for\ this\ specific\ service}$ • $Cost\ of\ Clanlab\ Response\ Unit\ per\ year =$ $(average\ number\ of\ hours\ spent\ per\ lab\ or\ dump) \times (number\ of\ labs\ or\ dumps\ per\ year) \times (gross\ salary\ cost)$* • $Cost\ of\ Clanlab\ Response\ Unit\ per\ year = (number\ of\ employees\ for\ a\ given\ year) \times (gross\ salary\ cost)$ **1.2. MATERIALS** • $\boldsymbol{Cost\ of\ materials\ for\ local\ or\ federal\ police\ per\ year =}$ $\boldsymbol{cost\ of\ all\ materials\ per\ year}$ [21] $\times$ $\boldsymbol{\%\ of\ the\ total\ materials\ spent\ on\ dismantling\ and\ cleaning\ up\ synthetic\ drug\ labs\ or\ dumping\ sites\ per\ year}$ • $\boldsymbol{Cost\ of\ materials\ for\ Clanlab\ Response\ Unit\ per\ year =}$ $\boldsymbol{cost\ of\ all\ materials\ used\ for\ synthetic\ drug\ labs\ or\ dumps\ per\ year}$[22] • $Cost\ of\ materials\ for\ Clanlab\ Response\ Unit\ per\ year =$ $average\ cost\ of\ materials\ per\ intervention \times number\ of\ interventions\ per\ year$[23]* • $Cost\ of\ materials\ for\ Clanlab\ Response\ Unit\ per\ year =$ $\%\ of\ total\ the\ budget\ that\ is\ spent\ annually\ on\ materials\ for\ synthetic\ drug\ labs$ **1.3. TRAINING**

[21] Used for dismantling or cleaning up, but the materials are also used for other purposes.
[22] These are dismantling-specific costs that do not need to be calculated.
[23] This formula can be used only to calculate the cost of disposable materials. If the total disposable materials costs are being measured using this formula, it is possible to calculate a total cost by adding the disposable materials cost to the non-disposable materials cost (that are ideally calculated using the depreciation index as explained in Annex 5).

• Training of police officers Specialised training of Clanlab Response Unit officers	**1.3. TRAINING** • Some information on training the Clanlab Response Unit	• $\boldsymbol{Cost\ of\ training\ local\ or\ federal\ police\ per\ year =}$ $\boldsymbol{cost\ of\ the\ training\ in\ synthetic\ drugs\ per\ employee\ per\ year \times number\ of\ employees\ trained}$ • $\boldsymbol{Cost\ of\ training\ Clanlab\ Response\ Unit\ per\ year\ =}$ $\boldsymbol{\%\ of\ the\ budget}$[24] $\boldsymbol{that\ is\ spent\ annually\ on\ training\ in\ synthetic\ drugs}$ • $Cost\ of\ training\ Clanlab\ Response\ Unit\ per\ year = cost\ of\ the\ synthetic\ drug\ training\ per\ employee\ per\ year \times number\ of\ employees$ • $Cost\ of\ training\ Clanlab\ Response\ Unit\ per\ year\ = cost\ of\ all\ training\ in\ synthetic\ drugs\ per\ year$[25]
2. FIRE BRIGADE **2.1. PERSONNEL** • Hours spent by the fire brigade (AGS and non-AGS officers): safety **2.2. MATERIALS** • Materials used by	**2. FIRE BRIGADE** **2.1. PERSONNEL** • Some information on officers that are used in different scenarios	**2. FIRE BRIGADE** 2.1. **PERSONNEL** • $\boldsymbol{Cost\ of (AGS)\ fire\ brigade\ officer\ per\ year\ =}$ $\boldsymbol{\%\ of\ the\ total\ time\ the\ fire\ brigade\ spent\ on\ labs\ or\ dumping\ sites\ per\ year \times\ fire\ brigade\ budget\ per\ year}$ • $Cost\ of\ (AGS)\ fire\ brigade\ officer\ per\ year =$ $(average\ number\ of\ hours\ spent\ per\ lab\ or\ dump) \times (number\ of\ labs\ or\ dumps\ per\ year) \times (gross\ salary\ cost)^*$ **2.2. MATERIALS** • $\boldsymbol{Cost\ of\ materials\ for\ fire\ brigade\ per\ year =}$

[24] Ideally this is a separate budget within the total budget.
[25] These are dismantling-specific costs that do not need to be calculated. For non-disposable materials a depreciation index is necessary, as explained in Annex 5.

the fire brigade: protective clothing and trucks **2.3. TRAINING** • Training of fire officers • Specialised training of AGS officers	**2.2. MATERIALS** • Some information on materials used in different scenarios **2.3. TRAINING** • No information	$\boldsymbol{cost\ of\ all\ materials\ per\ year}$[26] $\times$ $\%\ \boldsymbol{of\ the\ total\ time\ spent\ on\ dismantling\ and\ cleaning\ up\ synthetic\ drug\ labs\ per\ year}$[27] • $Cost\ of\ materials\ for\ fire\ brigade\ per\ year =$ $cost\ of\ all\ materials\ per\ year$[28] $\times$ $\%\ of\ the\ total\ interventions\ spent\ on\ dismantling\ and\ cleaning\ up\ synthetic\ drug\ labs\ per\ year$ **2.3. TRAINING** • $\boldsymbol{Cost\ of\ training\ fire\ brigade\ AGS\ officers\ per\ year} =$ $\%\ \boldsymbol{of\ the\ total\ budget\ that\ is\ spent\ annually\ on\ training\ in\ synthetic\ drug\ labs}$ • $Cost\ of\ training\ fire\ brigade\ AGS\ officers\ per\ year =$ $(cost\ of\ training\ per\ employee\ per\ year \times number\ of\ employees) \times$ $\%\ of\ the\ total\ time\ spent\ on\ dismantling\ and\ cleaning\ up\ synthetic\ drug\ labs$
3. CIVIL PROTECTION **3.1. PERSONNEL** • Hours spent by the Civil Protection:	**3. CIVIL PROTECTION** **3.1. PERSONNEL** • Percentage of the total time of the Civil	**3. CIVIL PROTECTION** **3.1. PERSONNEL** • $\boldsymbol{Cost\ of\ the\ Civil\ Protection\ per\ year} =$ $\boldsymbol{personnel\ budget\ of\ the\ the\ Civil\ Protection} \times$

[26] Used for dismantling or cleaning up, but the materials are also used for other purposes.
[27] In order to be able to estimate this we need detailed information on the time spent in all interventions by the fire brigade. This is more detailed information than is required for the second equation, where we only need to put the total interventions of the fire brigade next to the total synthetic drug interventions.
[28] Used for dismantling or cleaning up, but the materials are also used for other purposes.

dismantling, cleaning up and transport	Protection that goes to drugs • Data from the financial department of the Civil Protection on personnel	$\%$ ***of the total time spent on the dismantling and transport of synthetic drug labs*** • $\boldsymbol{Cost\ of\ the\ Civil\ Protection\ per\ year = Total\ budget\ per\ year\ of\ the\ Civil\ Protection} \times$ $the\ percentage\ of\ total\ time\ spent\ by\ the\ Civil\ Protection\ on\ synthetic\ drugs$ per year[29] • $Cost\ of\ the\ Civil\ Protection\ per\ year = (average\ number\ of\ hours\ spent\ per\ lab\ or\ dump) \times (number\ of\ labs\ or\ dumps\ per\ year) \times (gross\ salary\ cost)$* • $Cost\ of\ the\ Civil\ Protection\ per\ year = (average\ personnel\ cost\ charged\ per\ lab\ or\ dump) \times (number\ of\ labs\ or\ dumps\ per\ year)$*
3.2. Materials • Materials used by the Civil Protection: protective clothing, trucks and packaging materials	**3.2. Materials** • Data from the financial department of the Civil Protection on materials and vehicles	**3.2. Materials** • $\boldsymbol{Cost\ of\ materials\ for\ the\ Civil\ Protection\ per\ year = cost\ of\ all\ materials\ per\ year}$[30] $\times$ $\%$ ***of the total materials spent on dismantling and cleaning up synthetic drug labs or dumps per year*** • $Cost\ of\ materials\ for\ theCivil\ Protection\ per\ year = average\ cost\ of\ all\ materials\ used\ per\ case\ for\ a\ given\ year \times number\ of\ labs\ or\ dumps\ per\ year *$
3.3. Training • Specialised training officers	**3.3. Training**	**3.3. Training** • $\boldsymbol{Cost\ of\ training\ the\ Civil\ Protection\ per\ year = (cost\ of\ training\ per\ employee\ per\ year \times number\ of\ employees)} \times$ $\%$ ***of the total time spent on dismantling and cleaning up synthetic drug labs***

29 In this formula it is not possible to make a distinction between personnel, materials and training costs.
30 Used for dismantling or cleaning up, but the materials are also used for other purposes.

4. PRIVATE FIRMS	4. PRIVATE FIRM	4. PRIVATE FIRMS
4.1. COSTS CHARGED BY PRIVATE FIRMS FOR DISMANTLING, TRANSPORT, STORAGE AND DESTRUCTION	4.1. COSTS CHARGED BY PRIVATE FIRMS FOR DISMANTLING, TRANSPORT, STORAGE AND DESTRUCTION • Costs charged to the federal police, Antwerp region, for 2015-2017 by a private firm • Costs charged to the federal police, Limburg region, for 2016-2017 by a private firm	4.1. COSTS CHARGED BY PRIVATE FIRMS FOR DISMANTLING, TRANSPORT, STORAGE AND DESTRUCTION • $\boldsymbol{Total\ cost\ of\ private\ firms}$: $\boldsymbol{sum\ of\ all\ revenues\ or\ invoices\ for\ all\ private\ firms}$[31] • $Cost\ of\ dismantling\ by\ private\ firms\ per\ year = average\ cost\ per\ dump\ or\ lab\ \times (number\ of\ labs\ or\ dumping\ interventions)$* • $Cost\ of\ dismantling\ by\ private\ firms\ per\ year = average\ cost\ per\ dump\ or\ lab\ \times (number\ of\ labs\ or\ dumping\ interventions - number\ of\ labs\ or\ dumps\ dismantled\ by\ the\ Civil\ Protection)$[32] * • $Cost\ of\ transport\ for\ private\ firms\ per\ year = average\ cost\ per\ dump\ or\ lab\ \times (number\ of\ labs\ or\ dumping\ interventions) *$ • $Cost\ of\ storage\ for\ private\ firms\ per\ year = average\ cost\ per\ dump\ or\ lab\ \times (number\ of\ labs\ or\ dumping\ interventions) *$ • $Cost\ of\ destruction\ by\ private\ firms\ per\ year = average\ cost\ per\ dump\ or\ lab\ \times (number\ of\ labs\ or\ dumping\ interventions) *$ • $Total\ cost\ of\ private\ firms\ per\ year = average\ cost\ per\ dump\ or\ lab\ \times (number\ of\ labs\ or\ dumping\ interventions) *$
4.2. COSTS CHARGED BY PRIVATE FIRMS FOR THE MATERIALS	4.2. COSTS CHARGED BY PRIVATE FIRMS FOR THE MATERIALS	

31 In this formula we are not able to make a distinction between service, material and remediation costs.

32 This formula might not be 100 % correct because the dismantling might occasionally be done by an actor other than a private firm or the Civil Protection, but we accept this small margin and perceive the formula as correct enough for an estimate.

