

EAST AFRICA

BY ACEMP & CEJAD

Country/regional report series on the political ecology of mercury within the artisanal and small-scale gold sector

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From Port to Pit

Mapping the Mercury Supply Chain for Artisanal and Small-Scale Gold Mining in East Africa



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Centre for Environment Justice and Development (CEJAD)

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Disclaimer

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Table of Contents

1	Introduction	4
1.1	Project background and objective	4
1.2	Impact of Mercury pollution on Ecosystem and Human Health	4
1.3	Methodology.....	5
1.3.1	Data reliability and limitations.....	8
1.4	Report structure.....	8
2	Legal and Institutional Framework	10
2.1	Laws and regulations on mercury import, trade and transport	10
	The Environment Management Act (EMA) 2004.....	11
2.2	Status of the Minamata Convention.....	14
2.2.1	Kenya.....	14
2.2.2	Tanzania	14
2.2.3	Uganda	14
2.3	Policy-practice gap	14
3	Mercury in the artisanal and small-scale gold mining sector in East Africa	15
3.1	Artisanal and small-scale gold mining in East Africa.....	15
3.2	Use of mercury in artisanal and small-scale gold mining in East Africa.....	16
3.3	Knowledge of mercury among artisanal and small-scale gold miners	18
4	Regional and domestic mercury trade.....	20
4.1	Formal and informal mercury import and export.....	20
4.2	Regional and domestic trading routes.....	22
4.3	Main actors: companies and people.....	26
4.4	Mercury prices and packaging through the mercury supply chain	28
5.	Conclusions and recommendations.....	31
6	References	33
7	Annex A.....	35
8	Annex B	43

Abbreviations and Acronyms

ASGM	Artisanal and Small-Scale Gold Mining
ASM	Artisanal and Small-Scale Mining
CET	Common External Tariff
CSOs	Civil Society Organizations
DRC	Democratic Republic of the Congo
EAC	East African Community
EIA	Environmental Impact Assessment
EPP	Environmental Protection Plan
GoK	Government of Kenya
Hg	Mercury
IUCN	International Union for Conservation of Nature
KRA	Kenya Revenue Authority
Kg	Kilogram
MDAs	Ministries, Departments and Agencies
NAP	National Action Plan
NEMA	National Environment Management Authority
NEMP	National Environment Management Policy
OHS	Occupational Health and Safety
PML	Primary Mining License
SME	Small and Medium-Sized Enterprise
UNEP	United Nations Environment Program
USD	United States of America Dollars
URA	Uganda Revenue Authority

1 Introduction

Mercury is widely used by artisanal and small-scale miners in East Africa to extract gold. Mercury is a pollutant that cannot be broken down in the environment and thus continues to accumulate in the ecosystem including the food chain, causing significant environmental and health damage, especially to communities located close to artisanal and small-scale mining (ASGM) sites. While there have been some initiatives to reduce the use of mercury within ASGM over the years, these have had very limited success and mercury continues to be readily available and used in most ASGM sites throughout the region.

There have been several elaborate studies on the ASGM sectors in Kenya, Tanzania, and Uganda including on miners' livelihoods, social and environmental impacts, organizational practices, mercury usage, and the value chain of gold from ASGM. Yet, there is a clear knowledge gap pertaining to the mercury supply chain. There is a general discrepancy between formal mercury import numbers and the estimated mercury usage in most countries with ASGM, suggesting that most mercury is smuggled into the region. But where does mercury enter the region? From where? Who are the main traders, and how does it get to the ASGM sites? These are some of the questions that are yet to be properly explored. This study addresses these gaps and contributes with new knowledge on the ASGM mercury supply chain in East Africa.¹

The Minamata Convention on Mercury is a global treaty that aims at protecting human health and the environment from negative effects of mercury. It was agreed and formally adopted in 2013 and entered into force in August 2017.² The Convention sets out several measures to control the supply and trade of mercury including the regulation of the informal sector of ASGM, which is the single largest source of mercury emissions, in East Africa as well as globally. In 2015, ASGM emitted an average of 838 tons, which is 38% of all sectors' emission, followed by the stationary combustion of coal (power plants) with 13.1% and cement production with 10.5%.³

Kenya, Tanzania and Uganda all signed the Minamata Convention on 10 October 2013 and while only Uganda has ratified the convention (March 2019), both Kenya and Tanzania are likely to do so soon. All three countries are currently in the process of preparing national action plans (NAPs) for the reduction of mercury usage in ASGM.

1.1 Project background and objective

The main objective of the study is to map formal and informal mercury import and export in East Africa, with a particular focus on identifying illicit trade routes, trade hubs, price and quantity patterns, and key players. The intention is that a better understanding of the informal mercury trade in the region and increased transparency will help to enhance the mercury governance within the ASGM sector and to support the development of realistic NAPs.

1.2 Impact of Mercury pollution on Ecosystem and Human Health

The negative impact from mercury on the environment and human health is well documented. Once mercury is released, it can travel long distances, and persist in environments where it circulates between

¹ In this report East Africa is defined as Kenya, Tanzania and Uganda.

² United Nations Environment Programme (UNEP) (2019). Text and Annexes. In Minamata Convention on Mercury.

³ AMAP/UNEP, 2019. Technical Background Report for the Global Mercury Assessment 2018.

air, water, sediments, soil, and living organisms. Unlike many other pollutants, mercury is an element, which means it cannot be broken down in the environment. In the environment, the elemental mercury can be transformed into methylmercury, which is significantly more toxic to humans and animals, as it enters the food chain more readily than other forms of mercury.^{4,5} Mercury gets more concentrated as it rises up the food chain, reaching its highest level in large predatory fish, both freshwater and marine species, often consumed by humans. In such species, elevated levels of methylmercury have been found in numerous exposure studies.⁶ As a result, humans and wildlife at different geographical locations across the world, especially those populations whose diet is based on fish, have been found with alarming levels of mercury in their bodies.

Environmental contamination from the use of mercury in ASGM has been demonstrated in many countries in Sub-Saharan Africa. The ASGM sector constitutes the majority of mercury emissions from Sub-Saharan Africa including East Africa, i.e. an estimated 73% of the total emissions of mercury originates from ASGM, in particular from the burning of amalgam⁷ compared to the 38% emitted by the sector worldwide. Many studies from Sub-Saharan Africa and other parts of the world demonstrate that individuals involved in ASGM, their families, and people living adjacent to the mining activities are exposed to hazardous levels of elemental mercury vapor. Numerous tests of the mercury content in blood, hair, and urine have found alarming levels of mercury, in particular in people involved in burning of amalgam. The effects caused by mercury depend on the degree of exposure. Even small amounts of mercury can affect the human nervous system and cause muscular tremors, while larger amounts can lead to various neurological disorders. Other health impacts include kidney dysfunction/microdamage, mental problems, inflammation in the gingiva, tunnel vision, and permanent brain damage. For pregnant women, mercury poisoning is particularly dangerous. Mercury is concentrated by a factor of ten to one in the fetus relative to the mother. This means that even a woman with a low level of mercury intoxication can give birth to a child with severe mercury poisoning.

1.3 Methodology

The data collection for this study, including literature studies and extensive fieldwork, was conducted over the course of 2019 by IUCN NL and partner organizations in Kenya, Tanzania and Uganda supported by a regional consultant. Fieldwork was conducted in the commercial capital cities, selected border posts, selected ASGM areas and associated district and regional towns by the respective field teams as shown in Table 1-1 and Figure 1-1.

Table 1-1: Areas visited during fieldwork, 2019.

KENYA	TANZANIA	UGANDA
Nairobi City	Dar es Salaam City	Kampala City
Mombasa City	Nyarugusu Village and Geita Town, Geita Region	Busia border post, Tiira Sub County, Busia District
Bondo Town, Siaya County	Kapanda Village and Mpanda Town, Katavi Region	Kitumbi Sub County, Kassanda District

⁴ WHO (2013). Mercury exposure and health impacts among individuals in the artisanal and small-scale gold mining (ASGM) community. World Health Organization.

⁵ Gibb, H. and O'Leary (2014). Mercury exposure and health impacts among individuals in the artisanal and small-scale gold mining community: A comprehensive review. Environmental Health Perspectives 122:667-672.

⁶ UNEP (2002). Global Mercury Assessment. United Nations Environment Programme, Geneva.

⁷ AMAP/UNEP (2013). Technical Background Report for the Global Mercury Assessment 2013. Arctic Monitoring Assessment Programme, Oslo and United Nations Environment Programme, Geneva.

Kakamega Town, Kakamega County	Mwanza City, Mwanza Region	Mutukula border post, Rakai District
Migori Town, Migori county	Chunya Town, Itumbi Village, Matundasi Village, Mbeya Region	Katenga Engaju Sub-county, Buhweju District
Busia, Busia County	Musoma Town, Mara Region	
Sirare Border, Migori County	Kahama Town, Namba Tisa Village, Kakola Town, Shinyanga Region	

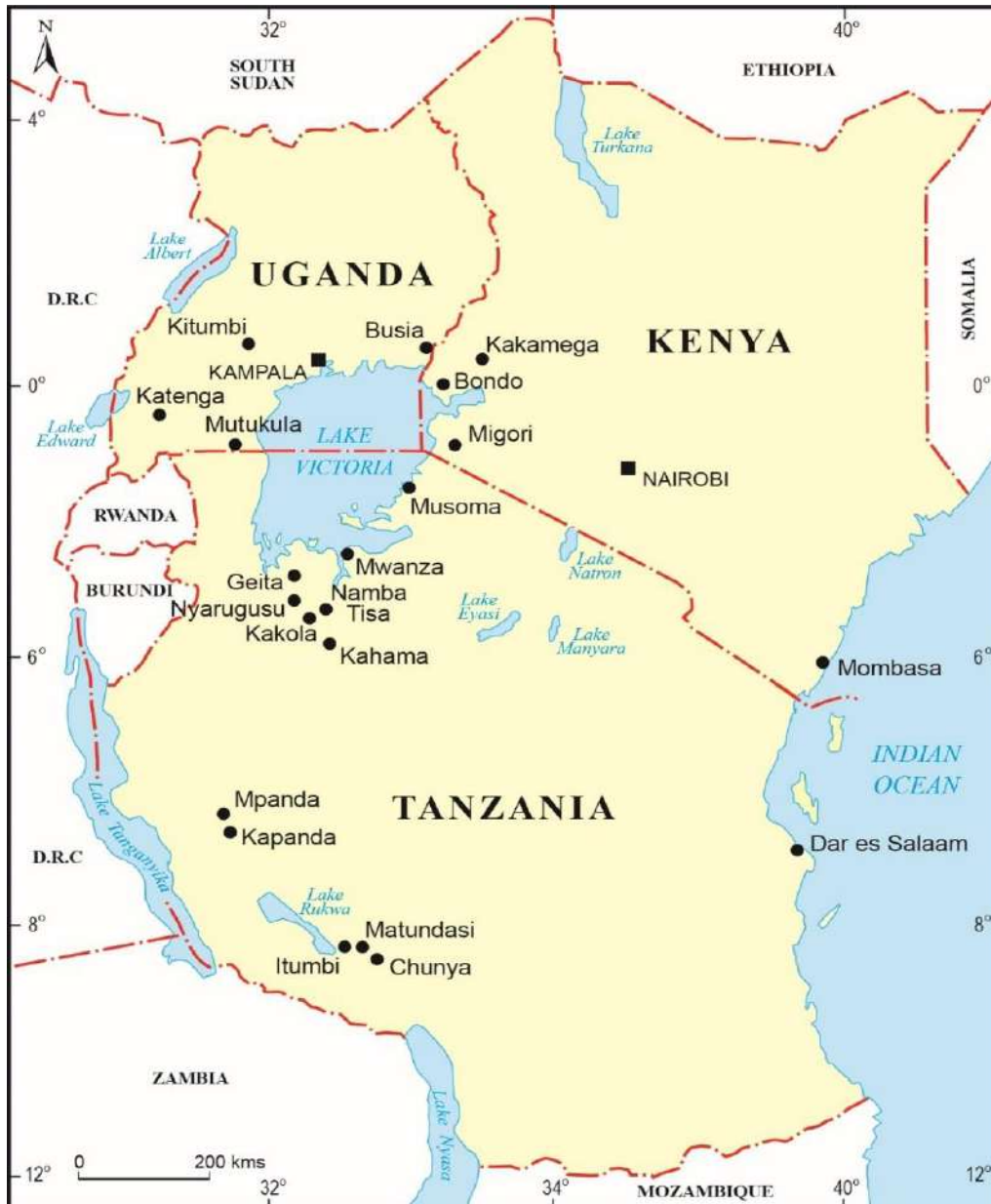


Figure 1-1: A Map of East Africa showing location of areas visited by field teams.

