

ORGANIZED CRIME INDEX
BACKGROUND PAPER



**GLOBAL
INITIATIVE**
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ORGANIZED CRIME

MEASURING THE SCOPE AND SCALE OF THE ILLICIT DRUG TRADE

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ABOUT THE SERIES

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

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FROM VISION TO ACTION: A DECADE OF ANALYSIS, DISRUPTION AND RESILIENCE

The Global Initiative Against Transnational Organized Crime was founded in 2013. Its vision was to mobilize a global strategic approach to tackling organized crime by strengthening political commitment to address the challenge, building the analytical evidence base on organized crime, disrupting criminal economies and developing networks of resilience in affected communities. Ten years on, the threat of organized crime is greater than ever before and it is critical that we continue to take action by building a coordinated global response to meet the challenge.



INTRODUCTION

Developing a comprehensive understanding of illicit drug markets requires knowledge of supply routes and techniques, price sensitivity and changes in drug consumption patterns.

This requires up-to-date knowledge on *both* the supply and the demand side of the market. On the one hand, understanding production and distribution dynamics can help in formulating and assessing interventions in source and transit countries, including interdiction and law enforcement efforts. On the other hand, familiarity with the demand side and consumption markets can aid in assessing the conditions of people who use drugs (PWUDs) and developing harm reduction, prevention, treatment and law enforcement initiatives at the local level.¹

However, policymakers' responses to drug markets often operate in silos or rely on supply-centric, enforcement-based approaches, which fail to recognize the complementarity between supply and demand. In recent years, in fact, there has been a growing concern regarding the reliability and accuracy of a dichotomous understanding of illicit drug markets, as they increasingly become more fluid and complex.

In addition, there are concerns regarding the reliability of methods and data used. These concerns arise not only from the inherent shortcomings and limitations of these methods when applied alone but also from the politicization of the overall issue.

Introduction

To minimize risks of misperception, new approaches have been progressively developed by academic institutions and think tanks, to fill potential knowledge gaps. These include, among others, the combination of existing approaches with extensive reliance on information provided by non-traditional sources, such as PWUDs, couriers, local distributors and dealers and through focus-groups and in-depth interviews. This is not only to ascertain consumption habits but also to triangulate data on drug prices and supply-related assumptions formulated by law enforcement authorities.

This paper assesses what is known about illicit drug markets at the international level, what definitions are used in international and regional conventions, and what methods are employed at both international and national levels to quantify the supply and demand side of illicit markets. Measurement methods, along with their respective limitations and pitfalls, are considered and we propose possible alternative approaches that could yield assessments of better quality and higher reliability, for both academic and policymaking purposes.



DEFINING 'ILLICIT DRUG TRADE'

The UN legislation on illicit drugs

The United Nations Office on Drugs and Crime (UNODC) currently defines drug trafficking as the 'global illicit trade involving the cultivation, manufacture, distribution and sale of substances which are subject to drug prohibition laws'.² This definition largely relies on the legislative framework for drug trafficking established by UN member states with the aim to prevent psychoactive 'substances from illegal use and channels while ensuring their medical and scientific use'. The framework rests on three major treaties: the 1961 UN Single Convention on Narcotic Drugs, the 1971 UN Convention on Psychotropic Drugs, and the 1988 UN Convention Against Illicit Traffic in Narcotic Drugs and Psychotropic Substances.

The 1961 Single Convention focuses on plant-based drugs (i.e., opium/heroin, coca/cocaine and cannabis) and classifies them under four different lists (schedules), with differing levels of control depending on a qualitative definition based on their effects. 'Psychotropic drugs', such as amphetamines, barbiturates, benzodiazepines and psychedelics, were then introduced by the 1971 UN Convention on Psychotropic Substances as a response to the diversification of use patterns following the proliferation of synthetic drugs. The 1961 Convention is widely considered more onerous in the regulatory requirements it applies to drugs under its schedules.

In 1988, the scope of control regulated under these two conventions was further extended to every step in the market chain, ranging from the production and distribution of precursor chemicals to anti-money laundering measures when the UN Convention Against Illicit Traffic in Narcotic Drugs and Psychotropic Substances was adopted.³

Apart from the introduction of internationally accepted understandings of control regimes as a response to the trends in illicit drug market over the years, the UN treaties, which are considered the backbone of the international legal framework of drug markets, present many overlapping provisions. These pertain to the definitions of substances, operational frameworks of international control bodies, control on production and trade, public response to consumption, and penalties, and so often result in inconsistent interpretations. For example, although drug consumption was deliberately kept outside the scope of

punishable offences under the 1961 and 1971 conventions, possession for personal use was suggested to be considered a crime under the 1988 treaty, marking an attempt to clarify the legality of possession for personal use compared with possession with intent to deal. Recent consensus interpretations of the 1988 Convention now recognize the limited nature of its provisions in this regard and states no longer view the UN conventions as mandating criminalization of simple possession.⁴

The complexity of the overlapping conventions, combined with the discrepancies between provisions and, by extension, differing interpretations to regulate the same issues, creates ambiguity not only in understanding the impact of illicit drugs at the national level but also in assessing the related markets. Recent work has suggested understanding drug control as a 'regime complex' rather than the more orthodox understanding of the system as a uniform 'prohibition regime'.⁵

As the system endures, its fundamental regulatory principles, developed during an era when drug use was not well understood and the profound future consequences of illicit markets were not fully envisioned, continue to underpin global drug policies.⁶ However, such policies are often seen as deficient: supply continues unabated, albeit in shifting forms, while public health-based approaches, previously seen as at odds with the system, are demonstrating some of the only clear examples of policy success.⁷

THE DEBATE ON CANNABIS REGULATION

An issue complicating the development of consistent frameworks for illicit drug markets arises often as a result of the different understandings of legal(ized) and criminal conduct in different jurisdictions.