USED **4.3. COSTS CHARGED BY PRIVATE FIRMS FOR THE REMEDIATION OF CONTAMINATED SURFACES** **4.4. TRAINING**	**USED** • Costs charged to the federal police, Antwerp region, for 2015-2017 by a private firm • Costs charged to the federal police, Limburg region, for 2016-2017 by a private firm **4.3. COSTS CHARGED BY PRIVATE FIRMS FOR THE REMEDIATION OF CONTAMINATED SURFACES** **4.4. TRAINING**	**4.2. COSTS CHARGED BY PRIVATE FIRMS FOR THE MATERIALS USED** • $\boldsymbol{Cost\ of\ materials\ for\ private\ firm\ per\ year} =$ $\%\ \boldsymbol{of\ budget\ that\ is\ spent\ annually\ on\ materials\ for\ synthetic\ drug\ labs}$ • $Cost\ of\ materials\ for\ private\ firm\ per\ year =$ $cost\ of\ all\ materials\ per\ year$[33] $\times\ \%\ of\ the\ total\ time\ spent\ on\ dismantling\ and\ cleaning\ up\ synthetic\ drug\ labs\ per\ year$ **4.3. COSTS CHARGED BY PRIVATE FIRMS FOR THE REMEDIATION OF CONTAMINATED SURFACES** • $\boldsymbol{Cost\ of\ remediation\ by\ private\ firms\ per\ year} = \frac{\boldsymbol{(costs\ of\ all\ synthetic{-}drug{-}related\ remediations\ for\ the\ given\ year\ for\ a\ firm)}}{\boldsymbol{(number\ of\ synthetic{-}drug{-}related\ remediations\ by\ that\ firm)}} \times$ $\boldsymbol{(number\ of\ synthetic - drug - related\ remediations\ in\ Belgium)^*}$ **4.4. TRAINING**

[33] Used for dismantling or cleaning up, but the materials are also used for other purposes.

		• $\boldsymbol{Cost\ of\ training\ for\ private\ firm\ per\ year} =$ $\%\ \boldsymbol{of\ the\ budget\ that\ is\ spent\ annually\ on\ training\ in\ synthetic\ drug\ labs}$ • $Cost\ of\ training\ for\ private\ firms\ per\ year =$ $(cost\ of\ the\ synthetic\ drug\ training\ per\ employee\ per\ year \times number\ of\ employees)$ • $Cost\ of\ training\ private\ firms\ per\ year = (cost\ of\ the\ training\ per\ employee\ per\ year \times number\ of\ employees) \times$ $\%\ of\ the\ total\ time\ spent\ on\ dismantling\ and\ cleaning\ up\ synthetic\ drug\ labs$
5. <u>ENVIRONMENTAL ORGANISATION</u> **5.1. <u>BUDGET SPENT BY ENVIRONMENTAL SERVICES</u>**	**5. <u>ENVIRONMENTAL ORGANISATION</u>** **5.1. <u>BUDGET SPENT BY ENVIRONMENTAL SERVICES</u>** • Limited numbers for two cases	**5. <u>ENVIRONMENTAL ORGANISATION</u>** **5.1. <u>BUDGET SPENT BY ENVIRONMENTAL SERVICES</u>** • $\boldsymbol{Cost\ of\ OVAM\ or\ SPAQUE\ per\ year} =$ $\%\ \boldsymbol{of\ total\ the\ budget\ of\ OVAM\ or\ SPAQUE\ stipulated\ for\ this\ specific\ service}$ • $Cost\ of\ OVAM\ or\ SPAQUE\ per\ year =$ $average\ cost\ for\ the\ remediation\ of\ labs\ and\ dumps \times number\ of\ remediations\ per\ year^*$

*Formulas that can be used on a case level.

Table 2: Overview of cost categories for the Netherlands

THE NETHERLANDS		
NECESSARY DATA	**AVAILABLE DATA**	**FORMULAS FOR COST ESTIMATES**
1. POLICE **1.1. PERSONNEL** • Hours spent by the regional police: safety scan and guarding of the scene • Hours spent by the central police: guarding the scene and coordinating the dismantling process • Hours spent by the LF0: safety search,	**1. POLICE** **1.1. PERSONNEL** • Composition of the LFO team and pay scales of interventions for production, storage and dumping sites 2015-2017	**1. POLICE** **1.1. PERSONNEL** • $\boldsymbol{Cost\ of\ regional\ police\ per\ year} = \%\ \boldsymbol{of\ the\ total\ time\ the\ regional\ police\ spent\ on\ labs\ or\ dumping\ sites} \times \boldsymbol{personnel\ budget\ of\ the\ regional\ police}$ • $Cost\ of\ regional\ police\ per\ year = (average\ number\ of\ hours\ spent\ per\ lab\ or\ dump) \times (number\ of\ labs\ per\ year) \times (gross\ salary\ cost)$* • $\boldsymbol{Cost\ of\ national\ police\ per\ year} = \%\ \boldsymbol{of\ the\ total\ time\ the\ national\ police\ spent\ on\ labs\ or\ dumping\ sites} \times \boldsymbol{budget\ of\ the\ national\ police}$ • $\boldsymbol{Cost\ of\ National\ Support\ Unit\ per\ year} = \%\ \boldsymbol{of\ the\ total\ budget\ of\ the\ national\ police\ stipulated\ for\ this\ specific\ service}$

support and advice on dismantling **1.2. MATERIALS** • Materials used by the regional and central police: protective clothing and transport to the crime scene • Materials used by the LFO: protective clothing and transport to the crime scene **1.3. TRAINING** • Training of police officers	**1.2. MATERIALS** • Vehicles used by the Central Support Unit and an estimate of the price • Budget estimate for materials 2018 **1.3. TRAINING**	• $\boldsymbol{Cost\ of\ National\ Support\ Unit\ per\ year = \ budget\ specifically\ stipulated\ for\ the\ LFO}$[34] • $Cost\ of\ national\ police\ per\ year =$ $(average\ number\ of\ hours\ spent\ per\ lab\ or\ dump) \times (number\ of\ labs\ or\ dumps\ per\ year) \times (gross\ salary\ cost)$* • $Cost\ of\ National\ Support\ Unit\ per\ year =$ $(average\ number\ of\ hours\ spent\ per\ lab\ or\ dump) \times (number\ of\ labs\ or\ dumps\ per\ year) \times (gross\ salary\ cost)$* • $Cost\ of\ National\ Support\ Unit\ per\ year = (number\ of\ employees\ for\ a\ given\ year) \times (gross\ salary\ cost)$ **1.2. MATERIALS** • $\boldsymbol{Cost\ of\ materials\ for\ regional\ or\ national\ police\ per\ year =}$ $\boldsymbol{cost\ of\ all\ materials}$[35] $\times$ % $\boldsymbol{of\ the\ total\ time\ spent\ on\ dismantling\ and\ cleaning\ up\ synthetic\ drug\ labs}$ • $Cost\ of\ materials\ for\ regional\ or\ national\ police\ per\ year = average\ cost\ materials\ per\ intervention\ \times$ $number\ of\ synthetic\ drug - related\ interventions$[36]* • $\boldsymbol{Cost\ of\ materials\ for\ National\ Support\ Unit\ per\ year\ =}$ % $\boldsymbol{of\ the\ budget\ that\ is\ spent\ annually\ on\ materials\ for\ synthetic\ drug\ labs}$ • $Cost\ of\ materials\ for\ National\ Support\ Unit\ per\ year = average\ cost\ of\ materials\ per\ intervention\ \times$ $number\ of\ interventions$* • $Cost\ of\ materials\ for\ National\ Support\ Unit\ per\ year\ = cost\ of\ all\ synthetic\ drug\ materials\ per\ year$[37]

[34] In this formula we are not able to make a distinction between the personnel, material and training cost.
[35] Used for dismantling or cleaning up, but the materials are also used for other purposes.
[36] This formula can be used to calculate the cost for disposable materials; the cost for non-disposable materials can be added by applying the depreciation index in Annex 5.
[37] These are dismantling-specific costs that do not need to be calculated.

• Specialised training of Central Support Unit officers		**1.3. TRAINING** • $\textbf{Cost of training regional or national police per year} = \%\ \textbf{of the total budget that is spent annually on training related to synthetic drug labs}$ • $Cost\ of\ training\ regional\ or\ national\ police\ per\ year = cost\ of\ the\ training\ in\ synthetic\ drugs\ per\ employee\ per\ year \times number\ of\ employees\ trained$ • $\textbf{Cost of training NationalSupport Unit per year} = \%\ \textbf{of the total budget that is spent annually on training related to synthetic drug labs}$ • $Cost\ of\ training\ National\ Support\ Unit\ per\ year = cost\ of\ the\ synthetic\ drug\ training\ per\ employee\ per\ year \times number\ of\ employees$ • $Cost\ of\ training\ Nationwide\ Support\ Unit\ per\ year = cost\ of\ all\ training\ per\ year$[38]
2. FIRE BRIGADE **2.1. PERSONNEL** • Hours spent by the fire brigade (AGS and non-AGS officers): safety	**2. FIRE BRIGADE** **2.1. PERSONNEL** No data available	**2. FIRE BRIGADE** **2.1. PERSONNEL** • $\textbf{Cost of fire brigade (AGS) officer per year} = \%\ \textbf{of the total time spent on lab or dumping sites} \times \textbf{personnel budget of the fire brigade}$ • $Cost\ of\ fire\ brigade\ (AGS)\ officer\ per\ year = \%\ of\ the\ total\ interventions\ spent\ on\ lab\ or\ dumping\ sites \times personnel\ budget\ of\ the\ fire\ brigade$ • $Cost\ of\ fire\ brigade\ (AGS)\ officer\ per\ year =$

[38] These are dismantling-specific costs that do not need to be calculated.

2.2. <u>MATERIALS</u> • Materials used by the fire brigade: protective clothing and trucks **2.3. <u>TRAINING</u>** • Training of fire officers • specialised training of AGS officers	**2.2. <u>MATERIALS</u>** No data available **2.3. <u>TRAINING</u>** No data available	$(average\ number\ of\ hours\ spent\ per\ lab\ or\ dump) \times (number\ of\ labs\ or\ dumps\ per\ year) \times (gross\ salary\ cost)$* **2.2. <u>MATERIALS</u>** • $\boldsymbol{Cost\ of\ materials\ for\ fire\ brigade\ per\ year} =$ $\boldsymbol{cost\ of\ all\ materials}$[39] $\times$ % $\boldsymbol{of\ the\ total\ time\ spent\ on\ dismantling\ and\ cleaning\ up\ synthetic\ drug\ labs}$ • $Cost\ of\ materials\ for\ fire\ brigade\ per\ year =$ $cost\ of\ all\ materials$[40] $\times$ % $of\ the\ total\ interventions\ spent\ on\ dismantling\ and\ cleaning\ up\ synthetic\ drug\ labs$ **2.3. <u>TRAINING</u>** • $\boldsymbol{Cost\ of\ training\ fire\ brigade\ AGS\ officers\ per\ year} =$ % $\boldsymbol{of\ the\ total\ budget\ that\ is\ spent\ annually\ on\ training\ related\ to\ synthetic\ drug\ labs}$ • $Cost\ of\ training\ fire\ brigade\ AGS\ officers\ per\ year = (cost\ of\ the\ training\ per\ employee\ per\ year \times number\ of\ employees) \times$ % $of\ the\ total\ time\ spent\ on\ dismantling\ and\ cleaning\ up\ synthetic\ drug\ labs$
3. <u>PRIVATE FIRMS</u> **3.1. <u>COSTS CHARGED BY PRIVATE FIRMS FOR DISMANTLING, TRANSPORT, STORAGE AND</u>**	**3. <u>PRIVATE FIRMS</u>** **3.1. <u>COSTS CHARGED BY PRIVATE FIRMS FOR DISMANTLING, TRANSPORT, STORAGE AND</u>**	**3. <u>PRIVATE FIRMS</u>** **3.1. <u>COSTS CHARGED BY PRIVATE FIRMS FOR DISMANTLING, TRANSPORT, STORAGE AND DESTRUCTION</u>** • $\boldsymbol{Total\ cost\ of\ private\ firms}: \boldsymbol{sum\ of\ all\ revenues\ or\ invoices\ of\ all\ private\ firms}$[41] • $Cost\ of\ dismantling\ by\ private\ firms\ per\ year =$

[39] Used for dismantling or cleaning up, but the materials are also used for other purposes.
[40] Used for dismantling or cleaning up, but the materials are also used for other purposes.
[41] In this formula we are not able to make a distinction between service, material and remediation costs.