Considering that mercury is becoming an increasingly controversial commodity, with the significance of the Minamata Convention slowly trickling down through the media and governing bodies in East Africa, the information for this study was predominantly acquired through informal discussions with various

types of stakeholders, though a number of formal interviews were also conducted. The informal discussions predominantly evolved around the following discussion points:

- Mercury usage;
- Mercury source(s);
- Mercury routes and trade hubs;
- Stakeholders involved in the supply chain;
- Quantity and packaging form of mercury at different stages of the supply chain;
- Price(s) for different types of quantities and at different locations in the supply chain;
- Informal governance (who controls the business?); and
- Is the supply chain of mercury interlinked with the ASGM gold value chain? If so, how?

The aim of the fieldwork was to identify and speak to both public officials and people involved in the mercury supply chain; from where the commodity enters East Africa, following its trajectories through the various trading hubs until it is sold and used at ASGM sites. Stakeholders were identified from 1) the field teams' past engagements with the ASGM sector, 2) chance encounters, 3) snowballing, where one encounter would lead to another, through networking and recommendations, and 4) formal leaders and public officials who, in one way or the other, are involved with the mercury supply chain and/or the ASGM sector. The following is a list of the types of stakeholders the teams spoke to in the course of the data collection.

Stakeholder groups	Types of stakeholders	Response in relation to the study
Artisanal and small-scale gold miners	Gold ore processing plant owners Informal pit holders Mining site operation managers Pit miners and ore crushers Primary Mining License (PML) owners	Generally willing to talk and seemed knowledgeable on both formal and informal mercury governance, though license owners and pit holders were typically more knowledgeable than miners.
Civil society organizations and mining associations	Association of small-scale miners in Katavi, Tanzania Busia United Small-Scale Mining Association, Uganda Federation of Miners Association of Tanzania (FEMATA) Geita Women Miners Association (GEWOMA), Tanzania Geita Region Miners Association (GEREMA), Tanzania International Peace Information Service (IPIS Tanzania) Itumbi Miners Association, Tanzania Shinyanga Region Miners Association (SHIREMA), Tanzania Tiira Small-Scale Miners Association (TISSMA), Uganda SOLIDARIDAD Tanzania	Willing to talk and provided useful information. Linked field teams to other respondents.
Formal and informal businesses outside the mining sector	Mobile banking shops Metal scrapers Wholesale and retail chemical shops Wholesale hardware shops Wholesale medical laboratory shops Wholesale medical pharmacy shops	Some businesses (around a quarter) were willing to provide information on how they are engaged in the mercury supply chain. However, the vast majority were reluctant to provide any information

Government and state agencies	Custom officials at Busia border post Custom officials in Dar es Salaam Custom officials at Mutukula border post Kenya Revenue Authority Customs department Uganda Revenue Authority officials United Republic of Tanzania, Vice President's office, Division of Environment	Provided information on formal mercury supply chain although most custom officials seemed less informed on the informal mercury trade.
International organizations	MINAMATA convention implementation team for Tanzania and Working group for combating TB among miners in the SADC region	Willing to speak, provided useful information and were willing to share contact information of potential informants
Suppliers and traders	Cross border mercury traders Registered mercury traders in Nairobi Unregistered mercury traders in mining sites Unregistered mercury traders in town/cities Gold dealers Small and informal gold brokers Jewellery shop owners in Dar es Salaam Jewellery shop owners in Geita Companies specialized in designing and manufacturing mining equipment Wholesale mining chemical shops in Dar es Salaam and Nairobi	Some traders were open and provided information on how they are engaged in the trade. This was especially the case with small brokers operating at the mine sites. However, as we moved upstream to large towns and cities, large dealers and jewellery shop owners (that people in the mine sites had mentioned as key suppliers) denied knowing anything on the mercury supply chain.

1.3.1 Data reliability and limitations

The data presented in this report generally constitutes data that have been verified through repeated citing by a large group of people, e.g. prices, key trade routes, and typical quantities. Any 'outlier data' that was deemed untrue, exaggerated or that could not be confirmed by others have been left out. The saturation points in the data collection suggest that the indicative pattern presented in this report resembles the actual ASGM mercury supply chain.

In all three countries, the trend from the fieldwork was that it was fairly easy to access information on mercury prices, quantities, users and sellers down-stream in the ASGM sites and adjacent towns. Miners and small-scale brokers were generally forthcoming with information including from where they were buying the mercury. However, as the field teams attempted to follow the supply chain up stream to the regional and national hubs, it became increasingly difficult to get convincing information about key mercury traders and importers. This was especially the case for the large cities of Nairobi, Dar es Salaam and Kampala. Traders and shops mentioned by people at the ASGM sites, were either continuously unavailable or they denied having anything to do with the mercury business. Therefore, with a few valuable exceptions, our understanding of key mercury traders in the large cities are based on the accounts of actors downstream. For instance, several ASGM miners and suppliers and traders that the teams spoke to mentioned jewelry shops in Dar es Salaam, Kampala and Nairobi as both key gold buyers and mercury suppliers. This information, however, was impossible to verify through direct conversations with this segment.

1.4 Report structure

The report is structured into six main chapters (including the introduction) as follows:

Chapter 1 – Introduction; the Chapter introduces the study including the key objectives, methodology and structure of reports. It also briefly presents impacts of mercury pollution on ecosystem and human health.

Chapter 2 – Legal and Institutional Framework; the Chapter provides the laws and regulations governing mercury import, trade, transport and use before depicting the status of the Minamata Convention in East Africa and briefly discussing the policy-practice gap and the need for aligning some of the mercury-related legislation.

Chapter 3 – Mercury in the ASGM sector in East Africa; the Chapter presents ASGM in Kenya, Tanzania and Uganda and the sector's use of mercury.

Chapter 4 – Regional and domestic mercury trade; the Chapter presents formal and informal mercury import and export in East Africa along with the regional trading routes. The chapter further provides information about mercury prices, quantities, and main actors in the mercury supply chains.

Chapter 5 – Conclusions and recommendations; the Chapter synthesizes the analysis of the results, listing scale and trends, and the recommendations for the way forward.

2 Legal and Institutional Framework

2.1 Laws and regulations on mercury import, trade and transport

In Kenya, Tanzania and Uganda, the policy framework and body of legislation governing the trade, usage and handling of mercury and mercury-added substances is broad based, cutting across the sectors of mining, agriculture, environmental management, natural resources, public and occupational health and safety, and industry. Whereas some of the laws expressly identify mercury as a hazardous substance and mandate regulatory clearance for its import and usage, others provide for mercury-related matters less explicitly.

With regards to the countries' legal controls for mercury importation, the East African Community Customs Management Act (No.1 of 2005) categorizes mercury as a hazardous substance, bounding mercury trade dealers within the region to national statutes on mercury import, distribution and usage. The principal statutes providing for restrictions on mercury import, transit and export are the Kenya Pharmacy and Poisons Act CAP 244 of 2012, the Tanzania Industrial and Consumer Chemicals (Management and Control) Act No. 3 of 2003, and the Uganda National Environment Act of 2019. The statutory scheme, as it stands, does not prohibit the import of mercury but mandates clearance protocols for mercury imports associated with local industries such as ASGM, agriculture and cosmetics.

The Acts and regulations pertaining to the import, export and domestic trade of mercury and mercury-added products, are encapsulated in Table 2-1 below.

Table 2-1: Overview of the policy and legal framework for the importation and domestic trade of mercury and mercury-added products.

Country	Policy/ legal instrument	Purview and relevancy
EAC member states	The East African Community Customs Management Act, No.1 of 2005	Kenya, Tanzania and Uganda are members of the East Africa Community (EAC) – a treaty based regional intergovernmental organization of six Partner States: Burundi, Kenya, Rwanda, South Sudan, Tanzania, and Uganda. One of the integration pillars and critical milestones of the EAC is the Customs Union which has been in force since 2005. Under the Customs Union, the EAC Partner States have agreed to establish free trade on goods and services amongst themselves as well as a Common External Tariff (CET), whereby imports from countries outside the EAC zone are subjected to the same tariff when sold to any EAC Partner State. Part A of the Act's second schedule imposes a general restriction on the importation of mercury such that any import of mercury into the member states' markets is subject to relevant domestic legislation and regulation.
Kenya	Standards Act Cap 496 R.E. 2012.	Pursuant with the Act, any goods imported into Kenya, including chemicals such as mercury, must meet respective standards specified by the Kenya Bureau of Standards, which is nationally responsible for the standardization of the specification of commodities.
Tanzania	The Industrial and Consumer Chemicals (Management and Control) Act No. 3 of 2003	The Act regulates the registration, management and control, importation, production, transportation, dealing, storage, and disposal of chemicals. The Act lists Mercury and mercury compounds as highly hazardous chemicals subject to stringent control measures (sixth schedule of the Act). Chemicals listed in the 8th schedule to the act are those which are severely restricted, banned or those banned by international treaties.

	The Tanzania Food, Drugs and Cosmetics Act, 2003	The Act provides for the safety of food, drugs, medical devices, cosmetics, herbal drug for human consumption and bodily use. It restricts the selling, manufacturing and importation of, amongst other things, medical devices that containing toxic substances such as mercury. The Act is a framework law that generally guides environment protection and management in the country. Has no express provision on mercury but restricts introduction of pollutants, toxic, and hazardous substance to the environment. Under it several regulations have been made to regulate a number of chemicals including mercury.
	The Environment Management Act (EMA) 2004	
Uganda	National Environment Act, 2019	Pursuant to the Act, the designated Minister may, by regulations, prohibit, amongst other activities, the import and export of mercury and mercury-added products after their phase-out dates, except where they are excluded or exempted.
	Uganda National Bureau of Standards Act Cap 237	The Act underlies the establishment of the Uganda National Bureau of Standards (UNBS), whose objectives are to formulate and promote the use of national standards and to develop quality control and quality assurance systems for the enhancement of consumer protection, public health and safety, industrial and commercial development and international trade, among other respects. Section 21(1) of the Act proscribes any person to import, distribute, sell, manufacture or have in possession for sale or distribution any commodity for which a compulsory standard specification has been declared unless such commodity conforms to the compulsory standard. This carries the implication that importation of mercury in Uganda must meet relevant UNBS-prescribed standards, in accord with the law.
	Import Inspection and Clearance Regulation, 2018	This regulation is made under the Uganda National Bureau of Standards Act and supplemented with the Pre-Export Verification of Conformity to Standards Guidelines, 2016. It requires any entity with the intention to import chemicals including mercury to apply for an import clearance certificate and to discharge the requisite fees.

As for legalities concerning mercury usage, the countries' statutes on environmental management, mining, industrial and consumer chemicals, and health and safety address the environmental effects of mercury consumption and exposure rather than the industrial employment of mercury in itself. This framework is, therefore, somewhat limited in that, beyond the implicitness borne by some of the current legal provisions on mercury control, there remains a lack of regulatory vehicles to implement statutory restrictions. The legality of mercury usage in the ASGM sector varies between Kenya, Tanzania, and Uganda.

In Kenya, the Mining Act, 2016 prohibits mercury usage in all mining operations that require mining permits including the ASGM operations. However, the National Environment Management Authority (NEMA) has developed a draft Chemicals Management (Toxic and Hazardous Chemicals and Materials Management) Regulations, 2018 that is awaiting gazettment pursuant to the provisions of sections 97 and 147 of the Environmental management and Coordination Act. The regulations, article 48, that is on banning or restriction of chemicals, states that *“No person shall manufacture, export, import, distribute, store or use restricted chemical or material registered under the Sixth schedule without a valid license from the Authority.”* The Sixth Schedule of the draft regulations lists Mercury as one of the restricted products and activities.

In Tanzania, the Mining Act of 2010 [CAP.123 R.E.2018] is silent on the legality of mercury usage in the ASGM, however it is assumed that the position of the 1998 Mining Act where mercury was legal subject

to the burning of amalgam in retorts still applies. The Industrial and Consumer Chemicals (Management and Control) Regulations, 2015 (made under the Industrial and Consumer Chemicals (Management and Control) Act, 2003) requires that all people using chemicals should be registered and issued with a certificate by the registrar from the Chief Government Chemist Agency and also should create public awareness of the risks of using such chemicals. Moreover, in Tanzania, the Environment Management Act (EMA) 2004, though not categorically, prohibits introduction of toxic, hazardous and pollutants in the environment in the contravention of the Act. The Act makes reference to the application of the Industrial and Consumer Chemicals (Management and Control) Act No. 3 of 2003 as far as matters relating to dealing with various chemicals including mercury.