For example, irrespective of its legality under national and international regulations, the consumption of cannabis is found to be socially and culturally legitimized by many communities despite the efforts made by states to condemn its production, distribution and use.⁸ Such discrepancies in the perceived legality of activities in the drug market in different jurisdictions make creating a globally recognizable framework for the illicit drug market, and its subsequent assessment, challenging.

Conflicts emerging around the subject of cannabis use regulation are also occurring. For example, in the United States, this exacerbates inconsistencies in the regulatory approaches governing federal authorities and those of numerous state jurisdictions. The growing trend in the decriminalization of cannabis use in the country has seen 37 states having legalized the medical use of cannabis by January 2023,⁹ and some 21 of these having legalized its recreational use in spite of its prohibition set forth under federal law. As a result, this creates not only a regulatory contradiction between federal and state legislation but also difficulties in framing, assessing and defining the impact of the illicit cannabis market in the country.¹⁰

Processes to further decriminalize or legalize cannabis use have sparked more discussions at the international level regarding the degree of compliance or conflict, with obligations set forth in the UN Conventions that ground the international drug control regime. The development of national policy approaches that legalize and regulate cannabis – rather than criminalizing it – continues to challenge the way the international community orients its illicit drug control debate. This is exemplified by the fact that Uruguay and Canada now have a national retail market that legalized and regulated the production, distribution, sale and use of recreational cannabis; while Georgia, Malta, Mexico, South Africa and Thailand, which have legalized recreational cannabis use, are considering similar ways forward.¹¹



MEASURING THE ILLICIT DRUG TRADE

Methods used to measure the supply side of the market

Understandings of the supply side of illicit drug markets usually rely on methods to estimate the volume of illicit drugs being produced and distributed in a given timeframe and jurisdiction(s), and indicators used for their measurement vary depending on the substance under analysis.

For example, law enforcement agencies and international organizations with a security mandate commonly use satellite or other imagery-based research to identify areas of cultivation in source countries for estimating heroin, cocaine and cannabis resin production. Other indicators, such as arrest-based data and seizures of illicit drugs, are also used to estimate illicit drug supply and, by extension, the drug market itself. For example, data pertaining to the trafficking of precursors is often used to estimate the presence and scale of amphetamine-type stimulants' synthesis in a given jurisdiction.

Satellite imagery

The supply chain for illicit plant-based drugs starts with the cultivation of coca, opium poppy and cannabis plants by cash-crop farmers. These crops are often grown in areas that can be isolated, are politically tumultuous or unsafe and have limited formal state presence, making ground-based measurements of such crop fields impractical.

In such circumstances, analysts rely on satellite imagery to measure the amount of land potentially cultivated and use the images to estimate the scale of illicit drug production. Satellite imagery is a tool that comes with a great deal of potential, but it also has some challenges. For example, extended coverage of potentially cultivated areas can be financially costly, data-heavy and laborious. The development and application of agricultural masks to inform the remote sensing interpretation process requires an accurate understanding of current, often regionally specific cultivation characteristics, and the validation of image interpretation necessitates some degree of physical verification through the practice of ground-truthing.¹²

Furthermore, as the success of the measurement relies substantially on timely acquisition of high-resolution data so as to obtain spectral contrast between illicit and licit crops, the measurement can be obstructed by cloud cover or directly by producers with intercropping, i.e., by concealing the actual size of cultivation with similar-looking legitimate crops.¹³

In addition, illicit crops can be grown indoors or in small quantities, such as in the case of cannabis cultivation in Western and South Eastern Europe, thus making the generation of data from aerial imagery unreliable or simply unavailable. To overcome this limitation, satellite-based image data is usually combined with information from yield studies, drug processing efficiency tests and reported eradication totals. However, this can lead to further errors, primarily owing to the use of reported eradication data that cannot be independently verified.¹⁴

In addition to estimates of cultivated areas, international organizations such as the UNODC annually offer estimates of crop yields. However, such estimates are often based on predetermined (or outdated) yield figures and lack periodic ground-truthing, which is essential for the verification and validation of standard ratios. In the case of heroin being produced from opium, for instance, one common ratio for opium to heroin is 18.5:1, regardless of the potential of changing soil conditions.¹⁵ Other factors that are not taken into account when applying predetermined ratios can relate to climate conditions (e.g. changes in humidity and temperatures), soil parameters (e.g. changes in pH), inputs (e.g. changes in the amount and type of fertilizer used) and technology (e.g. changes in irrigation systems).

In addition, estimates of drug production are generally calculated with the assumption that all harvested crops are converted into drugs, which may not always be the case. However, even in the case of a perfect conversion rate, as highlighted by the US Department of State, estimations may still be invalidated by origin and quality of raw crops and chemicals; technical methods applied; size and sophistication of laboratories; and the skill and experience levels of workers, which all affect production volumes.¹⁶

Data on drug-related crimes

Data recorded and published by law enforcement and criminal justice agencies offers a vast array of information pertaining to identifying and arresting possessors and traffickers of illicit drugs.

Regardless of national differences in regulating possession for personal use or distribution, changes and trends related to offences are a good indicator of the capacity and motivation of law enforcement agencies in implementing their policies.¹⁷ However, arrest-based data do not offer any indication of changes in the scale or nature of drug markets, for a number of reasons.