DESTRUCTION	**DESTRUCTION** • Data from a fund for the recovery of costs made for the dismantling, transport, storage, destruction and remediation of synthetic drug waste • Data for Zeeland-West Brabant for 2015-2017	$average\ cost\ per\ dump\ or\ lab\ \times (number\ of\ labs\ or\ dumping\ interventions)$* • $Cost\ of\ transport\ for\ private\ firms\ per\ year =$ $average\ cost\ per\ dump\ or\ lab\ \times (number\ of\ labs\ or\ dumping\ interventions) *$ • $Cost\ of\ storage\ for\ private\ firms\ per\ year =$ $average\ cost\ per\ dump\ or\ lab\ \times (number\ of\ labs\ or\ dumping\ interventions) *$ • $Cost\ of\ destruction\ by\ private\ firms\ per\ year =$ $average\ cost\ per\ dump\ or\ lab\ \times (number\ of\ labs\ or\ dumping\ interventions) *$ • $Total\ service\ cost\ of\ private\ firms\ per\ year =$ $average\ cost\ per\ dump\ or\ lab\ \times (number\ of\ labs\ or\ dumping\ interventions) *$
3.2. COSTS CHARGED BY PRIVATE FIRMS FOR THE MATERIALS USED	**3.2. COSTS CHARGED BY PRIVATE FIRMS FOR THE MATERIALS USED** • Data from a fund for the recovery of costs incurred in the dismantling, transport, storage, destruction and	**3.2. COSTS CHARGED BY PRIVATE FIRMS FOR THE MATERIALS USED** • $\boldsymbol{Cost\ of\ materials\ for\ private\ firm\ per\ year} =$ $\%\ \boldsymbol{of\ total\ budget\ that\ is\ spent\ annually\ on\ materials\ for\ synthetic\ drug\ labs}$ • $Cost\ of\ materials\ for\ private\ firm\ per\ year =$ $cost\ of\ all\ materials42\ \times \%\ of\ the\ total\ time\ spent\ on\ dismantling\ and\ cleaning\ up\ synthetic\ drug\ labs$

[42] Used for dismantling or cleaning up, but the materials are also used for other purposes.

	remediation of synthetic drug waste	
3.3. COSTS CHARGED BY PRIVATE FIRMS FOR THE REMEDIATION OF CONTAMINATED SURFACES	**3.3. COSTS CHARGED BY PRIVATE FIRMS FOR THE REMEDIATION OF CONTAMINATED SURFACES** • Data from a fund for the recovery of costs incurred in the dismantling, transport, storage, destruction and remediation of synthetic drug waste	**3.3. COSTS CHARGED BY PRIVATE FIRMS FOR THE REMEDIATION OF CONTAMINATED SURFACES** • $\boldsymbol{Cost\ of\ remediation\ by\ private\ firms\ per\ year} = \frac{(\boldsymbol{costs\ of\ all\ remediations\ for\ the\ given\ year\ for\ a\ firm})}{(\boldsymbol{number\ of\ remediations\ by\ that\ firm})} \times (\boldsymbol{number\ of\ remediations\ in\ the\ Netherlands})^{*}$
3.4. TRAINING	**3.4. TRAINING**	**3.4. TRAINING** • $\boldsymbol{Cost\ of\ training\ private\ firm\ per\ year} = \%\ \boldsymbol{of\ the\ total\ budget\ that\ is\ spent\ annually\ on\ training\ in\ relation\ to\ synthetic\ drug\ labs}$ • $Cost\ of\ training\ private\ firms\ per\ year = (cost\ of\ the\ synthetic\ drug\ training\ per\ employee\ per\ year \times number\ of\ employees)$

		• $Cost\ training\ of\ private\ firms\ per\ year = (cost\ of\ the\ training\ per\ employee\ per\ year \times number\ of\ employees) \times$ $\%\ of\ the\ total\ time\ spent\ on\ dismantling\ and\ cleaning\ up\ synthetic\ drug\ labs$
4. <u>ENVIRONMENTAL SERVICES</u> **4.1. <u>HOURS SPENT BY ENVIRONMENTAL SERVICES</u>**	**4. <u>ENVIRONMENTAL SERVICES</u>** **4.1. <u>HOURS SPENT BY ENVIRONMENTAL SERVICES</u>**	**4. <u>ENVIRONMENTAL SERVICES</u>** **4.1. <u>HOURS SPENT BY ENVIRONMENTAL SERVICES</u>** • $\mathbf{Cost\ of\ environmental\ service\ per\ year} =$ $\%\ \mathbf{of\ the\ total\ budget\ of\ the\ environmental\ service\ stipulated\ for\ synthetic\ drugs}$ • $Cost\ of\ environmental\ service\ per\ year =$ $(average\ number\ of\ hours\ spent\ per\ lab\ or\ dump) \times (number\ of\ labs\ or\ dumps\ per\ year) \times (gross\ salary\ cost)^*$ • $Cost\ of\ environmental\ service\ per\ year = total\ budget\ of\ environmental\ service\ \times$ $the\ percentage\ of\ time\ spent\ by\ the\ environmental\ service\ on\ synthetic\ drugs$ • $Cost\ of\ environmental\ service\ per\ year = average\ cost\ for\ the\ remediation\ of\ labs\ and\ dumps\ per\ year\ \times$ $number\ of\ labs\ or\ dumps\ per\ year^*$

*Formulas that can be used on a case level.

Cost estimates for Belgium and the Netherlands

In Tables 3 and 4 we attempt to fill in the formulas detailed above with the data collected through stakeholder interviews. We often use one of the alternative formulas instead of the best formula because of limited access to data. Sometimes it is possible to use different formulas to make cost estimates for Belgium and the Netherlands, as the decision is based on the availability of data and the formula that best matches these data. The left column displays the formula used, and the right one outlines how that formula was filled.

The formulas in Tables 1 and 2 distinguish only between dumping and lab sites and not between lab and storage sites. In this section, however, while the formulas remain the same, sometimes an extra distinction is made for storage sites. This means, for example, that we will calculate the average time spent on storage sites instead of on a dumping or lab site. The protocol remains the same, and is made clear in the estimates. This distinction was not included in the formulas, as it would render them lengthy and unclear. The formulas will be used in the same grid as dumping and lab sites.

Table 3: Cost estimate for Belgium

BELGIUM	
FORMULAS USED	**COST ESTIMATE**
1. POLICE **1.1. PERSONNEL** • $Cost\ of\ federal\ police\ per\ year = (average\ number\ of\ hours\ spent\ per\ lab\ or\ dump) \times (number\ of\ labs\ or\ dumps\ per\ year) \times (gross\ salary\ cost)$ • $Cost\ of\ Clanlab\ Responese\ Unit\ per\ year = (average\ number\ of\ hours\ spent\ per\ lab\ or\ dump) \times (number\ of\ labs\ or\ dumps\ per\ year) \times (gross\ salary\ cost)$	**1. POLICE** **1.1. PERSONNEL** We are able to fill in the first formula for the **federal police.**[44] Based on data we received on the number of hours spent on three dumping and three lab cases, we can estimate the average time spent on these sites. This makes it possible to fill in the 'average number of hours spent per lab or dump'. We also have data from the Clanlab Response Unit on the total number of dumps, labs and storage sites in Belgium, so we can fill in the 'number of labs or dumps per year'. Determining the 'gross salary cost' for federal police officers is complex because it is influenced by many factors, including seniority, rank, bonuses, etc. The wage scales for the federal police can be

[44] Read: remarks methodology. This first count is made for federal police officers, in which federal police officers that are members of the Clanlab Response Unit are not yet counted. They are estimated as a separate cost, because of their specific synthetic-drug-related tasks.

	found online (http://www.ssgpi.be/nl/page/Loonschalen). The average number of hours spent on labs in the three cases is 27. The average number of hours spent on a dumping site is nine, also based on the three cases. **For 2016 there were 26 dumps and 10 labs. We cannot count the storage sites (4), but for completeness we will measure them as a lab site (total: 14).** We cannot count them as storage sites, owing to the limited data, which means that it is impossible to make a distinction. Considering them as equal to lab sites is a simplification to make an estimate possible. We decided to use the level B and M ranks to estimate the salary cost, because these are the categories mentioned in the interviews. Their wages range from EUR 15 122 to EUR 35 448 per year, based on seniority. This is an average of EUR 25 285. If we divide this by 52 weeks, we get an average gross salary of EUR 486.25 per week, which makes an average of EUR 12.16 gross salary per hour if divided into 40 hours per week. **Gross salary cost of EUR 12.16/hour for a federal police officer**. This calculation is a simplification, because it does not include higher ranks. Average cost of the gross salary of a federal police officer on a lab site: 12.16 x 27 = EUR 328.32. Average cost for the gross salary of a federal police officer on a dumping site: 12.16 x 9 = EUR 109.44. The total gross salary cost for federal police officers working on

	dumps for 2016 can be estimated by: 109.44 x 26 = EUR 2 845.44. The total gross salary cost for federal police officers working on labs for 2016 can be estimated by: 328.32 x 14 = EUR 4 596.48. **Total gross cost for federal police for 2016: EUR 7 442** For the **Clanlab Response Unit** we used the second equation, based on data we received on the number of hours spent on 12 cases (six labs, three storage sites and three dumping sites). This enabled us to fill in the 'average number of hours spent per lab, dumping and storage site'. The **average number of hours spent on a lab site is 62, on a storage site is 37 and on a dumping site is 12.** The number of dumping, storage and lab sites remains the same, because these are central figures collected by the Clanlab Response Unit. So: **26 dumps, four storage sites and 10 labs.** Because of the mixed composition of the team, we have until now been unable to estimate the gross salary cost. We use the same simplification as that for the federal police and the same gross salary cost as for the federal police. We use **an average gross salary cost of EUR 12.16/hour for a Clanlab Response Unit officer**. **The total gross salary cost of Clanlab Response Unit officers on dumps for 2016: 12 x 26 x 12.16 = EUR 3 793.92** **The total gross salary cost of Clanlab Response Unit officers on labs for 2016: 62 x 10 x 12.16 = EUR 7 539.20** **The total gross salary cost of Clanlab Response Unit officers on**

1.2. Materials • $Cost\ of\ materials\ for\ Clanlab\ Response\ Unit\ per\ year = average\ cost\ of\ materials\ per\ intervention \times number\ of\ interventions$[43] • $Cost\ of\ materials\ for\ Clanlab\ Response\ Unit\ per\ year = cost\ of\ all\ materials\ used\ for\ synthetic\ drug\ labs\ or\ dumps\ per\ year$	**storage sites for 2016: 37 x 4 x 12.16 = EUR 1 799.68** **Total gross salary cost for Clanlab Response Unit for 2016: EUR 13 133** **1.2. Materials** The cost of the disposable materials used by the **Clanlab Response Unit** can be estimated with the first formula shown. However, it was not possible to collect the necessary data in time. If we had collected data on all or a small number of cases, we would be able to estimate an (average) disposable materials cost and use this for our calculation. Specialised materials and vehicles (non-disposable materials) can be clearly distinguished for 2016-2017 and can be calculated using the second formula. The Clanlab Response Unit bought a small truck (EUR **48 900**), a gas measurement system (EUR **2 300**), four air compressors (EUR **11 600**) and personal protective equipment (EUR **7 000**). All these non-disposable materials are likely to be used for more than 1 year, and this means that ideally we should use a depreciation index, as explained in Annex 5. However, our information is too limited to do this. For this estimation we will assume that the materials will be used for 5 years and that the residual value will be EUR 0. **The depreciation index is: (EUR 69 800 – EUR 0)/5 = EUR 13 960.**

[43] This formula can be used to calculate only the cost of disposable materials. If the total disposable materials costs are being measured using the first formula, it is possible to calculate a total cost by adding the disposable material cost to the non-disposable materials (that are ideally calculated by using the depreciation index as explained in Annex 5).