In Uganda mercury usage in the ASGM sector is neither allowed nor restricted by any laws and regulations. However, recently there have been some initiatives to avert the situation with establishment of the Mining and Minerals Policy of 2018 that calls for the organization and legislation of ASM operations and for the management of occupational health, safety and environment with special attention to mercury use in gold extraction. The Policy also sets out to promote the use of environmentally sound mining exploration, techniques and technology to regulate the use of toxic and hazardous substances. Moreover, there have been local governance initiatives in districts such as Buhweju that have come up with a resolution and ordinance that restricts the use of mercury in ASGM.

A host of policies, acts and regulations apply to the usage, handling and disposal of mercury and mercury-added products within the countries. Those that directly reference mercury are overviewed in Table 2-2 below, while those that indirectly relate to the management of mercury are included in the extended overview presented in Annex A.

Table 2-2: Overview of the policy and legal framework for the usage, handling and disposal of mercury and mercury-added products.

Country	Policy/ instrument	legal	Purview and relevancy
Kenya	Pharmacy and Poisons Act CAP 244 R.E, 2012.		Part I of the Schedule of the Act identifies mercury as a poisonous substance and reserves its usage to entities granted legal authorization for this purpose. With regards to its application in mining, Section 28 of the Act provides that "A person carrying on a regular business in mining, agricultural or horticultural accessories may apply to the Board in writing on the prescribed form for a license to deal in poisons and any such license, if granted, shall authorize the licensee to sell only the poisons specified therein, to persons who require them for a trade or business of mining, agriculture or horticulture". By implication, ASGM operators and wholesale mercury suppliers within ASGM value chains can practice the distribution and usage of mercury provided they solicit and qualify for a license to do so.
		Mining Act, 2016	As a principle Act governing Kenya's mining sector, the Mining Act obliges actors involved in mining activities to environmental compliance with the provisions of the country's environmental legislation. Section 140 of the Act prohibits the use of mercury in ASGM, stating "The holder of a mining permit shall not use such equipment as may be prescribed in Regulations or chemicals such as cyanide and mercury".
Tanzania	National Mineral Policy, 2009		The National Mineral Policy serves to promote the sustainable utilization and development of the country's mineral resources, by formalizing the mining sector, amongst other means. One of the policy objectives is to promote best practices for health, safety and environmental management in mining areas. In this respect, the Policy directs that the Government seek to ramp up monitoring and enforcement for the protection of the environment and public health from risks borne by mining

Country	Policy/ instrument	legal	Purview and relevancy
	The Water Resource Management Act, 2009		activities, and to raise environmental awareness and promote environmentally friendly technology, particularly for ASGM. The Water Resource Management Act provides for the sustainable management of water resources in furtherance of the National Water Policy. With regards to mining activities and associated pollution, the Act provides that any discharge of effluent into surface water or underground strata is subject to prior permitting by the relevant Basin Water Board. It also prohibits the conduct of anthropogenic activities, including mining operations, within 60 meters of a surface or ground water source.
	Mining Act Cap. 123 [R.E. 2018]		The Mining Act provides for the management and administration of all activities falling within the mining sector. With regards to ASGM and mercury consumption, the Act mandates the following: <ul style="list-style-type: none"> • formalization of ASGM miners (majority of whom are mercury users) through the issuance of Primary Mining Licenses (PMLs); • designation of areas for undertaking ASGM activities; • preparation of an Environmental Protection Plan (EPP) as a pre-requisite for entitlement to a PML; • Oversight of compliance and enforcement of laws including environmental and safety issues by the Mining Commission.
	The Mining (Environmental Protection for Small Scale Gold Mining) Regulations, GN. 14 of 2010		Aimed at guiding ASGM actors towards compliance with environmental obligations under the Mining Act and other sector laws, the Regulations: <ul style="list-style-type: none"> • Proscribe environmental pollution involving land, water and air; • Prohibit the use and mercury without retort • Prescribe a buffer zone of 50 meters between mining sites and water sources.
	The Standards Act No.2 2009		The Act mandates Tanzania Bureau of Standards (TBS) to ensure the health, safety, environment and general welfare of the people of Tanzania by setting quality and safety standards for locally available commodities. In this capacity, TBS has established a code of conduct for the management of mercury in small-scale gold mining and refining, which emphasizes environment and health safeguards such as the use of retorts, isolation of tailings and the adoption of environmentally superior technology.
Uganda	National Environment Act, 2019		The National Environment Act (2019) is Uganda's principal statute concerning matters pertaining to environmental management. Beyond its provisions on general pollution prevention and response, Section 74 of the Act provides for the management of products containing mercury, lead, cyanide, arsenic and polonium, mandating that the National Environmental Management Authority (NEMA) to establish criteria, in consultation with respective competent authorities, for the following: <p>(a) The management of mercury or mercury compounds, lead, cyanide, arsenic and polonium in manufacturing or mining processes;</p> <p>(b) The management of products containing mercury, lead, cyanide, arsenic and polonium; and</p> <p>(c) The provision of alternatives to products containing mercury, lead, cyanide, arsenic and polonium.</p> <p>Pursuant to the Act, the Minister may, by regulations, prohibit (inter alia) the manufacture and use of mercury, lead, cyanide, arsenic and polonium added products after their phase-out dates, except where they are excluded or exempted.</p> <p>These provisions constitute most of what is accounted the country's legal basis for the control of mercury and mercury-containing substances.</p>

2.2 Status of the Minamata Convention

Kenya, Tanzania and Uganda are all signatories to the Minamata Convention and are currently in the process of preparing the National Action Plans (NAPs) as a stepping stone in minimizing the use of mercury in ASGM.⁸

2.2.1 Kenya

Kenya is a signatory to the Minamata Convention (Signed 10 October 2013) but is yet to ratify. The country is in the process of preparing a NAP for ASGM, as per the provisions of article 7 and annex C of the convention, and a draft NAP is in place. Among the required elements of the NAP are strategies for managing trade and prevention of diversion of mercury from foreign or domestic sources.

2.2.2 Tanzania

Tanzania signed the Minamata Convention on 10 October 2013 and on 10 September 2019 it was approved in parliament, moving towards ratification. The country is also preparing a NAP for minimizing mercury usage in ASGM, with a draft having been prepared.

2.2.3 Uganda

Uganda signed the Minamata Convention on 10 October 2013 and deposited their instruments of ratification on 1 March 2019 and has prepared a draft NAP with the general objective being to reduce or eliminate mercury access and use, as well as the releases and emissions of mercury to the environment by ASGM to protect human health and the environment. Among other objectives, the country aims at reducing mercury emissions, releases and risks of exposure to mercury by the ASGM sector by 70% by 2024; and providing an alternative and substitute for mercury use in the sector by 2030.

2.3 Policy-practice gap

Overall, the developments in the policy environment and legal frameworks on the trade and management of mercury within the countries have been progressive. The growing legal emphasis on mercury control is nonetheless challenged by the need to bridge the policy-practice gap that has emerged due to the constrained resources to enforce the legislation. The lagging adoption of retorts in Tanzania is a lucid example of the implementation gap. In the mining regulations of 1999, miners were instructed to use retorts when burning amalgams in order to reduce ASGM actors' exposure to mercury vapor during gold extraction. Despite the instructions, the majority of miners did and do not use retorts despite their ability to recycle more than 75% of the mercury while protecting people and the environment from the vapors.

Moreover, the countries' efforts towards the realization of their respective Minamata Convention commitments would benefit from a concerted approach to intensifying the legal focus on the control of mercury. That is to say, increased regulatory performance on the national objectives for mercury restriction and/or phase out would in turn require streamlined institutional arrangements to convey governing laws and regulations, as well as a more consolidated set of guidelines to replace the sector-specific guidelines that have thus far proven toothless.

⁸ UNEP, Minamata Convention on Mercury website, 2019.

3 Mercury in the artisanal and small-scale gold mining sector in East Africa

3.1 Artisanal and small-scale gold mining in East Africa

ASGM is prominent throughout East Africa. While the sub-sector has played a prominent role in Tanzania for decades, it is rapidly growing in both Kenya and Uganda, involving increasing number of people. ASGM plays a vital role in the livelihoods of hundreds of thousands of men and women directly and an even larger number indirectly. In East Africa, women may make up anywhere from 25-45 percent of the workforce.⁹ Table 3-1 presents the history, legal framework and number of ASGM miners in Kenya, Tanzania and Uganda.

Table 3-1: Country overview of ASGM in East Africa.

Kenya	<p>History and locations: Kenya's ASGM sector has existed since the 1920s, following establishment of gold mining activities in areas such as Macalder, Osiri, Mikei, Masara, Kitere and Lolgorien. However, the past decade has seen an increase in the number of people engaging in the sector, many experimenting with livelihoods outside the agricultural sector. Currently, ASGM is active in areas of Migori, Kilimapesa, Rosterman, Turkana, Siaya, Vihiga, Kisumu and West Pokot.</p> <p>Legal framework: The Kenya Mining Act (2016) has made room for legalization and formalization of ASGM, with all existing ASGM activities having to apply for mining permits. The Act distinguishes between artisanal mining and small-scale mining. The former is defined as traditional and customary mining operations where permits are obtained through the county mining boards, which then recommend to the headquarter for issuance of the permit. Small-scale mining operations must apply directly through the cadastral system. The ASGM sector is legally entitled to receive advice, training facilities and assistance necessary for effective and efficient artisanal mining operations from the county representative of the Director of Mines. The Mining Act establishes various criteria to determine who is qualified to engage in artisanal mining. Thus, a permit for artisanal mining operation, that is granted for a period of three years and is subject to renewal, is only granted to Kenyan citizens who are at least 18 years and who are members of an artisanal mining corporative association or group.</p> <p>Size: While 800,000 people are dependent to the ASM sector, it is estimated that over 140,000 people are directly employed in the sector, with 40,000 being from ASGM.¹⁰</p>
Tanzania	<p>History and locations: Mining of gold began in Tanzania in Geita during the 1890s by German interests. What can be referred to ASGM dates as far back as 1909, when gold mining started at Ngasamo and Sekenke mines in Iramba, Singida, followed by Mwanza, and Musoma. After the end of the German colonial period, under the British authority, discoveries of gold in the country continued. These discoveries attracted thousands of people from Tanzania, neighboring countries as well as from overseas, notably with the 1922 Lupa gold rush. ASGM activities expanded dramatically during the 1980s and 1990s following multiple gold discoveries throughout the Lake Vitoria Gold Fields.¹¹</p> <p>Legal framework: The ASGM legal framework started in the late 1970s when the 1979 Mining Act paved the way to small scale miners to obtain mining permits in areas designated for mineral prospecting that did not require large investments. The Mining Act of 1979 was the most comprehensive post-independence mining law to be enacted by the government. It sought to guide and regulate mining activities. Like the colonial laws, it also placed all mineral resources and property rights under the control of the State. In 1998, ASM gained more legal status following the establishment of the Mining Act of 1998 that required a person to obtain a Primary Mining License (PML) from the commissioner for minerals. However, it is a common</p>

⁹ The World Bank & Gender Action Plan, 2012: Gender Dimensions of Artisanal and Small-Scale Mining, 7.

¹⁰ Alliance for Responsible Mining (ARM) and PACT, 2018. Economic Contributions of Artisanal and Small-Scale Mining in Kenya: Gold and Gemstones.

¹¹ Chachage, C. S. L. 1995. The Meek Shall Inherit the Earth but not the Mining Rights. The Mining Industry and Accumulation in Tanzania. In: GIBBON, P. (ed.) Liberalised Development in Tanzania. Uppsala, Sweden: Nordiska Afrikainstitutet.