For example, while an increase in arrest rates for drug-related offences may indicate an improvement in the capacity of law enforcement, such a trend does not necessarily imply the expansion (or contraction) of the market under analysis in a given jurisdiction. Changes in arrest rates may also be due to other factors, such as shifts in policies and governments priorities, or more (or less) resources being allocated to such agencies.¹⁸ Moreover, governments often tend to emphasize the importance of the number of individuals arrested in drug-related offences rather than the actual impact that, say, a single yet relevant arrest might have in disrupting a specific illicit drug economy in a territory or community. With this in mind, the use of quantitative arrest-based data as a drug market metric has limited significance, not only in assessing illicit drug markets but also in understanding the impact that such arrests may have in respect to the real (rather than inferred) disruption of markets.

Seizure-based data

Data pertaining to the detection and seizure of illicit drugs, precursor chemicals and clandestine laboratories by border police, state police or customs is among the most common metrics used by law enforcement authorities in their assessment and measurement of illicit drug markets. To some, seizure data provides a useful tool for gaining insight into specific drug transit points and key trafficking nodes.¹⁹ However, such data is more appropriately viewed as a measure of law enforcement presence and capacity, or changing policies or improvements in policing. Seizures do not offer a representative or extrapolative view of a drug market's structures or flows. In other words, the presence or absence of a specific substance in seizure reports is not necessarily an indication of a substance's presence or absence from a particular drug market, nor is the volume of a seizure in and of itself evidence of the volume of flow through a particular point – or a change in flow for that matter.

Political influence also poses challenges in the measurement and understanding of illicit drug markets. Policy decisions in defining a specific substance as illegal and thus influencing the prioritization actions around the detection of the substance results in a stronger enforcement focus, which further reinforces the policy position – in effect creating a sequence of reciprocal cause and effect.²⁰ As the level of observation increases as a direct result of the increased focus on one particular substance, and so may directly correlate with the proliferation of a substance's flow, it can be assumed that the assessment of the given market will be heavily influenced by the political decision in creating the framework.²¹ In other words, it may often be that 'the demand for numbers creates its own supply' and the more the fight against a certain drug is prioritized, the more that drug is observed and the greater the size of its flow appears, which, in turn, leads to it being prioritized still more.²²

There are several examples to demonstrate this phenomenon, particularly from Africa.

According to Gernot Klantschnig, for instance, a well-established cannabis market in Nigeria was 'discovered' by local authorities only when the country's military rulers declared cannabis-related offences as symbols of Nigeria's crisis.²³ In South Africa, authorities regularly reported very low volumes of annual cocaine seizures – not exceeding 1.5 tonnes²⁴ – for nearly ten years until, in 2021, it seized nearly 6 tonnes of the drug.²⁵ However, this does not necessarily mean that the flow of cocaine through South Africa suddenly spiked in that particular year. In fact, research has shown that the volume of cocaine in South Africa has always been high, but that in that particular year the ability of law enforcement to detect cocaine improved as a result of three global intelligence operations and South African authorities being forewarned by external law enforcement partners of specific shipments flowing through the country's ports. As a consequence, these seizures can be seen for what they are, as a reasonable metric for understanding changes in law enforcement activity and not necessarily changes in the South African cocaine market features or flows.

Similarly, data regarding clandestine drug manufacturing facilities, as well as seizures of precursor chemicals, is also viewed as key indicators in assessing the production of a particular substance in a region. However, even though this approach is easy to implement, it remains 'unsettling, because no one has a systematic basis for estimating the seizure rate' over a defined timeframe.²⁶

One of the major limitations of this approach arises from the recording and storing of such data by different organizations. While law enforcement agencies in some jurisdictions lack overall capacity and resources to record seizure data regularly and accurately, those equipped with the necessary capacity and resources often record data without any emphasis on details such as the mode of transportation, point of origin or final destination.²⁷

NATIONAL EFFORTS AND CHALLENGES TO MEASURE AND MONITOR DRUG MARKETS IN AFRICA

In Africa, a number of efforts have been made to establish national agencies tasked with generating and sharing drug trafficking information. For example, Nigeria's National Drug Law Enforcement Agency (NDLEA) is mandated to not only combat drug trafficking but also produce and collect data pertaining to the drug market in the country. Over the years, the agency has faced numerous challenges in efficiently collecting data related to drug trafficking and use in the country, specifically owing to a lack of the necessary scientific, research or analytical resources. The available data produced by the NDLEA, therefore, seems to be more representative of its efforts in combatting drug trafficking and attracting recognition and resources than tracking trafficking dynamics.²⁸

Another initiative in the region is the Joint Airport Interdiction Task Force established in Senegal through the UNODC-sponsored Cocaine Route Programme, of which members were trained on sophisticated anti-trafficking techniques and methodologies to increase their capacities to forecast, intercept and report illicit drug trafficking in the country. Despite these efforts, the reliability of data produced with respect to drug trafficking in the country has been questioned, affecting the transparency of the local drug market through the politicization of the issue. Concerns were also raised relating to the incentivization of the numbers rather than the quality of seizures and arrests made by local law enforcement agencies.²⁹

Another example is the establishment of the Central Narcotics Bureau (Office Central des Stupéfiants, OCS) in 2010 through the merger of anti-drug units of existing law enforcement agencies in Mali, with an aim not only to intercept and combat drug trafficking in the country but also to collect data pertaining to the local illicit drug market. The capacity of the OCS to understand the extent of the phenomenon in the country has been substantially hindered as a result of political unrest, security concerns and a lack of using meaningful methodologies in assessing this market, such as epidemiological surveys.³⁰

There is also a lack of uniformity in how seizure data is recorded and stored by different law enforcement agencies operating in national territories (i.e. police as opposed to customs), as well as the nature of databases that store all of the gathered information provided by different organizations, which affect the collation of such data, even in the same jurisdiction (see, for example, the case of use-related offences being regulated at the level of three entities: the Federation of Bosnia and Herzegovina, the Republika Srpska and the Brčko District).³¹ In addition, cooperation and collusion between drug trafficking organizations and state actors create additional challenges in performing seizures, collecting accurate data and sharing information in good faith with the international community.³²

With such limitations and shortcomings in mind, seizure data can provide some modest insights into trends in drug markets only if combined with other indicators. These range from drug price to consumption habits and drug market retail inventories. For example, an increase in the detection of kitchen-type laboratories and periodic seizures of ephedrine and pseudoephedrine, combined with high consumption detected from wastewater studies and stable retail prices might suggest the presence of an embedded synthetic drug market in a given territory.