	Total cost of non-disposable materials for Clanlab Response Unit for 2016: EUR 13 960 If we had been able to obtain data about the disposable materials from the first formula, we could now estimate a total cost. We were unable to do so, which gives us a total cost only for the non-disposable materials.
1.3. Training • $Cost\ of\ training\ local\ or\ federal\ police\ per\ year = cost\ of\ the\ training\ per\ employee\ per\ year \times number\ of\ employees\ trained$	**1.3. Training** The cost for the specialised training of the Clanlab Response Unit cannot be measured with the data present in the organisation. The officers are obliged to undertake a 2-week training course in Poland and a 1-week follow-up course in Belgium (after 2 years). This training is organised in collaboration with the European Union Agency for Law Enforcement Training (Cepol), which makes it probable that this cost could be traced, but because of time constraints we were unable to do this.
2. FIRE BRIGADE **2.1. Personnel** • $Cost\ of\ fire\ brigade\ (AGS)\ officer\ per\ year = (average\ number\ of\ hours\ spent\ per\ lab\ or\ dump) \times (number\ of\ labs\ or\ dumps\ per\ year) \times (gross\ salary\ cost)$	**2. FIRE BRIGADE** **2.1. Personnel** For the fire brigade we are able to identify the number of personnel who attended for only three given situations. The data are based on the stakeholder interviews, because the necessary data are not recorded by the fire brigade. Our key informant estimated the number of personnel and the amount of materials present on site, based on his expertise. In cases where there is a fire at a lab/dumping site, on

	average the fire brigade sends: - two car-pump vehicles; - one commando vehicle; - one ladder vehicle. In cases where a strange odour is present: - one car-pump vehicle; - one commando vehicle. In cases where there is a chemical leak: - two car-pump vehicles; - one commando vehicle; - a vehicle specific for chemical incidents; - one AGS officer. The number of people manning vehicles has been averaged as follows: one car-pump vehicle is manned by five fire officers and one petty officer; the commando vehicle is manned by one officer; the vehicle that is specifically for chemical incidents is manned by two officers. We have no information on how often these different situations occur, and for how long the fire brigade is active on a lab/dumping site. We

2.2. Materials • $Cost\ of\ materials\ for\ the\ fire\ brigade\ per\ year = cost\ of\ all\ materials^{45} \times \%\ of\ the\ total\ time\ spent\ on\ dismantling\ and\ cleaning\ up\ synthetic\ drug\ labs$	would be able to complete this formula if we could collect data on the 'average number of hours' these fire officers and petty officers attend a lab or dumping site and the 'number of labs and dumps' they go to each year. Fire brigades charge their costs to other persons/organisations for some of the interventions they perform. These costs differ depending on the zone in which they operate. It is possible to search online for each separate zone and find the interventions for which they charge costs and how much is charged. It is also possible to use the same method as used for the federal police officers and look at the wage scales, which can also be found online. **2.2. Materials** The three situations explained in the personnel section are also important for estimating the cost of the materials that are used. In this case we also have an idea of the vehicles that are being used (based on these three situations) and thus of the possible 'cost of all materials'. However, we are unable to fill in the formula, because we have no idea of how much time the fire brigade spends on the cleaning up of synthetic drug-related sites, or how many of its interventions are

[45] Used for dismantling or cleaning up, but the materials are also used for other purposes.

2.3. TRAINING • $Cost\ of\ training\ of\ fire\ brigade\ AGS\ officers\ per\ year = (cost\ of\ the\ training\ per\ employee\ per\ year \times number\ of\ employees) \times \%\ of\ the\ total\ time\ spent\ on\ dismantling\ and\ cleaning\ up\ synthetic\ drug\ labs$	related to cleaning up synthetic drug-related sites (in comparison with the total time/interventions). We are thus not able to fill in the '% of the total time spent on dismantling and cleaning up synthetic drug labs'. In addition, no information on the cost of materials with which to make an estimate is present in the organisation. **2.3. TRAINING** AGS officers are specialised in handling dangerous substances. In order to qualify as an AGS officer, firemen must complete a 1-year postgraduate university course. From information obtained via our stakeholder interviews we were able to estimate that the 'cost of this course was **EUR 8 000** per employee'. We have no data on the 'number of AGS officers' in Belgium or on the extra training they undertook after this initial course, so here, also, we are unable to complete our formula. As was mentioned in the section on materials, we have no idea of how much time the fire brigade invests in cleaning up synthetic drug-related sites (in comparison with the total time spent on the job). We need to establish what percentage of time/total interventions the fire brigade spends on this task, because it also performs many other tasks, and cleaning up these sites is only be a small part of the fire brigade's job.

3. THE CIVIL PROTECTION

3.1. PERSONNEL

- $Cost\ of\ the\ Civil\ Protection\ per\ year = (average\ personnel\ cost\ charged\ per\ lab\ or\ dump) \times (number\ of\ labs\ or\ dumps\ per\ year)$
- $Cost\ of\ the\ Civil\ Protection\ per\ year = total\ budget\ of\ the\ Civil\ Protection \times the\ percentage\ of\ total\ time\ spent\ on\ synthetic\ drugs$

3. THE CIVIL PROTECTION

3.1. PERSONNEL

In Belgium, the Civil Protection take cares of a substantial part of the dismantling and transportation of synthetic drug waste and hardware. As can be seen, this calculation is set up slightly differently to other estimates. The Civil Protection puts prices on its personnel and material costs. So we will use these costs rather than salary or unit costs of materials.

We can use the first formula, because were able to collect data from 12 synthetic drug-related cases that the Civil Protection was involved in, which makes it possible to calculate an ‘average cost per lab or dump’. These cases give information about personnel, materials and transportation costs. The **average personnel cost in these 12 cases is EUR 1 316.** No distinction was made between labs and dumps, so we have to calculate them as one.

We do not know the ‘number of labs or dumps per year’. Nor do we know the wage scale of the Civil Protection officers who are active in cleaning up synthetic drug-related sites. These two parts of the formula need to be completed in order to calculate the cost.

The second formula that is being used is put under the category of ‘personnel’, but is actually a total cost calculation in which it is impossible to make a distinction between the costs of personnel, materials, training, etc.

3.2. Materials • $Cost\ of\ materials\ for\ the\ Civil\ Protection\ per\ year =$ $average\ cost\ of\ all\ materials\ used\ at\ labs\ or\ dumps \times number\ of\ labs\ or\ dumps\ per\ year$	The 'total budget' that we were able to determine for 2015 does not enable us to differentiate between the costs of the service provided by the Civil Protection and the materials it uses. We will estimate these costs as a total cost. The Civil Protection website[46] features statistics about the 'percentage of work' that is allocated to drug-related tasks. For 2015 a total of 4.3 % of incidents and 7.1 % of working hours were spent on drug-related tasks. The Civil Protection has a role to play both in synthetic drug production and in cannabis production. Because these numbers do not allow us to determine the ratio of cannabis to synthetic drugs, we will use a simplification in which we assume that this ratio is 50/50. The **budget** for the personnel, functioning and investments in the Civil Protection **for 2015 was EUR 29 000 000**. Knowing **that 3.55 %** (7.10 %/2) **of the total working hours were spent on synthetic drugs**, we can conclude that the total cost of the Civil Protection for 2015 was: **EUR 2 900 000 x 3.55 /100 = EUR 1 029 500**. We were not able to make this calculation for 2016 because we did not know the total budget for 2016. For the total cost estimate that can be found in the last box, we will extrapolate the budget for 2015 to 2016. **Total cost for the Civil Protection for 2015: EUR 1 029 500** **3.2. Materials** As a result of the data that were provided to us, material and transportation costs will be considered as one because the numbers

[46] https://www.civieleveiligheid.be/nl/inhoud/wat-doet-de-civiele-bescherming

	do not allow us to separate them out. In addition, as with the fire brigade, we are unable to use a depreciation index. The **'average material and transportation cost' in these 12 cases is EUR 2 335**. The organisation has no knowledge of the total 'number of dumps, lab or storage sites' that the Civil Protection attends, so we cannot finish our calculation with this formula. We also know the cost price of disposable materials; these are supplied as unit costs. However, we cannot use these cost prices in our calculation because we do not have detailed information on the 'average cost of the materials per lab or dump' and the 'number of labs or dumps per year'. The **cost price for gloves, dust masks and protective clothing ranges from EUR 1 to EUR 82 per piece**.
4. PRIVATE FIRMS **4.1. COSTS CHARGED BY PRIVATE FIRMS FOR DISMANTLING, TRANSPORT, STORAGE AND DESTRUCTION** • $\boldsymbol{Total\ cost\ of\ private\ firms = sum\ of\ all\ revenues\ of\ all\ private\ firms}$[47] • $\boldsymbol{Total\ service\ cost\ of\ private\ firms\ per\ year = average\ cost\ per\ dump\ or\ lab \times (number\ of\ labs\ or\ dumping\ interventions)}$	**4. PRIVATE FIRMS** **4.1. COSTS CHARGED BY PRIVATE FIRMS FOR DISMANTLING, TRANSPORT, STORAGE AND DESTRUCTION** We use the first formula to estimate the costs charged by private firms. The numbers we were able to collect do not enable us to make a distinction between the cost of the service that the private firm provided and the materials they used. Because of the lack of such detailed data, we will calculate the costs for private firms as a total cost.

[47] In this formula we are not able to make a distinction between service, material and remediation costs.