	<p>tendency for most PML owners to informally sub-lease mining rights to un-registered ASGM miners (pit holders) in exchange for a share of outputs. Due to increasing public outcry on the poor state of affairs in the mining sector, especially the very beneficial conditions for large-scale mining companies, the government enacted the Mining Act of 2010 as amended in 2018, which is the current law governing the mining sector. Today, only Tanzanian citizens above 18 years can apply for a PML and they are required to conduct an EPP.</p> <p>Size: The Tanzanian ASGM sector is significant, though quoted numbers seem to vary a lot, with most quoted numbers lying between 500,000 and one million directly involved in ASGM, with a much larger number benefiting indirectly from the sector.^{12, 13}</p>
<p>Uganda</p>	<p>History and locations: ASGM activities firstly started during the colonial period between the 1920s and 1950s in the South-Western parts of the country, before spreading to other areas of Kigezi, Karamoja, Mubende, Kisoga and Buhweju. The civil instabilities in the 1970s led to the closure of formal mines and retrenchment of workers in the mining sector. This contributed to the increase of ASM miners in the country following high unemployment rates. The first gold rush in the mid-1980s led to a dramatic increase in the number people involved in ASGM. This trend has continued up till today, e.g. with gold rushes around 2013 at various locations in Uganda, e.g. Mubende.¹⁴</p> <p>Legal framework: Through the Mining Act (2003), ASM activities are formalized and regulated under the Location License that offers prospecting, mining, and trade rights to ASM operators. The legal framework regulating ASGM activities in the country include: The Mineral Policy of Uganda (2000), the Mining Act, (2003) and the Mining Regulations (Amended), 2011. Also, the ministry responsible for mining considers ASM as one of the priority areas that require reforms hence a Mining Policy 2018 (draft) has been drafted, which among others aims at organizing and formalizing ASM in Uganda.</p> <p>Size: In 2008, a total of 20,000 ASM miners engaged in gold mining, a number that grew to 31,622 miners in 2017 mainly due to the rising gold prices, high population increase and prolonged drought. The number of people indirectly involved in the sector is significantly higher.¹⁵</p>

3.2 Use of mercury in artisanal and small-scale gold mining in East Africa

There are accounts of mercury usage in East Africa as far back as the colonial period. Accounts from the gold rush in the Lupa Gold Fields in Chunya District in Tanzania mention the use of mercury as early as in the 1920s.¹⁶ For Uganda, mercury was used as early as 1932 by the British who discovered gold in Tiira Sub County in Busia District.

Today mercury is widely used by ASGM operators throughout East Africa, predominantly in hard rock mining, but also in alluvial mining, though there are areas with alluvial mining where the gold grains are fairly large and no or very little mercury is used. While methods differ between sites and operations, the dominant method throughout the region is that of concentrate amalgamation.¹⁷ In this method, the gold bearing ore or sediments are first crushed and grinded into fine particles, followed by a concentration, typically through gravity on hand-fed sluices, where only the heavy particles (including the gold) is accumulated in a basin or pan. At this stage mercury is added to and mixed with the concentrate. When

¹² World Bank. International Development Association Project Paper on a proposed Additional Credit to the United Republic of Tanzania for the Sustainable Management of Mineral Resources Project (Report No: PAD 1177, World Bank). 2015.

¹³ Kinyondo, A., & Huggins, C. (2019). Resource nationalism in Tanzania: Implications for artisanal and small-scale mining. *The Extractive Industries and Society*, 6(1), 181-189.

¹⁴ ACEMP, 2017, Understanding Artisanal and Small-Scale Mining in Uganda.



















¹⁵ ACEMP, 2019, The National Overview of the Artisanal and Small-scale Gold Mining (ASGM) Sector, including Baseline Estimates of Mercury Use and Practices.

¹⁶ AGENDA et al., (2013). ASGM sites: Matundasi and Makongolosi mining areas in Tanzania. In IPEN Mercury-Free Campaign Report.

¹⁷ The more harmful method of whole-ore amalgamation, known from Asia and South America, is fortunately very rare in East Africa.

mercury comes into contact with gold-ore mixed with water, it eventually forms an amalgam, which is recovered from the pan. Subsequently the amalgam is heated resulting in the mercury evaporating, leaving a piece of gold often referred to as sponge gold due to its appearance (See the photo series in Table 3-2 for a visual overview).

Table 3-2: Stages in ASGM gold extraction.

<p>Stage 1: Extracting gold-bearing ore</p>			
<p>Stage 2: Crushing of the ore</p>			
<p>Stage 3: Concentration of the ore</p>			
<p>Stage 4: Amalgamation</p>			
<p>Stage 5: The amalgam</p>			
<p>Stage 6: Burning of amalgam</p>			



Commonly, mercury captures less than half of the gold in the ore. Nevertheless, it is preferred by most miners as it is easy and quick to use, can be done on an individual level, and is perceived as cheaper than alternative methods. While there have been several initiatives to reduce mercury usage in East Africa, notably the Global Mercury Project around 2006-2008, a very limited number of people use retorts, a device that captures 75-95% of mercury for reuse, or other mercury-reducing methods and mercury is still widely used and available throughout the region's ASGM sites. For instance, a study by IPIS (2018), estimated that 98 % of all ASGM operators use mercury.¹⁸ During the past 15 years, hundreds of cyanidation leaching plants have been established throughout the region, starting in Tanzania, but later spreading to Uganda and Kenya. Most orebody entering the leaching plants have initially been amalgamated. The complexing of mercury with cyanide increases the likeliness for the mercury to become water-soluble resulting in significant release of highly toxic and mobile mercury into water bodies. It is, however, assumed that the proliferation of leaching plants have had some reducing effect on the mercury usage.¹⁹ The estimated mercury consumption for Kenya, Tanzania and Uganda are presented in Table 3-3 below.

Table 3-3: Mercury use in ASGM in East Africa per year.

Country	Estimated mercury usage in tons ²⁰		
	Minimum	Average	Maximum
Kenya	1	3.5	6
Tanzania	20	35	50
Uganda	2	4	6

3.3 Knowledge of mercury among artisanal and small-scale gold miners

Observers working on mercury usage within ASGM seem to have contrasting opinions on miners' understanding of the health and environmental risks associated with mercury use. One opinion is that people within ASGM are unaware of the risks associated with mercury and use the substance unknowingly. Another belief is that most people working within ASGM are aware of the hazards and either choose to run a calculated risk or mitigate this risk by burning the amalgam in open air (as opposed to indoors, which used to happen in the past to keep gold quantities secret) and positioning themselves away from the wind direction. Based on our knowledge and experience, we assume the reality to be somewhere in-between the two positions, with some old-time miners having received training and other types of sensitization at one or more occasions, while newcomers to the mining areas are unaware of the dangers associated with mercury. Clearly, various types of engagement initiatives, i.e. trainings, posters, pamphlets, demonstrations of safer extraction methods etc. all have some impacts on miners' attitude and behavior. However, at the end of the day, most still choose to continue using mercury in lack of an

¹⁸ IPIS. (2018). Mapping artisanal and small-scale mining in northwest Tanzania: A survey on its nature, scope and impact. In H. Merket. Mwanza.

¹⁹ The governance and safety around the leaching plans is a topic that clearly needs further research.

²⁰ According to UN Environment, 2017.

attractive alternative. There are many examples where communities have received extensive sensitization on mercury including the introduction of mercury-reducing devices such as retorts and subsequently have continued extracting gold with mercury.²¹ A contributing factor may be that once these initiatives ended, there was a lack of an effective and resourceful extension service to follow up and engage to ensure the consistency of the introduced mercury reducing extraction practices. Moreover, in the livelihoods of miners, there are numerous risks including mine accidents, illnesses, noise levels, dust exposure, conflicts over land and minerals etc. Hazards from working with mercury may be perceived as low on the list of daily encountered challenges by the majority of miners.

²¹ Jønsson, J. B., Charles, E., and Kalvig, P. 2013: Toxic mercury versus appropriate technology: Artisanal gold miners' retort aversion. *Resources Policy* 38(1): 60-67.

4 Regional and domestic mercury trade

4.1 Formal and informal mercury import and export

Data on formal mercury trade to East Africa is based on national statistics officially reported to the UN Comtrade²² and Trade Map.²³ Most of the formal mercury importation into East Africa has been for industrial use by chemicals companies mostly located in the big cities of Nairobi and Mombasa in Kenya, Dar es Salaam in Tanzania and Kampala in Uganda. A total of 31 companies in the region have reported to officially import mercury, with 16 of them being from Kenya, 9 from Tanzania and 6 from Uganda. However, when the field teams attempted contacting the companies, most of the provided companies' contact information was non-responsive. For the ones that were reached, none of the companies admitted having imported or engaging in the mercury trade except for one company that claimed to have stopped importing mercury in 2014. The informal import and export data is based on information from actors in the mercury supply chain, collected mainly by field researchers.

This indicates that most of the mercury used by ASGM follows the informal channels, hinging on multiple cross-border routes with intricate supply networks serving ASGM sites around the region. Due to this informality, it is difficult to get actual figures on the mercury trade. The trade operates in secrecy and is controlled by gold dealers and mercury suppliers since they have financial capital and connections to the mercury supply chain outside the region. At lower levels, it is primarily controlled by local gold dealers, mine pit holders and owners of gold concentration and extraction operations.

Table 4-1 presents official annual statistics on formal mercury importation for East Africa from 2011 to 2018. The import differs between countries and fluctuates significantly throughout the years. For instance, in 2011 Kenya imported mercury 20 times higher than Tanzania and 265 times higher than Uganda. In 2016, when all countries last reported importation, Kenya imported 5 times more than Tanzania and 945 times higher than Uganda. For the past 8 years, Kenya imported an average of 19,070 kgs, which is 6 times higher than Tanzania, which imported an average of 2,821 kgs and 155 times higher than Uganda that imported an average of 123 kgs. Kenya's official import is significantly more than the demand of its ASGM sector, while the import for Tanzania and Uganda are significantly lower than actual needs. Also, it is very questionable if Kenya need this high tonnage for industrial use. Therefore, it is assumed that a lot of Kenya's officially imported mercury ends up with ASGM in Kenya, Tanzania and Uganda. Generally, the statistics show a slight decrease in the amount imported from 2015 onwards when compared to previous years.

²² A repository of official international trade statistics by the United Nations, department of economic and social affairs.

²³ A database of the International Trade Centre (ITC), which is a joint agency of the World Trade Organization and the United Nations dedicated to supporting the internationalization of small and medium-sized enterprises (SMEs).

Table 4-1: Formal mercury importation by Kenya, Tanzania and Uganda expressed in Kgs.

Country	2011	2012	2013	2014	2015	2016	2017	2018	Top 3 exporters
Kenya	26,489	19,339	25,774	13,615	19,049	15,123	14,104	-	Germany, Mexico and USA
Tanzania	1,312	2,171	4,344	7,382	1,203	3,001	2,522	640	The Netherlands, ²⁴ China ²⁵ and Switzerland
Uganda	100	452	4	128	155	16	-	6	India, Malaysia and UK

Source: ITC Calculations²⁶

It should be noticed that obtaining reliable data on international mercury trade is challenging. At the international levels, there are discrepancies between the data reported to Trade Map and the data reported to UN Comtrade. Moreover, statistics reported to both organizations show discrepancies in the data on import/export reported by different countries. As shown in the table in Annex B on data on import statistics as recorded by Kenya, Tanzania and Uganda and export statistics as recorded by other countries from 2009 to 2018, Kenya reported to import mercury from Mexico (10,708 kgs), Panama (342 kgs), India (1,193 kgs), Vietnam (862 kgs) and Turkey (4,313 kgs) in 2018, but only Mexico and India reported exporting 10,766 and 7,763 kgs of mercury respectively to Kenya in that year. Similar cases are observed for Tanzania and Uganda throughout the years. This could be due to mercury export bans in the EU and US thus the exporters intentionally do not report mercury exports, or due to incorrect/ incomplete trade data reported to the organizations by different countries.

In Kenya, official mercury import data from Trade Map show that the country imported an average of 19,070 kgs of mercury between 2011 and 2018 with major exporters being Germany, Mexico and United States of America.²⁷ Data from Kenya Revenue Authority (KRA) and interviews with mercury dealers show that mercury that is imported into the country is mainly for industrial and medical use. For the industrial use, mercury is imported in the form of mercury metal or elemental mercury, while Mercury II Chloride is imported for laboratory use. Import data from the Customs department show that industrial mercury is imported mainly in metallic cylindrical flasks with capacities of 34.5 kgs, or in plastic bottles of 1 kg.

In Tanzania, official importation statistics for the past eight years show that the country has imported an average of 2,821 kgs, with The Netherlands, China and Switzerland being the major exporters. Given that non-extractive consumption accounts for the majority of the inventoried imports, the stable availability of mercury within the local ASGM sector is suggestive of a prevailing informal market.