Purity and price data

Both retail prices and drug purity are important indicative data in understanding local retail drug market dynamics.

Even though prices of the same substance may differ because of, for example, the relationship between distributors and consumers, the specific location within a broader context of detection (e.g. major consumption hubs as opposed to remote areas and neighbourhoods of a city) and prohibition-related law enforcement activities,³³ data collected at different levels of the supply chain combined with levels of purity detected (when made available by official laboratories) can provide some insight into local drug market economies.³⁴

The measurement of purity and the chemical analysis of drugs are valuable metrics in the understanding of market activity. Often these substances are adulterated with other substances, and filled with inert additives prior to retail distribution. This is done to increase their volume in order to maximize profits, especially for heroin and cocaine.³⁵ For this reason, purity-adjusted prices are calculated to mitigate fluctuations in pricing that may be due to this adulteration. Of course, the degree of adulteration is in and of itself also a metric that can contribute to a better understanding of drug market supply chain dynamics, with increases in adulteration often associated with supply contraction, and increases in purity often associated with supply expansion.

However, although this approach might prove worthy for profiling a specific drug market, it presents a number of limitations. For example, in the case of comparisons, it does not take into consideration how socio-economic and logistics-related factors affect prices inherent in the areas being compared, both within and between countries.³⁶

The use of such data in comparisons of national markets is further limited owing to: (i) differing practices in data collection and various types of information and methods used to calculate retail drug price in reporting jurisdictions; (ii) limited scope of the analysis, with limited geographical coverage in a particular timeframe as opposed to an annual and more holistic coverage; and (iii) vagueness regarding the methods used in producing such analysis and averages. In addition to discrepancies in data, such data is generally produced as a by-product of law enforcement activities,³⁷ which introduces further shortcomings.

Methods used to measure the demand side of the market

Understanding prevalence and characteristics of drug use in a population is a key component in evaluating illicit drug markets. However, owing to its illicit nature, drug users generally feel compelled to hide from authorities, making it difficult to accurately determine the number of PWUD and the volume of drugs being consumed.

Therefore, the scale of an illicit drug market is often measured through drug consumption estimates that are a factor of the number of users, as well as the mean consumption volume and consumption frequency per user.

According to this approach, either direct or indirect methods are conventionally used to calculate the prevalence of the drug use (i.e., the demand side).

Direct methods

There are two main direct methodologies used in calculating the prevalence of the illicit drug market: national registries and population surveys.

Generally, national registries are based on data collection of patients entering and leaving addiction treatment initiatives, including contact, counselling and resocialization programmes. In each of these cases, some volume of PWUDs are specifically identified by their local health, welfare and law enforcement agencies. National registries exist in many countries, where they provide summary data for statistical overviews at both local and national levels, as well as for epidemiological studies and health research.³⁸ However, there are several limitations around the use of such registries. For example, they do not consider hidden or hard-to-reach populations of PWUD who may successfully avoid or be unwilling to come into contact with the relevant state agencies. There are also ethics-related implications, especially arising from privacy and confidentiality concerns.³⁹

Another method used to measure the demand side of the illicit drug market is to conduct population surveys. These surveys can be undertaken through in-person interviews, computer-assisted telephone interviews or on a self-completion basis, where either the general population or a specific subpopulation is targeted. Population surveys can contribute to monitoring the trends in the market and facilitate estimations of prices through the identification of illicit drug use presence and related behaviours.

Population surveys also allow for the estimation of prevalence rates through individual-based responses, where the number of users and the volume of drugs consumed in a given time are obtained from participants. This information is then used to estimate the aggregate size of the illicit drug market.

However, there are three main limitations to this method: (i) inherent challenges related to statistical inference, i.e. in stretching the scope of such a survey to the relevant subpopulations of drug users; (ii) non-responsiveness with regard to the use of the illicit substance being measured; and (iii) systemic under-reporting (i.e. denying use altogether) or misreporting (i.e. under-reporting frequency of use).⁴⁰

As mentioned earlier, one of the major outcomes of this method is a population size estimate for PWUD. However, general population surveys often lack information on subpopulations of users. Young people (younger than 15 years), marginalized and homeless people, people in treatment centres and prisoners are regularly either under-represented or absent from such studies, which may prevent establishing a holistic snapshot of drug user populations.⁴¹ Limitations of population surveys, particularly in accurately estimating problematic drug use, such as dependent heroin and cocaine use, have been well acknowledged, especially owing to the failure of such surveys in reaching dependent users.⁴² Therefore, such studies tend toward a focus on either occasional users or heavy users of arguably less harmful drugs, such as cannabis.⁴³

Owing to these deficiencies, researchers have made efforts to capture the market in a more comprehensive manner. While some investigators opted for extending the scope of their studies by reaching out to the subpopulations,⁴⁴ other approaches, such as including inmates as a focus group,⁴⁵ the use of overdose data⁴⁶ and use of a ratio of users per dealer,⁴⁷ are used to estimate the scale of the market.