	We collected figures on the total revenue of one leading firm involved in cleaning up synthetic drug waste in Belgium. The information does not allow us to make a distinction between labs, storage or dumping sites, and we cannot distinguish between personnel or material costs. **Total revenue in 2015: EUR 316 811 on 44 orders, with a total of 152 539 kg dismantled materials.** **Total revenue in 2016: EUR 198 724 on 43 orders, with a total of 93 117 kg dismantled materials.** **Total revenue in 2017: EUR 497 263 on 48 orders with a total of 324 901 kg dismantled materials** Because of the large differences in revenue for these years, we will calculate the average revenue and take this as the figure for 2016. The **average revenue is EUR 337 599**. It is not possible to calculate the proportion of the costs for other firms, because we gathered information on the revenue of only one firm. However, the company we interviewed dominates the market in Flanders, which makes the contribution of other companies small but not negligible. **Total cost for a private firm for 2016: EUR 337 599** This cost is based on the revenue of one specific firm that is active in the field of synthetic drug waste. However, we were also able to collect data on charges made by private firms, through interviews with the prosecution and federal police. Other firms are also represented in

	these data, so we decided to detail these figures too. We were able to calculate an 'average cost per dump or lab'. For a **dump the average cost is EUR 3 163** (based on 44 dumps from 2015-2017). For a **lab the average cost is EUR 19 544** (based on 31 labs from 2015-2017). For a **storage site the average cost is EUR 1 761** (based on four storage sites from 2015-2016). In Belgium, the Civil Protection manage a substantial part of the synthetic drug waste and hardware. Ideally, we should be able to distinguish the proportions of the tasks performed by the Civil Protection and by private firms, but we are not able to do so based on the data that are present in the organisations.
5. ENVIRONMENTAL ORGANISATION **5.1. COSTS INCURRED BY PUBLIC ORGANISATIONS FOR THE REMEDIATION OF CONTAMINATED SURFACES (E.G. OVAM)** • $\textit{Cost of OVAM or SPAQUE per year} = \textit{average cost for the remediation of labs and dumps} \times \textit{number of remediations per year}$	**5. ENVIRONMENTAL ORGANISATION** **5.1. COSTS INCURRED BY PUBLIC ORGANISATIONS FOR THE REMEDIATION OF CONTAMINATED SURFACES (E.G. OVAM)** We use this formula for the cost of an environmental service because it is not possible to identify a specific budget for synthetic drug labs. For this research we contacted OVAM on this matter and they were able to provide data about two recent synthetic drug-related remediation operations. These operations were in their preliminary phase, and the information provided little detail about the company's procedures. The costs stem from the exploratory soil enquiry and not from the remediation of the soil. As a consequence, we do not know the actual remediation cost (which is performed and contracted out to a private firm). Remediation is performed only after the exploratory

	soil search has shown that it is necessary. **Average cost of the two cases: EUR 36 500.** The 'number of remediations' for a given year (e.g. 2016) is unknown; consequently, we are unable to calculate a total cost.
The total cost of dismantling and cleaning up synthetic drug production sites in Belgium in 2016 was EUR 1 401 634, based on the data we were able to collect.	

Table 4: Cost estimate for the Netherlands

THE NETHERLANDS	
FORMULAS USED	**COST ESTIMATE**
1. POLICE **1.1. PERSONNEL** • $Cost\ of\ regional\ or\ central\ police\ per\ year = (average\ number\ of\ hours\ spent\ per\ lab\ or\ dump) \times$	**1. POLICE** **1.1. PERSONNEL** For the Netherlands, data provided by the **regional police units and central police unit** are very limited. For the Zeeland-West

$(\textit{number of labs per year}) \times (\textit{salary cost})$ • $\textit{Cost of the Central Support Unit per year} =$ $(\textit{number of employees for a given year}) \times (\textit{gross salary cost})$[48]	Brabant unit the responsible unit coordinator estimated the number of dismantling and clean-up-related[50] personnel that would be sent to the site of a synthetic drug lab. This is a configuration based on expertise, and can differ from situation to situation, typically with the following personnel: - 4-10 police officers; - one regular fire brigade officer; - one AGS fire brigade officer; - one environmental service officer; - one or more Central Support Unit officer(s). The configuration of personnel that attend dumping sites was different. We have no full stakeholder information on these differences, so we cannot give a similar list based on the interviews. This is a consequence of the lack of a national protocol for both Belgium and the Netherlands. For our first formula for the personnel cost of the regional and central police, only the **4-10 police officers per lab site** are relevant. We know the number of police officers who attend but not 'the average number of hours spent per lab or dump'. The gross salary cost per month of a police officer in the Netherlands after a few years of police training ranges from EUR 2 517 to EUR 3 598. The average gross salary per month is EUR 3 057.50. If we estimate this per hour, by dividing this

48 This formula is only possible for this service because it is solely working on synthetic drug labs, so all personnel can be assigned as a synthetic drug personnel cost.

50 This means that we will not count personnel in the research team.

	number by 4.5 weeks per month and by 40 hours per week, **the gross salary per hour is** EUR **16.99.** Through our stakeholder interviews we were able to obtain the earlier mentioned ERISSP[51] data. These data are collected for the Netherlands as a whole and provide information on the 'number of labs, dumps and storage sites'. **For 2016 there were 61 labs, 177 dumps and 84 storage sites.** The second formula is about the LFO. The LFO specialises in synthetic drugs and does not perform any other tasks. Nevertheless, it is not 100 % accurate to take the number of employees and multiply this by the 'gross salary cost' of these employees, because the LFO staff also perform administrative tasks (e.g. processing the formal reports). In order to make a cost estimate for 2016 we accepted this uncertainty and used this formula. Our stakeholders informed us that the 'number of employees' in the LFO are **four junior members**, four senior members and one coordinator. We assume that this coordinator is also a senior member, which makes a total of **five senior members.** In 2018, the composition changed slightly, to three junior members, six senior members and one coordinator, which makes seven senior members. The average monthly 'gross salary cost' for junior members is

[51] European Reporting Instrument on Sites related to Synthetic Production.

	EUR 3 153.50. For a senior member this increases to EUR 4 045. To obtain the wage on a yearly basis we multiply the monthly wage by 12. This gives us a **yearly 'gross salary cost' of EUR 37 842 for junior members and EUR 48 540 for senior members.** To measure the personnel cost for 2016 we multiply the yearly gross salary by the number of employees per wage category. This gives a total for the **junior members** of 4 × EUR 37 842 = **EUR 151 368** and a total for the **senior members** of 5 × EUR 48 540 **= EUR 242 700**. **Total personnel cost for the LFO for 2016 was EUR 394 068**
1.2. MATERIALS • $Cost\ of\ materials\ for\ the\ Central\ Support\ Unit\ per\ year\ =$ $cost\ of\ all\ synthetic\ drug\ materials\ per\ year$[49]	**1.2. MATERIALS** The stakeholder interviews provided information about the quantities of both non-disposable materials and trucks that are being used by the LFO. These numbers are estimates for 2018, but we can use them for the year 2016. This will create a margin of error, but allows us to estimate the materials cost of this service. Interviewees informed us that junior and senior members use

[49] These are dismantling-specific costs that do not need to be calculated.

	different trucks. There are four trucks used by senior members that cost about EUR 100 000 each. This gives us a total of EUR 400 000. For the junior members, these trucks cost about EUR 80 000 each. The unit has five of these, which gives a total of EUR 400 000. The **total transportation cost for both senior and junior members is EUR 800 000.** The LFO has a budget for non-disposable materials that it plans to buy in 2018 (to make our annual estimate for 2016, we use this number for 2016). The **total cost for materials in this budget is EUR 117 075**, of which EUR 40 000 is estimated for the depreciation of trucks that the LFO already owns. We will not count this EUR 40 000 depreciation of older trucks, because we have already assumed a depreciation in our first calculation. **This means that the total is EUR 77 075**. In this budget the Support Unit uses a depreciation index, as explained in Annex 5 (EUR 40 000). This document told us that the Support Unit estimates that it will use machinery and trucks for 5 years. This makes it possible to spread our earlier estimated EUR 800 000 over 5 years, but we do not know the residual value of the trucks. We will consider this residual value to be EUR 0. Therefore, EUR 800 000 spread over 5 years **= EUR 160 000 per year; this figure can also be used for 2016 for all vehicles.** **Total material cost for the LFO for 2016: EUR 160 000 (trucks) + EUR 77 075 (other non-disposable materials) = EUR 237 075**

2. FIRE BRIGADE	No data available.
3. PRIVATE FIRMS **3.1. COSTS CHARGED BY PRIVATE FIRMS FOR DISMANTLING, TRANSPORT, STORAGE AND DESTRUCTION** • $Total\ cost\ of\ private\ firms: sum\ of\ all\ revenues\ or\ invoices\ of\ all\ private\ firms\ in\ the\ Netherlands$	**3. PRIVATE FIRMS** **3.1. Costs charged by private firms for dismantling, transport, storage and destruction** • $Total\ cost\ of\ private\ firms: sum\ of\ all\ revenues\ or\ invoices\ of$ $Netherlands$ For the cost of private firms we use the formula based on the revenues. The figures do not allow us to distinguish between the cost of the service provided by the private firm and the materials it uses. If the collected data were more detailed, we would use the two presented formulas to make our estimate. Because of the lack of such detailed data, we will calculate the cost for private firms as a total cost. We collected data from two leading firms dealing with the transport and destruction of synthetic drug waste in the Netherlands. These data do not allow us to distinguish between labs, storage and dumping sites, or between personnel and material costs. We also cannot disaggregate the costs of the private firm that performs the dismantling operation and transport and the costs of the firm that performs the storage and destruction.

	Total revenue in 2015 for the transport, storage and destruction of synthetic drug waste: EUR 300 000. **Total revenue in 2016: EUR 490 000.** **Total revenue up to mid-2017: EUR 220 000.** The costs for other firms cannot be calculated, because we received data about private firms in only one region. The contribution of other companies is assumed to be modest in this region, but not negligible. Data for other regions were not available. **Total cost for private firms for 2016: EUR 490 000**
4. ENVIRONMENTAL SERVICES	No data available.
5. SPECIAL COST CALCULATION FOR THE NETHERLANDS	**5. SPECIAL COST CALCULATION FOR THE NETHERLANDS** We are obliged to make a special calculation for the Netherlands. The numbers we collected on the individual actors can be considered to be rather limited. Nevertheless, during the stakeholder interviews we became aware of a *restitution fund* for people whose properties had been contaminated by synthetic drug waste. Private individuals, municipalities, environmental services,

	heritage organisations, etc., may all file a request for restitution. These people and organisations file the bills they received for dismantling, cleaning up, remediation and other costs. These data therefore reflect the overall cost for the whole country. If this fund were known about and used by every person and organisation that becomes the victim of synthetic drug waste in the Netherlands, we could use the fund's data to make a sound estimation of the costs of drug lab dismantling for the Netherlands. (The only costs we would then have to add would be the outlay on personnel, materials and training by the police, the LFO and the fire brigade.) An estimate based on this fund would suffice because the costs for private firms are covered, and the environmental services can use this fund to recover their expenditure. At present, however, this fund does not cover all costs, which means that our other formulas remain important (even though we are unable to complete them using the data we currently possess). The fund reports **116 requests for restitution** for the costs made as a consequence of synthetic drug waste. These requests were **filed with a total restitution inquiry of EUR 3 737 151** for 2016. The average cost for the requests filed was EUR 32 217, with the lowest being EUR 872 and the highest EUR 466 496. This range indicates that the expenditure needed to deal with synthetic drug waste can be very different depending on the situation. **Total cost for restitutions for 2016: EUR 3 737 151**

As a result of the special calculation made in the box above, we cannot simply add all of our total costs together to complete our cost estimate for the Netherlands. We decided to leave out the estimate we made for the private firms in 2016 (EUR 490 000). We believe these costs are sufficiently accounted for in the restitution fund data. With this in mind, we believe that **the total cost of dismantling and cleaning up synthetic drug production sites in the Netherlands in 2016 was EUR 4 368 294, based on the data we were able to collect.**

Conclusions

The aims of this study were (1) to identify cost categories related to dismantling and cleaning up synthetic drug production sites and (2) to establish a robust methodology to estimate the scope of these cost categories. To do so we collected data from individuals who are active in the synthetic drugs field. This enabled us to identify the different cost categories, collect the data available for Belgium and the Netherlands, ascertain gaps in the data preventing the calculation of some cost categories, and make estimates of the cost related to dismantling and cleaning up synthetic drug production and dumping/discharge sites in Belgium and the Netherlands

Cost categories

We obtained an overview of the different cost categories from a literature review. There have been a reasonable number of studies that identify cost categories linked to dismantling and cleaning up synthetic drug labs and dumping sites. The main cost categories identified for the different actors involved were professional personnel costs, material costs, training costs, service costs (mostly for private contractors) and decontamination costs.