In Uganda, there is a general challenge of data on formal mercury import in various Ministries, Departments and Agencies (MDAs), including the Ministry of Trade, Industry and Cooperatives. Data from the Uganda Bureau of Statistics shows that from 2016 to 2018, 15,493 kgs were imported. According to URA, eight consignments of mercury totaling 615 kgs formally entered the country between January 2013

²⁴ Tanzania last reported importation in 2014, probably due to the EU ban in 2011. The International Trade Centre stated that mercury was imported from EU countries, which would be illegal due to the export bans. In the UN Environment 2017 report “Global mercury supply, trade and demand” it is explained that when mercury in transit is repackaged at an EU port, the good can be assigned an EU origin at its final destination.

²⁵ Tanzania last reported importation in 2014.

²⁶ ITC calculations based on Kenya National Bureau of Statistics since January 2011 and until January 2018; Tanzania National Bureau of Statistics (NBS) since January 2017; Uganda Bureau of Statistics (UBOS) statistics since January, 2012 and until January, 2016 and UN COMTRADE statistics since January 2011.

²⁷ ITC, 2019.

and February 2016, mostly from Kenya.²⁸ However, informal in-country mercury trade flows have become increasingly evident as the numbers from the NEMA Baseline Survey Report (2018)²⁹ does not match the figures at the national institutions. Interviews with the URA indicated that South Africa and Kenya (through Eldoret or Kisumu) are the main source countries, with Malaysia also emerging as a major supplier in recent years.

For export statistics, Tanzania and Uganda show no records while Kenya has exported a total of 32,292 kgs of mercury for a period of 10 years from 2009 to 2018, with DRC, Tanzania and Uganda being the major partners. However, since 2014 Kenya did not record any export to Tanzania, and it recorded export in 2017 to Uganda after its last export in 2012.

Table 4-2 presents official Kenyan mercury export from 2009 to 2018.

Table 4-2: Formal mercury exportation by Kenya in Kgs.

Importers	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Uganda	104	344	-	1	-	-	-	-	690	-
Tanzania	1896	448	4905	1473	-	50	-	-	-	-
DRC	3799	4093	4208	2403	-	3658	278	967	-	-
Seychelles	-	370	-	-	-	-	-	-	-	-
Total	5799	5255	9320	3877	-	3708	278	1467	759	1829

Source: ITC Calculations and UN Comtrade

4.2 Regional and domestic trading routes

The mercury trade follows a multi-directional flow, making it difficult to perfectly identify its network(s). Given this nature, dealers in Kenya, Tanzania and Uganda could potentially import to or export mercury from each other across the borders depending on where the supply is stable, and the price favourable. Moreover, there could be situations where two mercury suppliers pass each other on the way, one on the way from Kenya to Uganda, the other on the way from Uganda to Kenya. As such, we categorize mercury trade routes into primary and secondary flows. A trade route is categorized as a primary flow when mercury comes from a big mercury hub to different areas. The account of mercury trading route going in the opposite direction is categorized as a secondary flow. An example is when mercury enters Kenya from Uganda via the Busia border or other porous border posts from Tanzania to ASGM sites in Kenya. Such flows are influenced by various factors including mercury availability, price and knowledge of the trade.

Apart from the direct import routes, mercury also reaches ASGM sites from indirect sources. Several interviewees mentioned the below as common sources that from time to time supply mercury for the ASGM sector:

- Individuals working in hospitals (a hospital in Mwanza, Tanzania was mentioned by several interviewees);
- Individuals working in medical laboratories and pharmacies;
- Licensed shops selling other mining chemicals; and
- Individuals working within military camps (a camp in Morogoro was mentioned by several interviewees).

²⁸ ACEMP/, 2019, The National Overview of the Artisanal and Small-scale Gold Mining (ASGM) Sector, including Baseline Estimates of Mercury Use and Practices.

²⁹ ACEMP/, 2019, The National Overview of the Artisanal and Small-scale Gold Mining (ASGM) Sector, including Baseline Estimates of Mercury Use and Practices.

In Kenya, mercury is formally imported into the country for industrial uses, most through the port of Mombasa. However, it is assumed that large quantities of this mercury ends up being diverted to the Kenyan ASGM sites as well as neighbouring countries of Tanzania through Sirari and Namanga borders and Uganda through Busia and Malaba borders through the primary flow (it may also go as far as to DRC, Burundi and South Sudan). However, there are cases of secondary flows and a principle instance is that from Migori in Kenya where ASGM miners prefer what they consider to be elemental mercury from across the border in Tanzania, which they perceive as more effective for gold extraction compared to the one sourced from shops and suppliers in Kenya.

Since the use of mercury in ASGM in Kenya is prohibited by The Mining Act,³⁰ the mercury trade flow into ASGM is likely originating from the legally imported mercury and, potentially, mercury smuggled into the country, that is diverted to ASGM and the informal networks across the border and within the country. These informal networks are supported by phone communications and face-to-face meeting with fellow gold/mercury dealers. Interviews with miners and mercury dealers at the mining sites indicate that the mercury used in ASGM is sourced from chemical shops in Nairobi, which points to the connection between the formal imports into the country and diversion to the ASGM sector.

In Tanzania, three main informal import routes were identified. These are the Northern, Southern and Eastern primary flows as presented below.

For the Northern primary flow, the majority of interviewees say mercury is imported from Kenya, where it comes from Mombasa, in most cases then passes through Nairobi, where it is sold to Tanzanian and Kenyan business people, many of whom are gold traders. They bring it to Tanzania, predominantly via the Sirari border (but sometimes through the Namanga border post) and on to the main towns of the Lake Victoria Gold Fields, in particular Mwanza, Geita, and Kahama. From these towns, it is then distributed to ASGM sites in the regions of Mwanza, Shinyanga, Geita, Mara, Tabora, Kagera, Kigoma, Singida and Simiyu. This route is thought to be the main import route of mercury into the country given the fact that most ASGM activities are concentrated in the Lake Victoria Gold Fields (however, there are situations where mercury follows the secondary flow hence sourced from Katavi and Mbeya regions to the Lake Victoria Gold Fields).

For the Southern primary flow, according to most of the sources, mercury is imported from Malawi and especially Zambia, though it is likely that it enters the continent in South Africa (where it is a legal trade), from where it moves through Zimbabwe and on through Malawi and Zambia to Tanzania via the Tunduma (for the Tanzania-Zambia border) or Songwe-Kasumulu (for the Tanzania-Malawi border). Once the mercury enters Tunduma or Songwe-Kasumulu, it is taken to Mbeya City where there are suppliers (gold buyers and dealers) that supply to ASGM sites in the districts of Mbarali and Chunya in Mbeya Region and Mpanda in Katavi Region through the primary flow (or from Mpanda to Chunya through the secondary flow).

For the Eastern primary flow, mercury reaches Tanzania through the port of Dar es Salaam. This mercury both goes to Mbeya for distribution in the Southern route and to the Lake Victoria Gold Fields, but also many of the minor ASGM sites in regions like Tanga, Lindi, Morogoro, Arusha, Njombe, Ruvuma and Dodoma. In an interview with a person who used to work for a Chinese mining equipment company, the interviewee stated:

³⁰ Government of the Republic of Kenya. (2016). The Mining Act, 2016. Nairobi, Kenya: GOVERNMENT PRINTER.

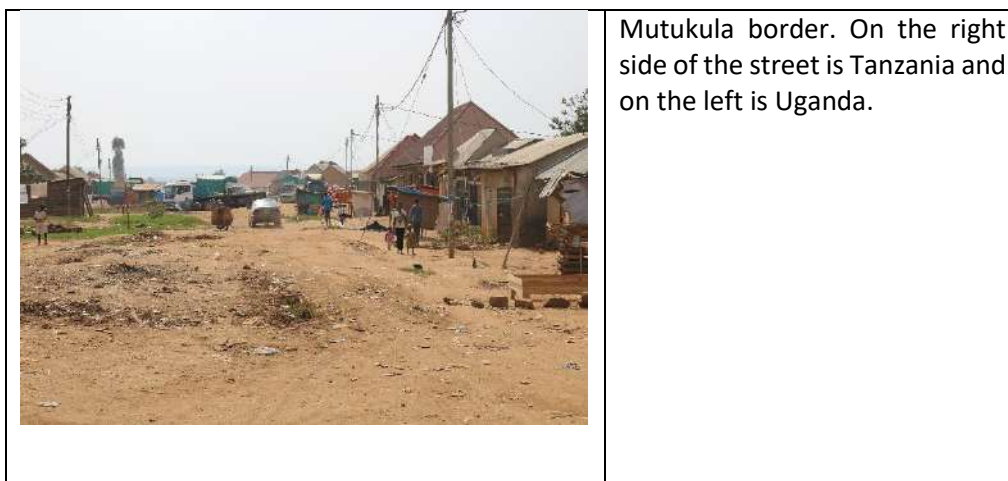
"Previously my workmates used to import mercury covertly amongst other mining chemicals and equipment that the company imported from China. They would then sell it to ASGM operations and gold dealers. They had developed some sort of informal business partnership with ASGM miners that the company management was not aware of." (Interview, 13 June 2019, Dar es Salaam).

In Uganda, ASGM miners believe that the mercury smuggled into the country mainly follow a primary flow, originating from China and Malaysia,³¹ then it enters Kenya through the Mombasa port before getting into the country via Busia³² and Karamoja, then spreading out to ASGM sites throughout the country, often passing Kampala on the way. From an interview with a small-scale mercury seller and the wife of a large mercury dealer in Buhweju, it was noted:

"Mercury traders in Buhweju get mercury from Busia and they sell it in small quantities equivalent to 10 grams or less. Most of the gold traders in Buhweju sell mercury in the ASGM sites, though there are also mercury suppliers who do not engage in gold buying. My husband gets mercury from Busia and transports it all the way to Buhweju. The packaging of the mercury is in containers of 10 kgs and he brings as many containers as possible, depending on his ability to buy." (Interview, 9 May 2019, Buhweju).




Consultations on domestic trading routes were carried out in Kampala and at Busia and Mutukula Borders (Table 4-3). At Busia, the customs enforcement office mentioned that the border between Malaba and Namayingo is porous with over fifty informal routes, which are too hard to monitor due to low manpower and as most of the officers have never seen mercury and therefore cannot easily identify the substance. Moreover, the mercury smugglers at the borders also have informants who monitor the movements of the police and URA officials.

Table 4-3: Mercury smuggling along the Uganda border.



³¹ According to ITC 2019, statistics on formal mercury importation into the country show that mercury is mainly imported from India, Malaysia and UK.

³² There are many porous routes at the border, the main one is Sofia village border.

	<p>A porous route along the Uganda-Kenya border line in Busia.</p>
	<p>One of the more common ways to smuggle mercury across the Kenya-Uganda border.</p>
	<p>One of the more common ways to smuggle mercury across the Kenya-Uganda border.</p>

According to customs officials and ASGM informants, the mercury trade along the Uganda-DRC Border and Uganda-Kenya Border is higher than that at the Uganda-Tanzania border, most likely because most mercury enters Tanzania from Kenya. Moreover, it is hard to intercept the mercury flows from Uganda to and from DRC and Kenya as there are several routes that can be used, for example Busia-Jinja-Kampala-Mbarara-Kisero and Busia-Tororo-Lira, also due to means of transport used. For instance, mercury is transported in public busses that make their routes from Nairobi to Busia, then picked by motorbikes, bicycles or people on foot across the border. However, the transportation and smuggling are kept very secretive. In early September 2019, there was a case of a youth caught smuggling 16 kgs of mercury across the border who had no identification and when asked his name, he gave a Muslim name, yet sources say he is Christian. He would also not mention where the mercury was going, where it was from or who had ordered it. These are some of the precautions that are taken during the trade. Figure 4-1 shows flows of mercury in East Africa, from when it reaches the region.