Another issue that adversely affects prevalence estimates using this approach is the non-responsiveness of individuals being targeted through such surveys. It is not clear whether there are differences between the prevalence rates among PWUD who respond to a survey and those who are unwilling to do so. This makes it hard to determine error margins.⁴⁸

The accuracy of information provided by individuals who are reluctant to answer certain questions or who are either under-reporting or exaggerating drug use behaviours owing to their fear of being marginalized, arrested, fined or jailed, also creates challenges in reliably assessing the aggregate market scale. The degree of under-reporting or misreporting in such surveys and the importance of discrepancies arising because of this phenomenon have been highlighted in some studies where self-reported consumption and biological evidence from urine samples were compared.⁴⁹ Discrepancies of between 22%⁵⁰ and 39%⁵¹ were found in these studies, which may result in considerable underestimation of drug use and, by extension, the market itself.⁵² Even though the data emphasizes the importance of corrections to be made when using survey responses, how such adjustments should be implemented to address the issue of under- or misreporting remains unclear, as discrepancies vary across surveys. However, in practice, a rescaling factor is used to balance the concerns regarding both non-responsiveness and misreporting, especially by taking into consideration the strictness of legal sanctions in a given jurisdiction.⁵³

Indirect methods

As previously noted, data gathered through surveys lack reliability for calculating an accurate estimate of drug prevalence and hence assessing market scale. Therefore, the use of indirect methods, such as obtaining data from healthcare services on consumption-related habits, can be crucial in identifying market drivers as well as short-term impacts of supply dynamics.⁵⁴ In this respect, data pertaining to the number of people seeking treatment, needle/syringe programmes and drug-related hospitalizations and deaths, is taken into consideration. For example, an increase in the number of drug-related deaths (e.g. because of overdose, blood-borne infections, or violence) and hospitalizations are common metrics reviewed, as changes in these may indicate a change in the regular composition of a drug (e.g. contamination or substitution) or it may be correlated with such things as an increase in PWUD re-entering society following detention or imprisonment, and doing so with significantly lower tolerance levels as a result of forced abstinence.⁵⁵

In this regard, harm reduction programmes may also have an influence. A successful reduction in community-based drug-related harm could include reductions in both overdose and hospitalization for populations of PWUD. Controlling for this would then give different scale indicators depending on the activities, effectiveness and reach of a region's harm reduction programming.

Following the accumulation of the aforementioned indicative data, the techniques that follow are commonly used to calculate an estimate of PWUD in a specific drug market:

- **Capture/recapture:** A sampling technique, often used in environmental studies, that entails conducting a controlled study in which the subjects (typically animal populations) are captured, labelled, released and subsequently recaptured after a certain period. By examining the proportion of 'capture' individuals in the recapture sample, it is possible to estimate the overall population size.
- **Multiplier method:** Often used in economics, this method is used to measure the total impact of a change in a particular variable under analysis. Applied to the drug consumption context, it measures the overall effect of a change in one component of the aggregate demand of drugs.
- **Multiple indicator method:** A model of testing and correcting for errors made in measuring a concept or 'latent construct'. In practice, it consists of two or more 'alternative' measures of the same phenomenon under analysis.

One of the major shortcomings of these approaches stems from the lack of availability and accuracy of data recorded by institutions, especially in countries where data collection is not prioritized or funded. Furthermore, indirect studies do not include PWUD who do not make contact with law enforcement, healthcare systems or treatment institutions on a regular basis, especially for the use of a drug such as MDMA (i.e. Ecstasy), for which relatively lower rates of drug-induced deaths or treatment attendance is reported.⁵⁶

Wastewater-based epidemiology

Wastewater-based epidemiology (WBE) provides qualitative and quantitative information with regard to a population's drug consumption habits through the analysis of chemical indicators in sewage samples collected in a particular area or region. WBE has proved useful in monitoring the demand side of the illicit drug market. The method has a number of benefits as it does not require any active PWUD engagement, but still allows for regular (near 'real-time') surveillance and geolocation of drug presence in a territory.⁵⁷

Even though WBE eliminates the limitations, ethical issues and privacy concerns raised in relation to the use of direct and indirect methods earlier to an extent, it is also associated with some shortcomings and limitations in calculating a holistic understanding of the market.

First, WBE allows for the identification of drug presence, but this does not necessarily imply drug consumption. In other words, the detection of illicit substances in wastewater systems might be caused by their simply having been dumped into the sewage system, and without enantiomeric profiling it is impossible to distinguish between an enantiopure substance and a metabolite, the by-product of the human body breaking down (metabolizing) a drug to a different form.

Other limitations are due to the limited geographical coverage as well as the timeframe over which samples are collected.⁵⁸ In addition, concentration measures in wastewater do not directly reflect drug consumption and require additional calculations to determine the quantities of drugs being consumed. Such calculations should take into account factors such as a drug's stability in the sewage system, the rate at which the drug is excreted by the human body, as well as the purity of the drugs consumed.⁵⁹ Moreover, WBE is a method designed for urban settings where wastewater infrastructure can be assumed to be strong and functioning, while it is less useful in rural or underdeveloped areas. Consequently, large rural territories are often not considered in national assessments. Using this method in specific portions of an urban setting (e.g. a particular neighbourhood) might also involve ethical concerns, such as the risk of possible identification and targeting of a particular ethnic or socio-economic group in the community.⁶⁰

In the case of heroin detection, WBE is problematic, as opioid metabolites (such as that of heroin) tend to deteriorate quickly in the wastewater system, which means it is possible that its use will be undetected. To ease detection, the WBE could use morphine as a proxy, however this raises the challenge of differentiating all of the various opioids available in a given territory (i.e., legally used pharmaceutical versus heroin). As such, the efficacy of WBE for heroin use estimation is problematic.