Indirect costs were ruled out of this research because they are difficult to ascertain and are expected to remain relatively low. The literature emphasises the possible health risks for professional staff that encounter synthetic drug labs, but in terms of costs the number of accidents is limited. This is linked to two factors: the actors and firms authorised to dismantle and clean up synthetic drug sites are experienced professionals and take safety precautions; and the stakeholders we interviewed claimed that work-related accidents are rare. Although intangible costs cannot be considered as costs linked to dismantling and cleaning up synthetic drug production/dumping sites, we cannot ignore their theoretical importance; much damage is caused to the environment by hazardous materials released from labs, dumps and discharges that have not yet been detected. However, it is impossible to give a reliable estimate of these costs in particular because they remain undetected. The focus of the cost estimate here is then exclusively on direct costs.

Data collection

We collected data needed to calculate the cost estimates. The actors in the field were unable to deliver most of the required data immediately because such data are not systematically recorded. We were able to calculate some data, for example the personnel cost of the federal police and the Clanlab Response Unit, based on figures available for a limited number of cases. In these instances, all data required to estimate personnel costs were present in individual dossiers, but they were not recorded at an aggregate level that would make it possible to calculate a cost estimate.

This research has attempted to put together the pieces of the puzzle. Yet we found that there are still many gaps in the data that are needed to calculate a total cost for dismantling and cleaning up synthetic drug production-related sites in Belgium and the Netherlands. Ideally, we would recommend the full recording of all of the data specifically linked to dismantling and clean-up interventions. However, in reality it is more likely that future reviews will need to be based on case-/dossier-level data, which we termed here the ‘second best scenario’. Given the workload that a full record of all cases/dossiers would create for the actors involved (or their administrators), we aim instead for a more achievable goal. We suggest that all actors who are active in the field of dismantling and cleaning up should collect the data stipulated in the formulas of their category for a handful of cases. The formulas that can be used on a case/dossier level are marked with an asterisk in Tables 1 and 2. Based on these data for a limited number of cases, they can then calculate an average number of hours spent, amount of materials used, etc., and multiply this by the number of times that this intervention is needed per year. So, although we collect detailed information on a few cases (e.g. five or 10 cases), the actors would have to record only the number of cases each year. This would create less work than collecting detailed information on all cases. It also means that we must accept a certain margin of error in the estimate.

Bearing in mind that we focused only on estimating direct costs and that there were considerable limitations in the data we were able to collect, this study must certainly be seen as underestimating the costs linked to dismantling and cleaning up synthetic drug production-related sites in Belgium and the Netherlands.

Development of the methodology

The third goal of this research was the development of a methodology to estimate the costs. A small number of similar cost studies were identified following a thorough search (Scott, 2002; Provincie Noord Brabant, 2015; Schoenmakers et al., 2016). Consequently, the literature was supplemented with interviews with stakeholders in the synthetic drugs field in order to identify the actors that are active in the field and to obtain data necessary to estimate the costs. Because of the lack of other scientific or publicly accessible data, the quantitative analysis detailed in this report was based on data collected from the different actors that took part in our interviews.

In Tables 1 and 2, we suggest an ideal formula, accompanied by some 'second best' options, for which we ask all actors involved in the dismantling and cleaning up process to collect full data from a limited number of cases or dossiers. The choice of formula is dependent on the availability of data. For personnel and material costs, for example, an estimate can be calculated with data from 10 cases for each country. These cases can be representative of the synthetic drug problem in a given country if they are collected insightfully. Actors such as the police, fire brigade, the Civil Protection and environmental organisations/services have a certain amount of expertise in synthetic drugs. These stakeholders can select the cases necessary to make a valid cost estimate.

To obtain a representative sample, it is important to differentiate between dumping, lab and storage sites — the data currently available show significant differences in the time spent dealing with each of these types of case. Ideally, a distinction is made between small and large dumps, between small discharges causing little environmental damage and large discharges resulting in substantial environmental damage, and between small/kitchen-sized and large-/super-sized labs/storage sites, etc.

In this proposal we identify different cases based on quantities. The cut-off point between a small or large dump/lab/storage site can depend on the situation (certainly when extrapolating this methodology to other countries). One country might encounter more small/kitchen labs operated by individuals 'cooking' for their own use, whereas others might be mostly confronted with super-labs owned by organised crime groups. The modus operandi and costs associated with these cases are so diverse that national stakeholders are in a better position to set the quantity bars. The stakeholders whom we interviewed in Belgium and the Netherlands claimed that effort is mostly, and increasingly, directed that large labs that are part of organised crime groups, and that small labs are targeted to a lesser extent. This situation would probably lead to a higher cut-off point between small and large labs. In order to obtain a uniform record and cost estimate, this limit should be the same for all actors and the whole country.

It would be useful if the cases selected for data retrieval were accompanied by a more detailed overall record of all cases related to the dismantling and cleaning up of synthetic drug production sites. For Belgium, for example, all the actors we interviewed were able to find drug-related dossiers in their recording systems, but a specific dossier has be read before ascertaining what it is about: drug possession, drugs dealing, drug production, etc. The current record, based on the category 'drug', is too wide to accurately estimate the costs of dismantling and cleaning up synthetic drug sites.

A general overall record of all cases related to the dismantling and cleaning up of synthetic drug sites would help estimate the costs involved. Extensive data are needed to calculate useful cost estimates. Relying on the limited recording systems that currently exist yields incomplete data, leading to flawed cost estimates. Improved systematic recording enables precise and accurate cost estimates (Lievens et al., 2016). It also enables all actors involved to acquire an overview of the time and resources spent on this particular criminal offence. Knowing the importance and impact of criminal activities makes it easier to identify policy gaps and to prioritise and allocate budgets in an intelligent way (Lievens et al., 2016).

Initial estimates for Belgium and the Netherlands

There are reasons to be cautious and to expect a considerable margin of error in this first cost estimate. However, if in the future data are more detailed and representative of the synthetic drug problem, we recommend that one-way sensitivity analyses or scenario analyses are used to counter some of the current uncertainties as described in the work by Cacuci et al. (2003).

We believe that many of the difficulties in setting up a general cost estimate methodology have their origin in the lack of a uniform, national process for dismantling and cleaning up synthetic drug sites in Belgium and the Netherlands. It obstructs a full understanding of all the actors involved, their specific tasks, the data necessary for the estimate, and so on. It also has an impact on the operational strength of these services. Uniformity and streamlining of practice could lead to shared know-how and to greater efficiency. Although efforts have been developed in this direction — as illustrated by existing procedural guidance in the province of Limburg in Belgium and in the protocols currently used in two regions in the Netherlands — the streamlining of procedure could be expanded national.

The allocation of a budget for specialised dismantling services is also worth consideration. The Clanlab Response Unit in Belgium and the LFO in the Netherlands draw their funding from the overall budget of the police units of which they are part. Having their own independent budget would reduce the cost calculation of these services to merely registering the budget appointed to them on a yearly basis. It would shift the cost estimate measurement from the bottom-up starting point of our methodology to a top-down approach.

As can be seen in the résumé for both Belgium and the Netherlands in Tables 5 and 6, the costs we were able to measure are not in proportion to the number of cases in Belgium and the Netherlands. Based on the number of dumping, production and storage sites for Belgium and the Netherlands, we can conclude that the synthetic drug problem in the Netherlands is significantly bigger than in Belgium. For example, there were 26 dumps in Belgium compared with 177 in the Netherlands (almost seven times as many), 10 labs compared with 61 (about six times as many) and six storage sites compared with 84 (more than seven times as many). Yet the total cost estimated for Belgium (EUR 1 401 634) is about one third of that for the Netherlands (EUR 4 368 294). The data thus suggest that the amount spent per synthetic drug site in Belgium is significantly larger than that spent by the Netherlands.

Table 5: Résumé — Belgium

BELGIUM		
COST CATEGORY	**ESTIMATE**	**NUMBER OF DISMANTLED SITES**
Police	EUR 7 442	26 dumps 10 labs six storage sites
Clanlab Response Unit	EUR 27 093	
Fire brigade	No data	
Civil Protection	EUR 1 029 500	
Private firms	EUR 337 599	
Environmental services	No data	
Total cost in 2016	EUR **1 401 634**	

Table 6: Résumé — the Netherlands

THE NETHERLANDS		
COST CATEGORY	**ESTIMATE**	**NUMBER OF DISMANTLED LABS**
Police	No data	177 dumps 61 labs 84 storage sites
LFO	EUR 631 143	
Fire brigade	No data	
Private firms	EUR 490 000[52]	

[52] This is not included in the total cost. See remark with regard to special cost calculation above.

Environmental services	No data	
Special cost calculation	EUR 3 737 151	
Total cost in 2016	**EUR 4 368 294**	

The over-representation of costs for Belgium, compared with the proportion of synthetic drug sites dismantled and cleaned up, is not necessarily the result of a less efficient dismantling process. Limits in the data collection and methodology used here could have contributed to this discrepancy, steering the cost estimates in positive or negative directions. For example, cost estimates relied heavily on secondary data collected by stakeholders themselves, possibly contributing, among other things, to an underestimation of the number of drug production sites dismantled and cleaned in Belgium. These, and other possible explanations, can be identified and tested in follow-up research.

Next steps

We now conclude the report by identifying gaps in knowledge and suggesting next steps. First, it is important to bear in mind that the conceptual and methodological frameworks used to estimate the costs of illicit drug use cannot be directly used to estimate the costs of dismantling and cleaning synthetic drug production sites. Drug production has particular characteristics that render necessary the development (or adaptation) of a specific conceptual and methodological framework. This report provides the first and, thus far, only attempt at that. It should be considered as a starting point for the study of the costs of dismantling and cleaning up synthetic drug labs, and not as a final answer.

The production of synthetic drugs occurs within the illegal economy, about which there is limited knowledge. As mentioned in the introduction, the cases and dossiers that are handled by law enforcement actors are likely to reveal only the tip of the iceberg. For this reason, the cost estimate developed here, based on data provided by these actors, might be inadequate for estimating the ‘real’ cost of the synthetic drug problem. For one thing, only direct costs related to the dismantling and cleaning of identified production sites are included. For another, limits in the recording systems and in accessing data suggest that there may be a considerable margin of error in the cost estimate.

This study should be taken as being exploratory and as a step towards further expanding our knowledge on the subject. Considerable time was spent in gaining insight into the complex network of people involved in the dismantling of production sites — and understanding their duties and responsibilities — and in determining what data each organisation collects or what data are retrievable from their recording systems. Interviews were carried out with all actors active in the dismantling of synthetic drug production sites in order to obtain this information. All these people have busy schedules, into which it was not easy to fit interview time. Moreover, cost estimates are not always relevant for their operations, because the services exist whether or not there are significant numbers of synthetic drug-related sites and because those involved do not need to invoice anyone for the services they provide (except for private contractors). Consequently, the actors in this field may feel that there is little practical relevance in gathering the data needed to develop this cost estimate.