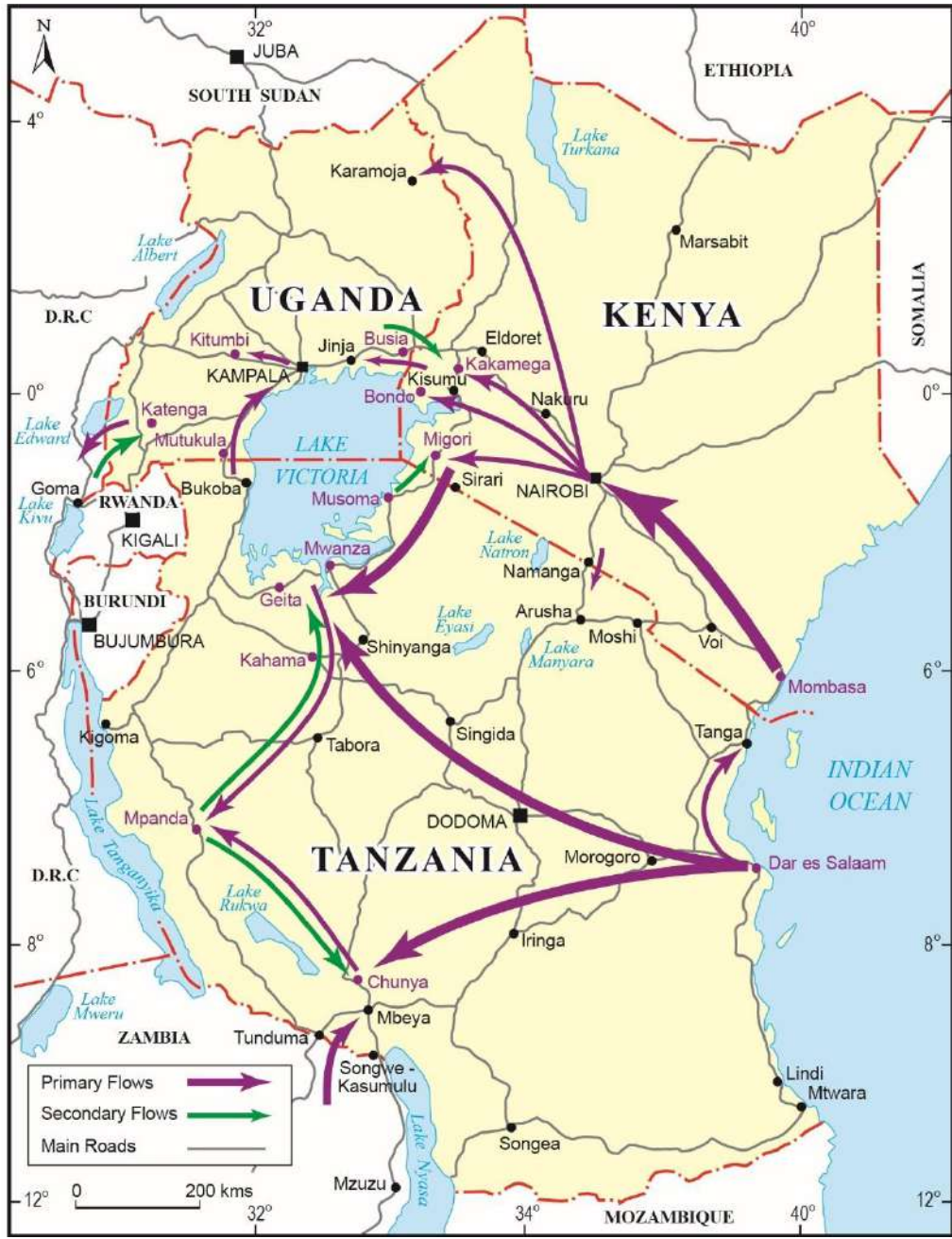


Figure 4-1: Mercury routes in East Africa.

4.3 Main actors: companies and people

Despite the mercury trade being very secretive and mercury suppliers typically only selling it to familiar buyers, most miners have access to mercury. This is due to among others the diversity of actors and sources of mercury that make it readily available in all ASGM sites across the region where it is needed. The mercury supply chain survives on trust that is built on several encounters among actors during the trade. New actors can also join the network through links that are carefully sought and made through established actors. Moreover, there is a relationship between the gold value chain and mercury supply

chain as most ASGM operators receive mercury on credit from gold dealers and the recipient settles the debt upon selling gold. However, there are also many non-gold actors in the mercury supply chain.

Actors in the mercury supply chain operate at upstream and downstream levels. The upstream level consists mainly of the formal dealers who are licensed to import mercury in bulk for industrial, medical, or other uses; and large-scale informal mercury importers and gold smiths who illegally import mercury into the region. Most actors in this level live and do business in capital cities within the region.

The downstream level consists of local wholesale and retail mercury dealers who get mercury from actors from upstream. They have a formed network with ASGM miners and gold brokers/dealers locally and may be living and doing business in capital cities within the region and have their agents in towns near ASGM sites. In most cases, these agents do not own the mercury but sell it on behalf of upstream dealers or fellow downstream dealers and receive a commission out of the quantity of mercury they succeed to sell. The agents obtain the mercury packaged in smaller proportions of 1 kg (often packaged in 75ml plastic bottles meant for medicinal syrup) in suitcases or bags so as to avoid any suspicion from law enforcers and sell it to ASGM miners or to gold brokers who also sell mercury at the mining sites to gold processors. The regular presence of gold brokers at the mining sites makes it easy for the gold processors to approach them to buy mercury.

Generally, the main actors in the mercury value chain include mercury dealers, mining pit owners, jewellery shop owners, gold dealers, transporters and ASGM miners who are the main users of mercury.

- Mercury dealers: These consist of foreign and local mercury dealers and these import the mercury from different countries into the region. The local mercury dealers act as intermediaries and suppliers to both the ASGM miners directly and to other interested stakeholders. They make the order to the big dealers and the quantity of the order made depends on the orders the wholesaler receive from different mining sites and retailers. The wholesaler then sells to a close-by retailer who will then sell to different mining sites.
- Mining pit owners: Have available capital as most of them own elusion plants and gold refinery machines in mining areas, thence can create a mercury trade network to facilitate ASGM miners to obtain more gold to increase profits from the mining pits.
- Jewellery shop owners: Have refinery machines and supply mercury to ASGM miners.
- Gold smiths and dealers: Control the mercury trade and are often the key importers of mercury because they have the capital and connections outside the country. They also supply mercury to local mercury suppliers and directly to the ASGM miners. In an interview in the Southern Highlands region of Tanzania, the interviewee who is a gold dealer, miner and among the most trusted suppliers of mercury for over ten years, said that most ASGM miners sell their gold to gold dealers, who then sell them mercury in return. The gold dealers have contact with mercury suppliers locally and internationally and they are more trusted by the suppliers compared to ASGM miners. The interviewee went further to say that previously almost all gold dealers (of Asian origin) in Dar es Salaam were supplying mercury directly to ASGM miners who sold gold to them, but this has changed due to more involvement of ASGM miners who became dishonest as they could receive mercury in advance but side sell the gold to other gold dealers. During a visit in his shop, 5 people entered, requesting to buy mercury. One person asked for 60 g, while others asked for 1 kg, and another asked for 10 kgs (he said a motorcycle rider would come to take 2 kgs first, then the remaining 8 kgs he would come to pick them later). These buyers came with different

means of transport, some used motorcycles, others used cars (Land cruiser), while others arrived there on foot.

- Transporters: The mercury is supplied on motorcycles to mining sites, including the very remote ones, mainly by young males who are knowledgeable of the mining sites and have good connection with various types of ASGM actors. At times people with disabilities, who are often less likely to be checked by custom controls, are used by large wholesale mercury dealers to transport mercury on their mechanized wheelchairs to retail mercury dealers who then supply it to miners.
- ASGM miners: While miners rarely have mercury as a key business, they occasionally sell or lend each other mercury.
- Other mercury providers: According to interviewees, other actors include hospital staff, laboratory and chemical shop owners, and individuals working within military camps. Moreover, there are some actors from public institutions such as police/ custom officers who from time to time cooperate with other actors in the mercury supply chain. One respondent narrated: *... in 2014, I was called by a friend of mine who is a police officer. He told me that he had some 10kgs of mercury that he hoped I could buy. We agreed on a place to meet close to the police post. When I reached there, we negotiated the price per kg. He wanted USD 120 per Kg. But I insisted that I could only pay him USD 80 per kg. Since he wanted to sell and we knew each other well, I insisted on my offer. Eventually he agreed, I paid and brought the mercury home. I think he had confiscated them from someone they had arrested, and he wanted to make money out of it. He was my friend and he trusted me...* (interview held on August 29, 2019 in Bondo, Kenya).

4.4 Mercury prices and packaging through the mercury supply chain

The packaging of mercury differs depending on the amount and stage in the supply chain. When entering the continent, it is typically packed into sealed metal jars of 34.5 kgs and sometimes 1 or 2 kgs bottles. After it reaches the suppliers, it is packed into smaller containers of different quantities (2 kgs, 1 kg, 500 g, 250 g) for distribution and depending on the needs of the buyer. Most suppliers use small packaging to avoid the risk of being caught. For Kenya and Uganda, the miners can buy as small quantities as 1 gram of mercury. The miners carry mercury in used plastic bottles, hard polythene or special packed bottles. In Tanzania, mercury is available at ASGM sites from 15 grams onwards, measured on an electronic weighing machine or using local measurements commonly referred to as koki (soda bottle cap). One soda bottle cap is equivalent to approximately 60 grams and using the koki method, the quantity begins at 30 grams (half of the cap). See Figure 4-2 below for different packaging of 460 g, 1 kg and 34.5 kgs.



Figure 4-2: Dental amalgam (460 g), Hg in plastic container (1 kg) and Hg in metallic cylinder (34.5 kgs) respectively.

Source: Field visits to formal shops stocking chemicals and chemical products in Uganda.

It was established that the price of mercury in East Africa increases as quantities become smaller downstream. As shown in Table 4-4 for the wholesale trade, the price ranges from USD 113 to USD 202 per kg while it ranges from USD 150 to USD 391 per kg for retail sale.

Table 4-4: Reported price ranges of mercury bound for ASGM at various distribution levels in Kenya, Tanzania and Uganda.

Country	Distribution Level	Average price (USD/kg)	Maximum wholesale price (USD/kg)	Price per 34.5 kgs flask (USD)
Kenya	Wholesale	113-148	500	3900-5100
	Retail	150-180		
Tanzania	Wholesale	130-202	435-520	3180- 4700
	Retail	150-391		
Uganda	Wholesale	175-202	188-202	
	Retail	250-270		

In Kenya, average wholesale prices range from USD 113 to USD 148 per kg while retail prices range from USD 150 to USD 180 per kg. Prices in 2014 from formal dealers went up to range between USD 250 and USD 300 per kg. During this time, the retail price for gold extractors also rose to USD 1.50 per g from USD 0.5. In the years 2015 and 2016, the prices stabilized to normal range of between USD 150 to USD 180 per kg. During this time, the retail price to buyers in ASGM sites was USD 0.5 per gram. In 2017, the price briefly increased to a record high USD 500 per kg, with a retail price of USD 2.5 per gram to buyers in the mining sites. Since 2018, the price of mercury has stabilized to range between USD 150 and USD 180 per kg.

In Tanzania, average wholesale prices range from USD 130 to USD 202 per kg while retail prices range from USD 150 to USD 391 per kg, when quantities are small. From early 2000 to around 2007, prices were low with 60 g (a koki) sold at USD 7 to USD 9. Prices rose from 2010 due to increased demand stemming from increases in mining activities likely arising from increases in the gold price; 60 g were sold at USD 26. Generally, the price of mercury per 1 kg ranges from USD 130 to USD 152 during common periods but may increase to a significantly higher price during high demand periods.

In Uganda, average wholesale prices range from USD 175 to USD 202 per kg while retail prices range from USD 250 to USD 270 per kg. The prices fluctuate mostly during festive seasons (September to December) where miners seem to increase their level of effort in order to increase their earnings for the Christmas and New Year celebrations. The price shoots up from the average USD 189 to around USD 216 because

everyone is purchasing mercury. However, from 2017 the price has on average ranged between USD 188 and USD 202 per kg, USD 0.5 per 2 grams and USD 0.3 per gram.

However, the prices are not stable as they vary over time depending on many different factors. These include, but are not limited to, the distance and remoteness of the ASGM site, seasonality, stage in the supply chain and fear of political turmoil during election periods as elaborated below.

Distance: Prices increase as they get further away from sources, pass borders, and enter the informal sector without proper permitting. For instance, a flask of 34.5 kgs is sold at a price of around USD 4100 in South Africa but upon reaching Tanzania it is sold at a price of around USD 4500. In Uganda, mercury dealers buy mercury from Busia at USD 189 per kg and sell it in the mining sites in Katenga at a price of USD 300. In 2012, one interviewee, a small miner in Kahama, Tanzania, bought 2 kgs of mercury from a gold dealer in Dar es Salaam at a price of USD 260 per kg each and sold it to ASGM operators in Kahama at a price of USD 520 per kilo.

Seasons of the year: Prices are lower during the rainy season and increase in the dry season. During high rainfall seasons (February to May) prices go down due to less mining activities as compared to dry seasons (June to November) where there is an increase in mining activities.