International reports

Several open-source reports with the aim of measuring and illustrating the scale of illicit drug markets on a global, regional and local level are available. The following section provides an overview of the three used most often.

The World Drug Report

UNODC's World Drug Report (WDR) has been published annually since 1997 with the goal of providing an in-depth analysis of global drug markets. In more recent years, its scope has been expanded to more directly examine the nexus between drugs and the environment within the bigger context of the sustainable development goals.

The methodology and approach employed under the WDR rely on the triangulation and cross-checking of multiple indicators, including drug price data at different levels of the supply and demand chains, surveys on drug production through satellite imagery and abstract conversion models and also the standardized Annual Report Questionnaire (ARQ), under which a plethora of information – from drug demand to drug seizures – is provided by each UN member state.

The latest version of the ARQ was updated and standardized in May 2021, so as to collect from each country information about drug legislation and policies (parts I and II), drug demand and prevalence (part III) and drug supply (part IV), including seizures, drug-related offences, etc.⁶¹ Additional sources include reports from Interpol, UNODC field offices, individual drug seizures and the UN Survey on Crime Trends and Operations of Criminal Justice Systems.⁶²

The WDR relies on a wide range of data and methodologies; however, pitfalls and limitations inherent in these methodologies and indicator data cause challenges in accurately assessing the scale of the global drug market.⁶³ For example, the lack of information gathering through surveys supported by UNODC on the production of drug crops such as opium poppy and coca bush in certain origin countries (e.g. Afghanistan, Morocco, Nigeria, etc.) and a failure to perform regular field research and interviews (including with PWUDs) owing to security concerns, economic considerations and changing drug policies in member states create uncertainties in calculating production estimates. As a result, assessing the market continues to be challenging.

A significant challenge in compiling the WDR also lies in having to rely on member states' responsiveness and capacities, as well as the accuracy and completeness of the data they share, as each year a number of states fail to provide a complete ARQ. Deficiencies in both technical and human resources in several member states, an absence of sophisticated methods and a potential lack of political will in measuring drug prevalence in their respective jurisdictions further limit the creation of an accurate global dataset of answers. The use of different definitions and methodologies under the ARQ further contributes to the obstacles encountered in triangulation and cross-comparison of data.

This becomes particularly problematic in regions like Africa and Asia. In addition to the limitations and pitfalls inherent in the methodologies commonly used to measure the market, further challenges are encountered in monitoring and understanding drug markets.⁶⁴ These include, among others:

- the unwillingness of certain countries to facilitate field research being conducted by international organizations in their jurisdiction

- a lack of capacity and resources of national institutions in performing seizures, and also collecting and sharing data pertaining to such seizures
- a lack of coordination between different national agencies collecting varying sets of relevant data
- cooperation and collusion between state actors and drug trafficking organizations.

Furthermore, many African nations tend to evade the submission of drug-related data as required by the existing international legal framework. To date, the response rate to ARQs remains low.⁶⁵ In 2004, only 24 out of 53 countries recognized by the UNODC submitted at least one ARQ. Ten years later, in 2014, this number had dropped to 12.⁶⁶ In 2021, only 10 countries in Africa submitted an ARQ response for the WDR dated June 2021, with only two submissions (Kenya and Morocco) being deemed substantively complete.⁶⁷

THE WORK OF THE AFRICAN UNION

In response to the general lack of capacity of the region to collect and assess drug-related data, the African Union launched the Pan-African Epidemiological Network on Drug Use (PAENDU) in 2016.⁶⁸ Consisting of 15 east and southern African countries, the PAENDU aims to report on the methods used for data collection and to present data on the reduction of drug demand, law enforcement arrests and seizures. Despite the network's good intentions, the reports produced under the umbrella of PAENDU mimic the data requirements of the UNODC's ARQ, meaning that they suffer from similar shortcomings. It is also worth noting that the first and seemingly latest PAENDU report was published in 2019, covering the period 2016–2017.⁶⁹

The US International Narcotics Control Strategy Report

The annual International Narcotics Control Strategy Report (INCSR) has been published by the US State Department since 1987, covering more than 60 countries where efforts to 'attack all aspects of the international drug trade, chemical control, money laundering and financial crimes' are described.⁷⁰ It can be considered the first systematic effort to make information regarding international drug trafficking public through the collection of data, a process which was enabled in 1986 by the Omnibus Drug Enforcement, Education and Control Act being entered into force in the US.

During the 1960s and 1970s, the illicit drug trade grew and spread, putting immense strain on countries struggling to combat trafficking and insurgencies funded by drug money. Consequently, these nations sought increased international collaboration to address the escalating global conflict. This effort coincided with the US-led 'war on drugs' and its associated 'war on crime' during the 1980s and 1990s.⁷¹

However, because of its strong focus on the work performed by law enforcement authorities to contribute to the war on drugs, the INCSR has faced persistent criticism over the years, especially owing to the influence of US security policies in the assessment of the supply of illicit drugs from different jurisdictions, resulting in the conclusion that the report's assessments are driven by political concerns rather than an understanding of the global scale of the drug market.⁷² Numerous governments have recognized the shortcomings of the supply-centric approach and oppressive prohibitionist tactics

over the last two decades,⁷³ yet the regulatory framework was established in a manner that assigned enforcement and compliance responsibilities to states, effectively cementing the control paradigm. The INCSR has been seen as a key US tool in seeking to maintain global policy uniformity in the face of clear weaknesses and failings.⁷⁴

This becomes particularly evident when looking at how the emphasis has shifted between different types of drugs as well as between different countries that pose particular security threats to the US.⁷⁵ In this context, foreign law enforcement agencies partnering with the US have incentives to exaggerate the monetary value of the eradicated crops, whereas political pressures may lead different agencies (e.g. customs versus the police) to claim credit for the same seizure or arrest, leading to a risk of double-counting; massive arrests are made more with a view to pleasing and positively impressing the US ('give them the data they want') than to actually fighting the criminal threat.⁷⁶

Even though the initial classification of the methodology of data collection used under the INCSR has historically hindered a comprehensive analysis of drug markets, more information regarding data collection and treatment methodologies has been made available in recent years. Some of the data contained in the report consists of yield estimates derived from satellite imagery and also estimates regarding the processing and transformation of raw materials into illicit drugs.