A question that has yet to be addressed is how and from whom these costs should be reclaimed. Often, the offender is not present at the crime scene, but the crime and the environmental damage have already been done. The landowner of the property where the synthetic drug waste is found is responsible for the cost of cleaning the waste. This has been a point of concern in both Belgium and the Netherlands, and it is a discussion that is yet to be settled. In the Netherlands progress was made by establishing a fund for restitution (which is also a great source of data, as can be seen in the cost calculation in Table 4).

Finally, it is also important to note that cost estimates are technical and complex calculations. The methodology presented here may be too technical to be used directly by the actors approached in the stakeholder interviews. A logical next step would be a follow-up project in which relevant officers are included, in order to develop practical guidelines on how data should be collected and processed. The guidelines would be circulated to all relevant organisations involved in the dismantling and cleaning of synthetic drug production sites, thus improving the collection of data required for a more complete cost estimate as described in Lievens et al., (2016).

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Annexes

Annex 1: Relevant studies

Relevant studies *(Cost estimate studies highlighted in bold)*	**Cost categories**[53]	**Data**	**Country**
Provincie Noord Brabant (2015), *Factsheet Samen tegen dumpen,* https://www.brabant.nl/subsites/subsidiedrugsafval/samen-tegen-dumpen.aspx, accessed on 28 November 2017	Clean-up (D) Health (ID)	Number of dumps in 2014 and 2015 Cost of clean-up of drug waste	Netherlands
Schoenmakers, Y., Mehlbaum, S., Everartz, M. and Poelarends, C. (2016), *Elke dump is een plaats delict. Dumping en lozing van synthetisch drugsafval: verschijningsvormen en politieaanpak*, Reed Business, Amsterdam.	Destruction of waste (D) Environment (D) Health (ID) Personnel (D) Materials (D) Remediation (D) Safety precautions (D) Storage of waste (D)	Number of dumps, labs and storage sites Cost of clean-up of drug waste	Netherlands

[53] D = direct cost, ID = indirect cost and IT = intangible cost.

Relevant studies *(Cost estimate studies highlighted in bold)*	**Cost categories**[53]	**Data**	**Country**
	Transport of waste (D)		
Scott, M. S. (2002), *Clandestine Drug Labs*, Chemical Time Bombs. Office of Community Oriented Policing Services, Washington DC, USA	Clean-up (D) Destruction of waste (D) Environment (D) Health (ID) Personnel (D) Remediation (D) Safety precautions (D) Training personnel (D)	Amount of waste Cost of clean-up of average-sized of lab + super-lab Cost of remediation of average-sized lab	USA
Boerman, F., Grapendaal, M., Nieuwenhuis, F. and Stoffers, E. (2017), *Nationaal dreigingsbeeld. Georganiseerde criminaliteit*, (https://www.politie.nl/binaries/content/assets/politie/algemeen/nationaal-dreigingsbeeld-2017/nationaal-dreigingsbeeld-2017.pdf), accessed on 28 November 2017.	Environment (D) Health (ID)	Number of laboratories, Netherlands	Netherlands
Boles, T. H., and Wells, M. J. (2010), 'Analysis of amphetamine and methamphetamine as emerging pollutants in wastewater and wastewater-impacted streams', *Journal of Chromatography A* 1217(16), pp. 2561-2568.	Environment (D) Health (ID)	No data present	USA

Relevant studies *(Cost estimate studies highlighted in bold)*	**Cost categories**[53]	**Data**	**Country**
Caldicott, D. G., Pigou, P. E., Beattie, R. and Edwards, J. W. (2005), 'Clandestine drug laboratories in Australia and the potential for harm', *Australian and New Zealand Journal of Public Health* 29(2), pp. 155-162.	Environment (D) Health (ID)	Amount of waste	Austria
Cameron, M. (2002), 'Health and safety concerns for law enforcement personnel investigating clandestine drug labs', *Chemical Health and Safety* 9(1), pp. 6-9.	Health (ID)	No data present	USA
Commissie Bemesting Akkerbouw/Vollegrondsgroententeelt (nd). *Effect pH op bodemleven*, https://subsites.wur.nl/nl/handboekbodemenbemesting/Handeling/pH-en-bekalking/Effect-pH-op-bodemleven.htm, accessed on 28 November 2017.	Environment (D)	No data present	Netherlands
De Middeleer, F. and De Ruyver, B. (2017), 'De verschuiving van illegale drugsmarkten van Nederland naar België Perceptie of realiteit?', *Justitiele Verkenningen* 43(2).	Does not apply	No data present	Belgium
Dealy, B. C., Horn, B. P., and Berrens, R. P. (2017), 'The impact of clandestine methamphetamine labs on property values: Discovery, decontamination and stigma', *Journal of Urban Economics* 99, pp. 161-172.	Property value (ID)	Amount of waste	USA
EMCDDA and Europol (2011), *Amphetamine: a European Union perspective in the global context*, (http://www.emcdda.europa.eu/system/files/publications/621/EMCDDA-Europol_Amphetamine-joint-publication_319089.pdf_en), accessed on 28 November 2017.	Environment (D)	Amount of waste	European Union

Relevant studies *(Cost estimate studies highlighted in bold)*	**Cost categories**[53]	**Data**	**Country**
EMCDDA and Europol. (2016), EU drug markets report: in-depth analysis, EMCDDA-Europol joint publications, Publications Office of the European Union, Luxembourg, (http://www.emcdda.europa.eu/system/files/publications/2373/TD0216072ENN.PDF), accessed on 28 November 2017.	Clean-up (D) Environment (D) Health (ID)	Amount of waste	European Union
EnviCrimeNet (2016), *Report on environmental crime*, http://envicrimenet.eu/EN/images/docs/envicrimenet%20report%20on%20environmental%20crime.pdf, accessed on 28 November 2017.	Environment (D)	No data present	NL
Europol (2017), *Serious and organised crime threat assessment: crime in the age of technology*, (https://www.europol.europa.eu/socta/2017/), accessed on 28th November 2017.	Does not apply	No data present	European Union
Hammon, T. L., and Griffin, S. (2007), 'Support for selection of a methamphetamine cleanup standard in Colorado', *Regulatory Toxicology and Pharmacology*, 48(1), pp. 102-114.	Health (ID)	No data present	USA
Hughart, J. L. (2000), 'Chemical hazards related to clandestine drug laboratories', Arhiv za Higijenu Rada I Toksikologiju/*Archives of Industrial Hygiene and Toxicology* 51(3), 305-310.	Health (ID)	No data present	United States of America
Kates, L. N., Knapp, C. W. and Keenan, H. E. (2014), Acute and chronic environmental effects of clandestine methamphetamine waste. *Science of the Total Environment* 493, pp. 781-788.	Environment (D)	Amount of waste	United Kingdom

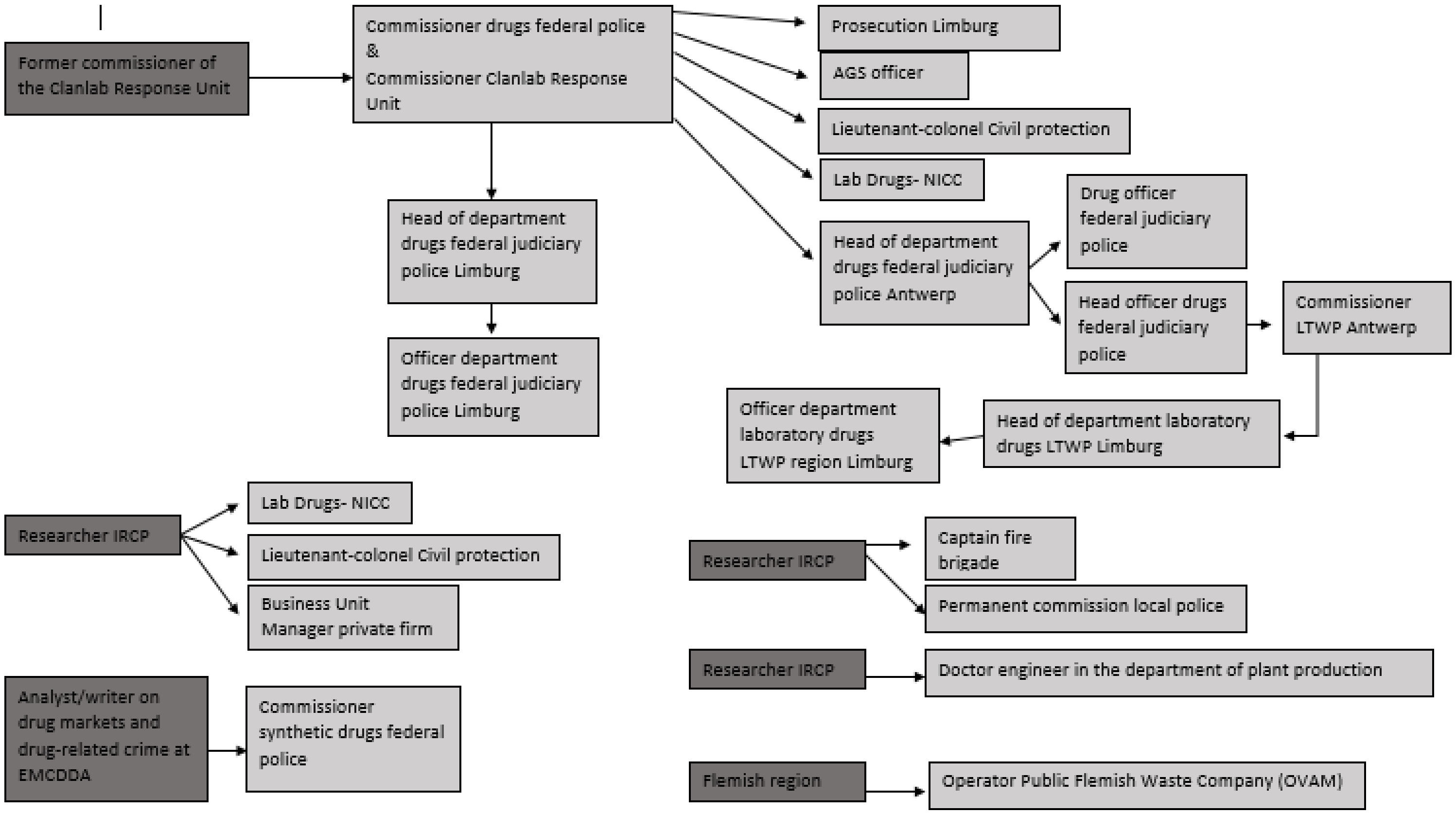
Relevant studies *(Cost estimate studies highlighted in bold)*	**Cost categories**[53]	**Data**	**Country**
KLPD — Dienst Nationale Recherche (2012), *Synthetische drugs en precursoren. Criminaliteitsbeeldanalyse 2012*, https://www.politie.nl/binaries/content/assets/politie/algemeen/nationaal-dreigingsbeeld-2012/cba-synthetische-drugs-2012.pdf, accessed on 28 November 2017.	Environment (D)	Amount of waste	Netherlands
Owens, C. V. (2017), 'Remediation of manufactured methamphetamine in clandestine laboratories: a literature review', *Journal of Chemical Health and Safety,* 24, pp. 22-37.	Health (ID)	No data present	United States of America
POD Wetenschapbeleid (2008), *Chemische profilering van afvalstoffen uit de clandestiene productie van drugs*, POD Wetenschapbeleid, Brussels, https://www.belspo.be/belspo/organisation/Publ/pub_ostc/Drug/rDR31_nl.pdf, accessed on 28 November 2017.	Does not apply	No data present	Belgium
Scanga, L. (2005), 'Drug problem: environmental solution', *Pace Environmental Law Review* 22, p. 151.	Clean-up (D) Environment (D) Health (ID)	Amount of waste	United States of America
Schoenmakers, Y. M. M., and Mehlbaum, S. L. (2017), 'Drugsafval in Brabant', *Justitiele Verkenningen* 43(2), pp. 899-102.	Health (ID) Personnel (D)	Number of laboratories	Netherlands