Stage in the supply chain: The price is lower when mercury is in the hands of dealers but increases when it reaches local suppliers. For instance, importers who operate chemical shops in Nairobi sell the 34.5 kgs flask of mercury to retail dealers at a price that ranges from USD 3900 to USD 5100. The retail dealers then divide the mercury into smaller plastic bottles that weigh 1 kilo. They then sell to gold brokers and/or local mercury suppliers at prices that range between USD 150 and USD 180. They sell these through agents who operate in towns near gold mining areas, who then sell the mercury to gold processors at the mining sites in 1-gram measurements at a price of USD 0.5 (similar patterns were observed in Tanzania and Uganda).

Fear of political crisis during election period: During election periods, most people who invest in the gold mining business are scared of potential conflicts during the elections. As such, investors in the gold business, according to interviewees especially traders of Indian descent, limit their business activities including the supply of mercury. For example, during the 2017 Kenyan election one of our informants, a mercury and gold dealer, purchased mercury from an informal source in Uganda at USD 150 per kg and sold it for USD 2.5 per gram and USD 250 per kg. The informant stated:

"I just kept calling my sources in order to get leads into where I could find mercury because there was no mercury in the market. I knew that if I could get some at a good price then I could make a good kill. Finally, a friend of mine who had supplied me with mercury before from Uganda called me and told me he had some mercury. I showed interest. I think he had stolen it from a company or one of those shops in Uganda. He offered it to me at USD 150 per kg. I went and we met at the Busia border, on the Uganda, side and bought them. I bought about 10kgs and sold at USD 2.5 per gram. Someone also bought a kg from me at USD 250." (Interview, 29 August 2019, Bondo, Kenya).

5. Conclusions and recommendations

Kenya, Tanzania and Uganda are all signatories to the Minamata Convention and are currently in the process of preparing the National Action Plans (NAPs) as a stepping stone in minimizing the use of mercury in ASGM. Compared to Uganda and Kenya, Tanzania has the largest ASGM sector in terms of workforce: Tanzania having 500,000 to one million people relying directly on the sector and millions more indirectly, compared to 50,000 and 140,000 for Uganda and Kenya respectively. Formal import and export data indicates that all three countries have formal mercury imports, mainly registered by chemical companies and intended for industrial use. This data shows that Kenyan imports are significantly higher compared to those of Tanzania and Uganda. Yet, data on official imports varies considerably and import and export rates of trading counties do not match. There is a clear indication that especially (a part of) Kenya's officially imported mercury intended for industrial use is redirected to the ASGM sector in Kenya and neighboring countries. Furthermore, it was found that regional mercury trade is not uni-directional from trade hubs to mining sites, but multi-directional across borders. Mercury dealers in Kenya, Tanzania and Uganda informally import and export mercury depending on supply and demand, which creates primary and secondary supply flows. Prices increase with decreasing mercury quantities and further down in the supply chain, as locations becomes increasingly more distant from the continent's entry points. Wholesale price ranges from 113 to 202 USD/kg while retail prices lie between 150 and 391 USD/kg.

Besides the main trade routes into East Africa through Mombasa, Dar es Salaam and Mbeya, mercury is sometimes supplied through indirect sources. Informants mentioned that mercury is, at times, purchased from individuals working in hospitals, medical laboratories and pharmacies, licensed shops selling other mining chemicals and individuals working within military camps. Finally, it was found that a strong relationship exists between the gold and the mercury supply chains, though many non-gold actors are also involved in the mercury supply chain.

In order to reduce and ultimately phase out the use of mercury, we recommend the following:

1. Increased cooperation and coordination

- Increased inter-institutional cooperation, e.g. between ministries for environment, mining, and customs, also across the three countries, so that policies, to the extent feasible, can be aligned and optimized and cooperation strengthened in the efforts to target the formalization of mercury trade and usage. Cooperation could focus on data capture, management and monitoring, aligning legislation, improving communication between mining and environmental line departments, collaboration between customs etc.
- Increased international and regional trade cooperation, including customs, so that illicit mercury trade can be tracked, contained, and used/disposed of/stored in a responsible manner.
- Minamata focal points to coordinate an inclusive NAP process in which miners (male and female) are involved, as well as CSOs and other related governmental institutions to ensure realistic and inclusive NAPs.

2. Improved legislation and enforcement

- Kenya and Tanzania to ratify the Minamata Convention, to become a force of law.
- Specific legislation on mercury and other chemicals used in mining such as cyanide, which is easy to comprehend by ASGM actors, and which can realistically be enforced by governments.
- Increased focus on government extension services in ASGM sites. This should support issues related to mercury reduction and the promotion of more environmentally friendly practices, in addition to the usual items looked at during mine inspections, e.g. health and safety, production levels etc.

- Training and resourcing of customs, especially customs at the key smuggling borders. It was noted that customs at boarder points are not aware of facts and restrictions related to mercury. It is thus recommended that adequate and regular training to customs officers is key to controlling the mercury supply chain.

3. Mercury-free gold extraction technologies

- Readily available technologies to replace the use of mercury by artisanal and small-scale miners. There is no silver bullet solution. Therefore, there is a need to experiment to find out what works and in which context. All methods should be piloted sufficiently before being rolled out at national levels.

4. Continued training and awareness raising

- Continuous awareness raising of miners (both male and female) at ASGM sites and surrounding communities by government and CSOs, through different approaches so that they become increasingly aware of the negative long-term consequences of using mercury in their activities. In the absence of mercury free extraction alternatives available in the short term, miners should adopt 'better' practices including improved concentration and use of retorts for the burning and recycling of mercury.

5. Further research

- Additional research on key actors in the up-stream mercury supply chain, working from the regional hubs and big cities. There are still data gaps on these actors, which need to be filled to get a more complete picture of the mercury supply chain.

- Additional research in other countries in the region, in particular DRC, Burundi, South Sudan, and Ethiopia, as our study indicated that mercury is also traded (formally and informally) to and from these neighbouring countries.

- More systematic research in alternative extraction practices that explore which mercury-free extraction methods work where and for who and with what strengths and weaknesses.

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7 Annex A

Extended overview of the policy and legal framework for the usage, handling and disposal of mercury and mercury-added products in East Africa.

Country	Policy/ instrument	legal	Purview and relevancy
Kenya	National Environment Policy, 2013 as amended.		The policy lays the groundwork for the protection of the country's natural heritage and ecosystem services through the sustainable management and use of the environment, thereby ensuring a better quality of life for current and future generations. With respect to pollution, it sets out working strategies for the sound management of environmental risks inherent to harmful chemicals, including the development of a national policy to control the management of toxic and hazardous substances. The Policy thus bears an indirect control over the procurement, usage and disposal of mercury.
	National Health Policy 2012-2030		The Policy objective is the attainment of the highest possible standard of health in a manner responsive to the needs of the population. Generally, the Policy underscores the contribution of the health sector to economic development as well as the imperativeness of realizing the people's rights to health as enshrined in the Constitution of Kenya. It also recognizes pollution as a hazard to public health, and as such, constitutes the policy matrix for the regulation of mercury.
	Mining and Mineral Policy, 2016		The Policy sets out to establish frameworks, principles, and strategies to provide for the exploration and exploitation of mineral resources for the country's economic development. One of the principles enshrined in the policy is the integration of sound environmental protection, safety and health concerns in mineral resources development and the enablement of equitable access to mineral resources and benefit sharing at the national, county and community levels. While it calls for the formalization of ASGM sector nationally, it does not elaborate on measures to scale down the employment of mercury within the sector.
	Pharmacy and Poisons Act CAP 244 R.E, 2012.		Part I of the Schedule of the Act identifies mercury as a poisonous substance and reserves its usage to entities granted legal authorization for this

Country	Policy/ instrument	legal	Purview and relevancy
			<p>purpose. With regards to its application in mining, Section 28 of the Act provides that "A person carrying on a regular business in mining, agricultural or horticultural accessories may apply to the Board in writing on the prescribed form for a license to deal in poisons and any such license, if granted, shall authorize the licensee to sell only the poisons specified therein, to persons who require them for a trade or business of mining, agriculture or horticulture".</p> <p>By implication, ASGM operators and wholesale mercury suppliers within ASGM value chains can practice the distribution and usage of mercury provided they solicit and qualify for a license to do so.</p>
	<p>Mining Act, 2016</p>		<p>As a principle Act governing Kenya's mining sector, the Mining Act obliges actors involved in mining activities to environmental compliance with the provisions of the country's environmental legislation. Section 140 of the Act prohibits the use of mercury in ASGM, stating "The holder of a mining permit shall not use such equipment as may be prescribed in Regulations or chemicals such as cyanide and mercury".</p>
<p>Tanzania</p>	<p>National Mineral Policy, 2009</p>	<p>Mineral</p>	<p>The National Mineral Policy serves to promote the sustainable utilization and development of the country's mineral resources, by formalizing the mining sector, amongst other means. One of the policy objectives is to promote best practices for health, safety and environmental management in mining areas. In this respect, the Policy directs that the Government seek to amp up monitoring and enforcement for the protection of the environment and public health from risks borne by mining activities, and to raise environmental awareness and promote environmentally friendly technology, particularly for AGSM.</p>
	<p>National Health Policy, 2003</p>		<p>The Policy provides a broad platform for the protection and administration of public health. In relation to pollution hazards, it also designates the Government Chemist Laboratory Agency (GCLA) to control in-country flows and usage of chemicals of concern to public health, including mercury.</p>

Country	Policy/ instrument	legal	Purview and relevancy
	National Policy, 1999	Mineral	The National Mineral Policy serves to promote the sustainable utilization and development of the country's mineral resources, by formalizing the mining sector, amongst other means. One of the policy objectives is to promote best practices for health, safety and environmental management in mining areas. In this respect, the Policy directs that the Government seek to amp up monitoring and enforcement for the protection of the environment and public health from risks borne by mining activities, and to raise environmental awareness and promote environmentally friendly technology, particularly for AGSM.
	National Water Policy, 1997		The Policy approaches current challenges within the water sector with directives for improved access to water, conservation of key aquatic environments and sustainable utilization and allocation of freshwater resources for competing usages. The Policy engages the mining sector in its requirements for water efficiency in various industrial activities as well as those relating to the control of effluent-based pollution of water bodies on the receiving end of mining activities.
	The Environmental Management Act No. 20 of 2004	Environmental	As a vehicle for Tanzania's National Environmental Policy, the Act establishes the legal and institutional framework for sustainable management of the environment, providing for environmental impact assessment and waste management, amongst other matters essential to safeguarding the environment. Discharge of oils and other toxic chemicals (including mercury) into the environment is prohibited under Section 110 of the Act. Drawing on principles such as the polluter pays principle, prevention of adverse effects, precautionary principle and the principle of waste minimization, the Act relates to mercury pollution from ASGM.
	The Environmental Management (Hazardous Waste) Regulations GN. No. 264 of 2009.	Waste	The regulations specify the administrative set-up and legal protocols for the management of various hazardous waste substances enlisted in the schedules thereunder, which include mercury. The Regulations pay regard to the precautionary principle, polluter pays principle, as well as the producer extended responsibility and cleaner production principles. Further, the regulations promote (i) cleaner production techniques to

Country	Policy/ instrument	legal	Purview and relevancy
			minimize generation of mercury waste and (ii) sound management and disposal of mercury waste.
	The Environmental Management (Water Quality Standards) Regulations GN. No 239 of 2007		The Regulations delineate water pollution prohibitions, minimum water quality standards, water pollutant discharge permitting requirements and water quality enforcement procedures. Regulations 5 and 6 prohibit among other things the discharge of industrial effluent and hazardous substances including mercury into receiving natural water environments.
	The Environmental Management (Air Quality Standards) Regulations		The Environmental Management (Air Quality Standards) Regulations require conformance to the minimum air quality standards set thereunder, and generally prohibit the emission of hazardous gases. The Regulations require all air-polluting activities to observe the highest permissible quantities of emission for gaseous pollutants, although they do not prescribe thresholds for mercury-containing vapors.
	Environmental Management (Soil Quality Standard) Regulations, GN. 238 of 2007		These Regulations are concerned with enacting prescribed soil quality standards as well as the monitoring and control of pollution of soils. Specifically, Regulation 16 (4) prohibits soil pollution and requires all organizations that produce, transport, trade, use, store or dispose of chemicals and toxic substances (including mercury) to comply with the Regulations concerning the safety of humans and other living organisms to avoid soil degradation. According to the regulations, the upper contaminant limit for heavy metals in soil has been set below 2 mg/kg.
	Environment Management (Environmental Impact Assessment and Audit) Regulations, 2018.		These Regulations state out the regulatory requirements for the conduct of EIA and identify projects for which environmental assessment is mandatory (Type A projects). The Regulations list artisanal and small-scale mining as an activity which may or may not require a full EIA study but needs to be registered all the same.
	The Water Resource Management Act, 2009		The Water Resource Management Act provides for the sustainable management of water resources in furtherance of the National Water Policy. With regards to mining activities and associated pollution, the Act provides that any discharge of effluent into surface water or underground strata is subject to prior permitting by the relevant Basin