Notwithstanding the progress in widening the set of indicators used for the INCSR report, limitations and shortcomings inherent in the data used to estimate drug markets remain, a phenomenon which is further magnified when drug flows happen to be measured by the same agency that is tasked with fighting them.⁷⁷

Such limitations were also acknowledged in the 2021 edition of the report through a caveat stating that the published figures are estimates and should be regarded as the midpoint of a range of statistical probabilities rather than as precise figures.⁷⁸

The European Monitoring Centre for Drugs and Drug Addiction reports

The EMCDDA, which was established in 1993 to provide EU member states (together with Norway and Turkey) with data pertaining to the illicit drug market in the region, periodically publishes regional and national reports, as well as two open-source databases focusing on evidence-based data. The EMCDDA's publications are aimed at capturing both the demand and supply sides of drug markets.

Two more comprehensive reports are published yearly, namely the European Drug Report, which has been issued since 1996, and the EU Drug Markets Report, which has been issued in cooperation with Europol every three years since 2013.

Unlike the WDR and the INCSR, the EMCDDA reports place particular emphasis on epidemiological indicators intended to capture the demand side of drug markets, and methodologies in data collection and treatment employed under these reports are more harmonized than those used in the open-source databases owing to the use of methodological handbooks and standardized formats for reports and surveys.

The EMCDDA has taken significant steps to enhance the consistency of its data collection and processing procedures by creating a network of national focal points in every member state (including Norway and Turkey) and adopting a methodological handbook to guarantee the quality and comparability of data.

The standardized tools include spreadsheets, reports and surveys. The EMCDDA coordinates and supports focal points in gathering and exchanging information, such as general probabilistic surveys that examine drug usage among adult and school populations; prevalence surveys that target individuals with drug use problems (defined as those who engage in long-term or regular use of opioids, cocaine, amphetamines or injecting drug use); quantitative and qualitative data concerning access to and demand for drug treatment; the prevalence of drug-related infectious diseases and fatalities; drug seizures (including of precursor materials, halted shipments and dismantled drug production facilities); drug-related crimes; and indicators on seized drugs' price, purity and potency.⁷⁹ In addition to data from these national focal points, data on drug supply and markets are also obtained from law enforcement agencies or automated programmes that track open-source information and press releases about drug trafficking in Europe.

The use of various datasets gathered through different methods enables verification and cross-referencing, strengthening the reliability of the final results published by the EMCDDA.

Despite the ability of countries monitored by the EMCDDA to gather precise data on drug use prevalence, as well as their willingness to use sophisticated methods such as wastewater analysis, there are still challenges in collecting uniform data. Such challenges arise from the differing legal frameworks and policies of monitored countries, which affect both the quality and comparability of data, despite the efforts to create a more harmonized and sophisticated database pertaining to the wholesale illicit drug market.⁸⁰ Furthermore, the difficulties in standardizing data, which hinder triangulation and therefore the comparability of such information, are exacerbated by the limitation and drawbacks inherent in the methods and indicators employed in the reports published by the EMCDDA. These limitations and pitfalls were also acknowledged under the disclaimers issued by the EMCDDA, which recognized that the figures published are limited to emphasizing trends in drug markets rather than in estimating a more comprehensive scale of the latter.



DISCUSSION

Alternative approaches

International organizations, including the UNODC, the United Nations Interregional Crime and Justice Research Institute and EMCDDA, have often provided training to law enforcement agencies across the globe to strengthen domestic data collection capabilities and enhance the quality of drug-related data originating from the continent. Despite these efforts, many countries, particularly in Africa, suffer from inadequate and under-resourced counter-narcotics agencies as well as health departments that lack operational budgets and which are hindered by corrupt management.

As a result, the applicability of methods to measure the demand side of the market, such as WBE (which relies on efficient urban wastewater systems and thus requires infrastructure often lacking in the Global South) or population surveys (requiring computer-assisted telephone interviews in areas with no power supply) is simply void, which means attempts to measure illicit drug markets largely have to rely on supply-side data collected by security providers. However, law enforcement agencies in Africa and Southern Asia have been often described as lacking the necessary organizational, institutional, technological or financial resources to effectively combat illicit drug trafficking. In most cases, these agencies are manned by personnel who are undertrained and are evaluated based on metrics such as the number of arrests they make each month, an approach that does not adequately measure their success in combating the drug trade.⁸¹

In Africa, the choice of relying on such indicators to measure and combat illicit drug markets, strongly influenced by decades of prohibition-oriented drug control with the goal of a 'drug-free continent', has not proved effective.⁸² On the contrary, drug markets continue to expand. As shown in a number of studies by the Global Initiative against Transnational Organized Crime over the years, the continent has shifted from hosting limited and traditional plant-based drug economies centred on khat and cannabis, to serving as a hub for the manufacturing, production and transshipment of various controlled drugs on an industrial scale.⁸³

The availability of cocaine, heroin and cannabis is abundant and their prices at both the retail and wholesale levels have dropped to some of the lowest averages seen in the past decade, likely pointing at a stable (if not excessive) supply.⁸⁴ But despite the increasing supply and use of cocaine and cannabis in the past decade, the amount of these commodities seized on the continent today is lower than it was 10 years ago.⁸⁵ In short, there is plenty of evidence pointing to the failure of the prohibitionist 'war on drugs' approach to Africa's illicit drug trades.