Relevant studies *(Cost estimate studies highlighted in bold)*	**Cost categories**[53]	**Data**	**Country**
Tytgat, J., Cuypers, E., Van Damme, P. and Vanhove, W. (2017), *Hazards of illicit cannabis cultivation for public and intervention staff*, (http://www.belspo.be/belspo/organisation/Publ/pub_ostc/Drug/DR67_nl.pdf), accessed on 28 November 2017.	Environment (D) Health (ID)	No data present	Belgium
UNODCCP (1999), *Global illicit drug trends*, (https://www.unodc.org/pdf/report_1999-06-01_1.pdf), accessed on 28 November 2017.	Environment (D) Health (ID)	No data present	United Nations
Van den Besselaar, J. and van Grootel, M. (2017), *ERISSP meldingen. Synthetische drugs, precursoren, nieuwe psychoactieve stoffen 2014, 2015, 2016 en 1e helft 2017. Meldingen omtrent productielocaties, opslaglocaties en dumplocaties*, Politie Landelijk Eenheid/Dienst Landelijke Recherche.	Does not apply	Number of labs Number of storage sites Number of dumping sites in the Netherlands	Netherlands
Wieman, J. (2007), 'Meth labs: cooking up environmental disaster' *Missouri Environmental Law and Policy Review*, 15, p. 127.	Environment (D)	Amount of waste	United States of America

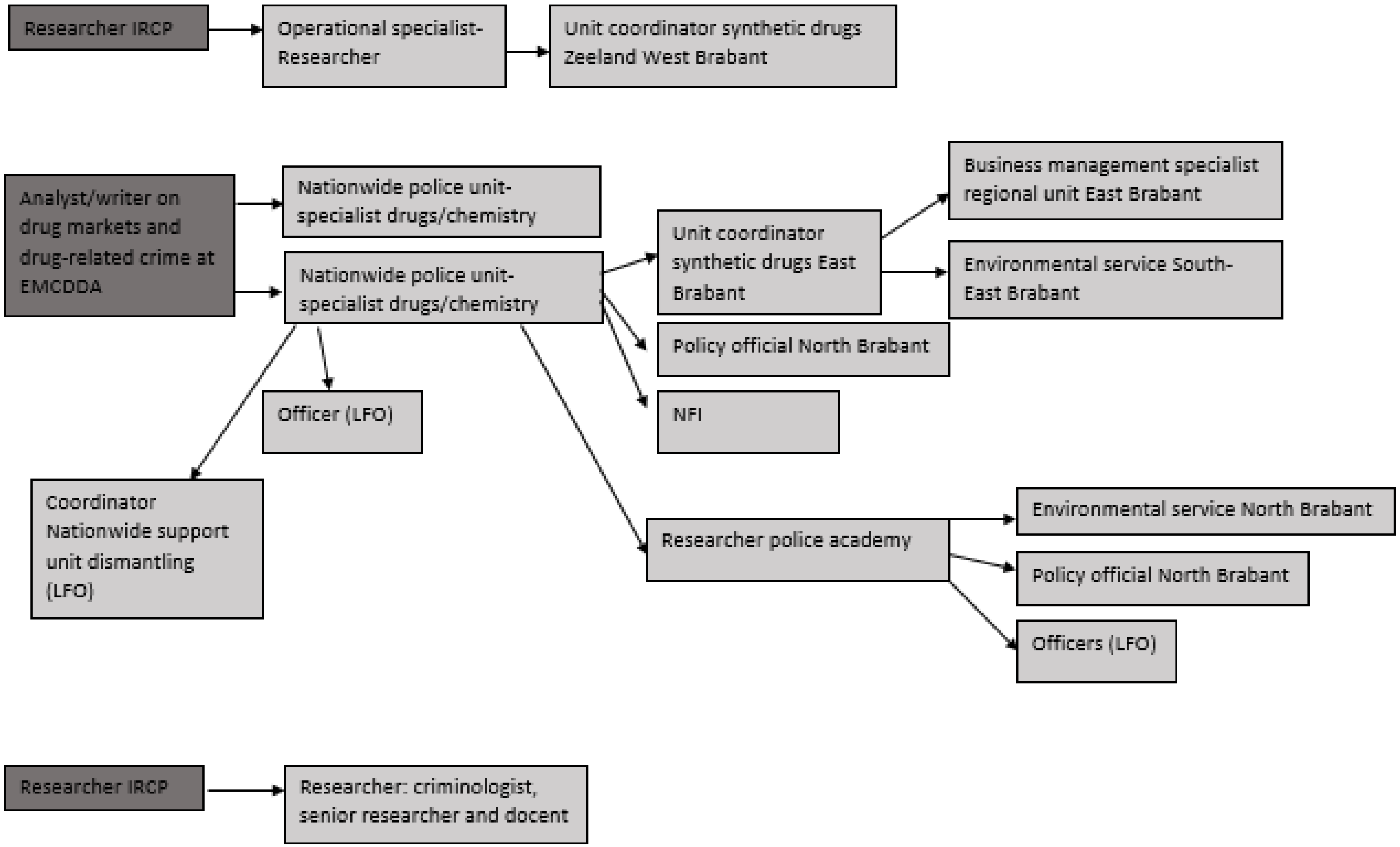
Relevant studies *(Cost estimate studies highlighted in bold)*	**Cost categories**[53]	**Data**	**Country**
N= 26			

Annex 2: Snowball sampling

Snowball sampling in Belgium



Snowball sampling in the Netherlands



Annex 3: Interview questions

1. Who are the most important actors for dismantling and cleaning up synthetic drug production or dumping sites? What procedures do they follow?
2. What are the possible costs related to the interventions of these actors?
3. Are you in the possession of data that would enable an estimate of the cost related to dismantling and cleaning up synthetic drug/dumping sites to be made?
4. If you think of data concerning this topic, what data do you think are missing?
5. What are the risks and hazards linked to dismantling and cleaning up synthetic drug production and dumping sites?

Annex 4: Stakeholders

BELGIUM	**THE NETHERLANDS**
NICC* 1. Expert, drugs lab - NICC - 03/10/2017 - Telephone	Netherlands Forensic Institute (NFI)
Federal (judiciary) police (Federale politie) 2. Head of department, drugs department, Antwerp region - Federal judiciary police - 20/09/2017 - Telephone 3. Officer, drugs department, Antwerp region - Federal judiciary police - 26/09/2017 - Telephone 4. Officer drugs department, Limburg region - Federal judiciary police - 8/10/2017 - Face to face 5. Commissioner, drugs department - Federal police - 15/09/2017 - Face to face 6. Commissioner, synthetic drugs department - Federal police - 26/10/2017 - Telephone 7. Commissioner, Clanlab Response Unit - Clanlab Response Unit - 15/09/2017 and 8/10/2017 - Face to face	Central police unit (landelijke eenheid) 1. Operational specialist, drugs/chemistry - Central police unit - 25/09/2017 - Face to face 2. Operational specialist, drugs/chemistry - Central police unit - 14/11/2017 - Telephone 3. Coordinator, LFO - LFO - 08/11/2017 - Mail and telephone
Local police: 8. Permanent commission, local police - Member commission - 08/11/2017	Regional police unit 4. Business management specialist, department staff and police profession - Regional police unit, East Brabant

Belgium	**The Netherlands**
- Telephone	- 27/10/2017 - Telephone
Private firm: dismantling, transport, storage and destruction 9. Business unit manager - Private firm - 04/10/2017 - Face to face	Private firm: dismantling, transport, storage and destruction
Civil Protection (Civiele bescherming) 10. Lieutenant-colonel - Civil Protection Brasschaat - 22/09/2017 - Telephone	
Fire brigade 11. AGS officer - Fire brigade, Kempen region - 22/09/2017 - Telephone 12. Captain, fire brigade - Fire brigade, Ghent region and formerly Antwerp region - 30/10/2017 - Telephone	Fire brigade
OVAM 13. Operator, target-oriented remediation department - OVAM - 27/09/2017 - Telephone	Environmental service 5. Advisor, synthetic drugs, North Brabant - Environmental service - 10/10/2017 - Telephone 6. Advisor, synthetic drugs, South-east Brabant - Environmental service - 10/11/2017 - Mail

Belgium	**The Netherlands**
LTWP* 14. Commissioner, LTWP, Antwerp region - LTWP - 02/10/2017 - Telephone 15. Head of department, drugs lab, Limburg region - LTWP - 05/10/2017 - Telephone 16. Head of department, drugs lab, Limburg region - LTWP - 11/10/2017 - Telephone	FO
	Regional police unit 7. Unit coordinator, synthetic drugs, Zeeland-West Brabant - Regional police unit - 02/10/2017 - Telephone 8. Unit coordinator, synthetic drugs, East Brabant - Regional police unit - 05/10/2017 - Telephone
Prosecution 17. Prosecution magistrate, drug phenomena, Limburg region - Prosecution Limburg - 08/10/2017 - Face to face	

BELGIUM	**THE NETHERLANDS**
Researcher 18. Scientist in the plant production department - University of Ghent, Faculty of Bio-Science Engineering - 18/09/2017 - Mail	Researcher 9. Operational specialist, researcher - Regional police unit - 15/09/2017 - Telephone 10. Researcher, knowledge and research department - Police academy - 05/10/2017 - Telephone 11. Researcher - Criminologist, senior researcher and professor - 16/10/2017 - Telephone 12. Policy official, nature, water and environment cluster - North Brabant - 10/10/2017 - Face to face
*Data derived from these interviews will not be used in the cost estimate. As mentioned before in Tables 1 and 2, the services provided by these services will not be counted, and they also did not provide data on other actors.	

Annex 5: Depreciation index

In Belgium, the Clanlab Response Unit, fire brigade, the Civil Protection and private firms responsible for cleaning up, transporting, storage and destruction of waste possess vehicles/trucks and other machines. In the Netherlands, these non-disposable equipments are used by the LFO, the fire brigade and private firms. Equipment used for transportation (e.g. special trucks) and analyst machines are likely to be used for more than one year. To calculate these costs on an annual base, we used a depreciation index. This index varies depending on the object, possible unforeseen circumstances (e.g. a truck is involved in an accident), etc. This index can be calculated using the following formula:

$\boldsymbol{Depreciation\ index} =$ ***(purchase value – residual value[54])/(years of use)***

An example of the use of such an index is when a private firm buys a special transportation truck for the transport of chemical waste produced by synthetic drug labs. If we take as an example that a truck cost EUR 50 000 (purchase value), the residual value is only EUR 2 000, and we think that it will be used for 10 years:

$\boldsymbol{Depreciation\ index} =$ ***(50 000 - 2 000)/(10)***

Based on this calculation, we will have to downgrade the value of the truck by EUR 4 800 every year. Or, looked at the other way around, the cost of this truck will be about EUR 4 800 every year for 10 years.

[54] The value of the object when it is no longer useable.