Country	Policy/ instrument	legal	Purview and relevancy
	<p data-bbox="586 401 837 464">Mining Act Cap. 123 [R.E. 2018]</p> <p data-bbox="586 968 837 1167">The Mining (Environmental Protection for Small Scale Gold Mining) Regulations, GN. 14 of 2010</p>		<p data-bbox="862 264 1421 394">Water Board. It also prohibits the conduct of anthropogenic activities, including mining operations, within 60 meters of a surface or ground water source.</p> <p data-bbox="862 401 1421 531">The Mining Act provides for the management and administration of all activities falling within the mining sector. With regards to ASGM and mercury consumption, the Act mandates the following:</p> <ul data-bbox="911 537 1421 926" style="list-style-type: none"> <li data-bbox="911 537 1421 667">• formalization of ASGM miners (majority of whom are mercury users) through the issuance of Primary Mining Licenses (PMLs); <li data-bbox="911 674 1421 730">• designation of areas for undertaking ASGM activities; <li data-bbox="911 737 1421 831">• preparation of an Environmental Protection Plan (EPP) as a pre-requisite for entitlement to a PML; <li data-bbox="911 837 1421 926">• Oversight of compliance and enforcement of laws including environmental and safety issues by the Mining Commission. <p data-bbox="862 968 1421 1062">Aimed at guiding ASGM actors towards compliance with environmental obligations under the Mining Act and other sector laws, the Regulations:</p> <ul data-bbox="911 1068 1421 1268" style="list-style-type: none"> <li data-bbox="911 1068 1421 1125">• Proscribe environmental pollution involving land, water and air; <li data-bbox="911 1131 1421 1188">• Prohibit the use and mercury without retort <li data-bbox="911 1194 1421 1268">• Prescribe a buffer zone of 50 meters between mining sites and water sources.
	<p data-bbox="586 1304 837 1503">The Mining (Safety, Occupational, Health and Environmental Protection) Regulations, GN. No. 408 of 2010</p>		<p data-bbox="862 1304 1421 1675">Focused on the mining industry, the regulations oblige managers of mining sites to take reasonable and practical steps to ensure that mine working areas are free from potentially hazardous agents and conditions which could affect the health and well-being of workers. They require mining labor to be protected from exposed levels of any physical, chemical or radiation hazards and promote the use of protective gear, which implies the adoption retorts with respect to mercury-based gold extraction.</p>
	<p data-bbox="586 1682 837 1776">Occupational Health and Safety Act, No.5 of 2003</p>		<p data-bbox="862 1682 1421 1879">This legislation deals with protection of human health from occupational hazards. It specifically requires the employer to ensure the safety of workers by providing safety gear i.e., personal protective equipment (PPE) to the work place. The Act also requires that hazardous working materials,</p>

Country	Policy/ instrument	legal	Purview and relevancy
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such as mercury, be replaced by harmless or less harmful alternatives.

	The Standards Act No.2 2009		The Act mandates Tanzania Bureau of Standards (TBS) to ensure the health, safety, environment and general welfare of the people of Tanzania by setting quality and safety standards for locally available commodities. In this capacity, TBS has established a code of conduct for the management of mercury in small-scale gold mining and refining, which emphasizes environment and health safeguards such as the use of retorts, isolation of tailings and the adoption of environmentally superior technology.
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	The Fisheries Act and Regulations		The Act stands to ensure sustainable development, protection, conservation, aquaculture development, regulation and control of fish and fish products. It mandates, amongst other requirements, measures to ensure human health and water resources are not threatened by contamination from pollution sources, such as mine leachate and run-off containing toxic and persistent contaminants, such as mercury.
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Uganda	National Environment Policy, 1994		The policy is concerned directing the management of the environment in Uganda, with the overall aim of achieving sustainable social and economic development. Amongst the policy objectives is the control of pollution of water, land and air, as well as environmentally sound management of wastes and hazardous materials, with regards to domestic, municipal and industrial activities alike.
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	Environment and Social Safeguard Policy, 2018		The Policy charges the national Ministry responsible with water and environment with the onus of ensuring that all activities conducted domestically pose little to no pollution on the environment with due conformity to pertinent safeguards. It calls upon the Ministry to ensure that projects and programmes are designed and implemented in a way that meets applicable international standards for maximizing energy efficiency and minimizing material resource use, the production of wastes, and the release of pollutants. The requirement is that projects and programmes promote more sustainable use of resources, including energy and water, reduce project or programme-related greenhouse gas (GHG) emissions, and avoid or
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Country	Policy/ instrument	legal	Purview and relevancy
			minimize adverse impacts on human health and other aspects of the environment.
	National Health Policy, 2000		The Policy guides the management of Uganda's health sector with the end-goal of delivering health facilities of the highest order to the its population and thereby raising the country's wellbeing status, economic development and quality of life. The Policy advocates for greater attention and support to health promotion, disease prevention and empowerment of individuals and communities for a more active role in health development.
	National Environment Management Policy, 2014		The Policy promotes the national objective of controlling pollution of the environment and ensuring environmentally sound management of domestic and industrial waste. It also conveys the directive for a strategy to develop and adopt appropriate technologies for waste management therefore setting an objective to promote the environmentally sound management of hazardous materials.
	The Mining and Minerals Policy, 2018		The Mining and Minerals Policy of Uganda, as a platform for the management of the country's mining sector, mobilizes an objective to protect the health, safety and environment in relation to mining industries including ASGM through, among other things, monitoring mechanisms. In this respect, the Policy promulgates the need for safe and environmentally favourable technologies and approaches to the management of toxic and hazardous substances associated with mining.
	National Environment Act, 2019		The National Environment Act (2019) is Uganda's principal statute concerning matters pertaining to environmental management. Beyond its provisions on general pollution prevention and response, Section 74 of the Act provides for the management of products containing mercury, lead, cyanide, arsenic and polonium, mandating that the National Environmental Management Authority (NEMA) to establish criteria, in consultation with respective competent authorities, for the following: (a) The management of mercury or mercury compounds, lead, cyanide, arsenic and polonium in manufacturing or mining processes;

Country	Policy/ instrument	legal	Purview and relevancy
			<p>(b) The management of products containing mercury, lead, cyanide, arsenic and polonium; and (c) The provision of alternatives to products containing mercury, lead, cyanide, arsenic and polonium.</p> <p>Pursuant to the Act, the Minister may, by regulations, prohibit (inter alia) the manufacture and use of mercury, lead, cyanide, arsenic and polonium added products after their phase-out dates, except where they are excluded or exempted.</p> <p>These provisions constitute most of what is accounted the country's legal basis for the control of mercury and mercury-containing substances.</p>
	<p>The Mining Act, 2003</p>		<p>The Act provides for the management and stewardship of Uganda's mining sector. While it does not expressly address the employment of mercury in ASGM, it spells out environmental protection measures for all stages and aspects of mining establishments.</p> <p>Specifically, it holds entities holding exploration licenses and/or mining leases liable to the conduct of an Environmental Impact Assessment (EIA) prior to initiating mining developments. On this basis, mining establishments can only be operationalized upon approval of the project by NEMA.</p>
	<p>Water Act Cap 152</p>		<p>The Act provides for the management of the country's water resources. Section 31 of the Act prohibits the discharge of waste and/or hazardous substances into surface water.</p>
	<p>The Occupational Safety and Health Act No 9, 2006</p>		<p>The Act sets the legal requisites to improve the working conditions of workers and in particular their safety, health, and the hygiene of their working environment - to ensure that they operate in an environment that is reasonably free from all hazards that can lead to injury and poor health. The manual handling of hazardous chemicals during manufacture, storage, transportation and sale, as well as the corresponding safeguard responsibilities placed on employers, fall within the jurisdiction of the Act.</p> <p>While mercury is not specifically cited in the Act (as a hazardous agent), its hazards with regards to occupational health and safety are generally addressed by it.</p>

8 Annex B

Mercury import and export statistics in kgs as reported by East African and other countries respectively.

Import as reported by East African countries				Export as reported by other countries	
Year	Importer	Exporter	Quantity	Exporter	Quantity
2018	Kenya	Mexico	10708	Mexico	10766
		Panama	342	-	-
		India	1193	India	7763
		Viet Nam	862	-	-
		Turkey	4313	-	-
	Tanzania	China	0	-	-
		South Africa	2	-	-
		-	-	India	50
	Uganda	China	6	-	-
2017	Kenya	China	7	-	-
		Germany	2	-	-
		Japan	7764	-	-
		Russian Federation	1726	-	-
		India	706	India	5865
		Singapore	3036	Singapore	2587
		Viet Nam	863	-	-
	Tanzania	China	0	-	-
		Switzerland	6	Switzerland	3
	Uganda	United Kingdom	0	-	-
-		-	Kenya	690	
2016	Kenya	-	-	India	3968
		-	-	Singapore	7762
		-	-	-	-
	Tanzania	China	2129	-	-
		Germany	1	Germany	7
		Switzerland	871	-	-
		USA	5	-	-
	Uganda	India	16	-	-
2015	Kenya	-	-	China, Hong Kong SAR	3003
		-	-	India	3588
		-	-	Mexico	1725
		-	-	Singapore	5692
	Tanzania	India	2	India	208
		Switzerland	1201	-	-
	Uganda	Malaysia	155	-	-
		-	-	India	2
2014	Kenya	-	-	China, Hong Kong SAR	2879
		-	-	India	4059
		-	-	Mexico	2588
		-	-	Singapore	1897
		-	-	-	-

		-	-	United Arab Emirates	2598	
	Tanzania	China	384	-	-	
		Germany	1163	-	-	
		China, Hong Kong SAR	1035	-	-	
		Netherlands	4200	-	-	
		India	600	India	276	
		-	-	South Africa	11	
		-	-	Switzerland	2070	
Uganda	Malaysia	128	-	-		
2013	Kenya	Germany	863	-	-	
		Japan	1725	-	-	
		Mexico	3450	Mexico	50	
		Seychelles	1725	-	-	
		India	1620	India	2293	
		Switzerland	5175	-	-	
		USA	11216	-	-	
		-	-	China, Hong Kong SAR	9477	
		-	-	Singapore	15007	
		-	-	United Arab Emirates	50	
	Tanzania	Germany	1128	-	-	
		Japan	902	-	-	
		Mexico	1190	-	-	
		Singapore	1117	-	-	
		USA	7	-	-	
		-	-	Netherlands	50	
	Uganda	USA	4	-	-	
	2012	Kenya	-	-	China, Hong Kong SAR	11215
			-	-	India	345
			-	-	Mexico	5406
-			-	Singapore	15525	
Tanzania		Brazil	1190	-	-	
		China, Hong Kong SAR	981	-	-	
		-	-	South Africa	126	
Uganda		Australia	1	-	-	
		Kenya	1	-	-	
2011		Kenya	-	-	China, Hong Kong SAR	10800
	-		-	Germany	9039	
	-		-	India	154	
	-		-	Singapore	3450	
	-		-	Spain	1725	
	Tanzania	India	45	India	1	
		Australia	3	-	-	

		Germany	1289	-	-
		South Africa	20	-	-
	Uganda	United Kingdom	100	-	-
		-	-	South Africa	282
2010	Kenya	Germany	10611	Germany	8105
		Japan	1726	-	-
		India	7	India	25
		South Africa	1	-	-
		United Kingdom	8	-	-
		USA	1725	-	-
	Tanzania	-	-	Kenya	448
	Uganda	-	-	Kenya	344
2009	Kenya	Germany	4814	Germany	3795
		Kazakhstan	1656	-	-
		Russian Federation	1656	-	-
		India	2	-	-
		Switzerland	2	-	-
		USA	3450	-	-
	Tanzania	Germany	2849	-	-
		-	-	Kenya	1896
	Uganda	India	11	-	-
		-	-	Kenya	104