In fact, far from eliminating production, supply and use of illicit drugs (the estimated number of people who use drugs today is higher than it was a decade ago), African prohibition measures based on 'trying harder' have not only seen continental drug markets expand in the past decade but also led to the strong criminalization of vulnerable groups in society: individuals who are impoverished, lacking shelter or deprived of political representation are frequently known to use drugs.⁸⁶ Unfortunately, these individuals are often targeted for detention or coerced into paying unjustifiable 'fines' solely because of their drug use. Such practice has been defined as unethical by many commentators, who argue that it not only serves no practical purpose in combating drug-related crimes (as it does not address the national and regional structural vulnerabilities that are enabling organized crime groups active in drug trafficking), but also violates the human rights of all people and communities who use drugs.⁸⁷

To overcome many of the structural limitations of methods to measure illicit drug markets in Africa, as well as the unethical outcomes of prohibitionist drug control, alternative approaches that layer multiple data indicators have proven useful in the overall understanding of recent trends in both the demand and supply side of illicit drug markets. In this respect, methods based on collecting data on drug prices at the retail level and purity assessments (or users' perceived quality), in combination with other indicator data on the supply side from enforcement agencies, offer useful insights into variability or stability of drug distribution in a region and hence help to better understand the local wholesale illicit drug market.⁸⁸

Taking into consideration the importance of information regarding price and purity of drugs available in the region as indicative data, extensive fieldwork focusing on local drug markets in selected African regions through the use of focus group discussions and personal interviews with hundreds of PWUDs from different communities, drug couriers, distributors and also law enforcement personnel is a method that has been used by the GI-TOC, with an emphasis on retail price points, general characteristics of consumption and distribution patterns in different regions.⁸⁹

The data collected through this mixed approach not only provides insight into the variability, stability or instability of the drug markets in the countries under analysis, but also highlights market flows and distribution structures.⁹⁰

From a drug-supply perspective, such studies reveal the important role of the African region in the global illicit drugs trafficking market, despite going against the existing misunderstanding of the region being peripheral to these global drug trade flows. On the demand side, collaborative partnerships with, and the placement of, PWUDs at the centre of studies not only allows for the formulation of more recent and relevant findings on prevalence and availability of drugs (which 'traditional' direct and indirect data collection methods as typically applied in more developed societies cannot provide in Africa) but it also contributes to acknowledging the voice and value of these populations in understanding better the contexts and characteristics of the drug market environments in which they exist. Further, it advances considerations of drug policy reform through the development of an information base that both inventories and analyzes drug market realities as well as challenges the impact of status quo national policy approaches to these markets as they currently exist.⁹¹

Final observations

Increased focus on assessing drug markets often results in growing discussions regarding the effectiveness and accuracy of the methods used. Nonetheless, owing to the illicit nature of the drug market as well as political influences, major obstacles in measuring both the supply and demand side of the market persist. In 1996, a leading academic commentator has argued that 'this is entirely a policy-driven enterprise, without any scientific goals' and that 'the numbers are in fact just decorations on the policy process, rhetorical conveniences for official statements without any serious consequences'.⁹²

As evidenced by the shortcomings of prohibitionist approaches inherent to assessments based merely on seizure and arrest data, as well as satellite imagery promoted by law enforcement agencies, it can be concluded that many governments from across the globe lack the capacity to formulate effective drug policies and responses to trafficking networks operating within their jurisdictions.

These shortfalls not only undermine governments' ability to create and execute evidence-based strategies to address illicit drug markets in their countries but also impact international and regional monitoring systems that depend on such national data. Through an overview of the main studies conducted by major international organizations mandated to analyze and counter illicit drug markets, such as the UNODC and EMCDDA, this paper has demonstrated that various practical obstacles to the work of law enforcement agencies, methodological inconsistencies, restricted data sources, low-quality and often outdated data and the politicization of statistics highlight the importance of recognizing that figures on drug trafficking do not offer an accurate view of real drug flows and, by extension, drug markets, particularly in regions like Africa. Therefore, a deeper understanding of the limitations of these figures is necessary to develop effective policies.

Nevertheless, it is important to note that studying drug trafficking from a supply perspective is not a futile endeavour. Even though it may not provide a completely accurate understanding, the best estimation attainable is still preferable to operating blindly.

Furthermore, through an overview of major methods used to measure the demand side of illicit drugs as well the description of alternative approaches, this paper has sought to highlight the need to better comprehend consumption dynamics as an essential component of illicit drug market assessments and health reforms.

However, methods such as population surveys, national registries or WBE do not come without limitations and shortcomings. Methodological inconsistencies, practical challenges such as under- or misreporting, poor data quality and human rights violations complicate effective market assessments.

No single dataset is capable of providing a complete and comprehensive understanding of illicit drug markets. Each available indicator, whether from the demand or supply side, comes with its own advantages and disadvantages, and if combined with other available indicators can contribute to enhancing the overall and more holistic understanding of the market for a given illicit drug. Ideally, the most effective way to gain insights into the supply and demand trends within and across illicit drug markets is through the integration of multiple data sources, obtained from different actors, with particular emphasis on PWUDs, their health and their rights. Such an approach will almost certainly provide a more comprehensive picture of the current status of drug markets and related (failed) policies, by counteracting the inherent limitations of individual data sources through cross-checking and so, by extension, will permit more informed decision-making around intervention programme design for and implementation in these illicit market environments.



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