

Mercury flows in the Southern African Development Community (SADC) Region

A report investigating mercury flows into and out of South Africa (SA)/SADC and how it is distributed and used

Expected result: Mercury destined for SA/SADC is strategically understood and appropriate interventions are considered by government

Planned activity: Research on imports into and exports from SA/SADC

Indicator: Report is published and shared with government and other relevant stakeholders by December 2010

Indicators of results: National government and SADC governments are considering improved regional policy and management to mitigate mercury contamination and releases by 2012.

Introduction

Despite global awareness on the public and environmental risks of mercury contamination, this toxin continues to be used globally in a great variety of processes and products. In the SADC African context elemental mercury is used particularly in the artisanal small scale gold mining (ASGM) sector and also enters into the sub-region in a variety of products including batteries, compact fluorescent lamps (CFL) and medical health care measuring devices such as thermometers.

Although the trade and eventual use of mercury products is largely regulated, the environmental fate of mercury-containing products in SADC is not generally undertaken in an environmentally sound manner. Elemental mercury destined for use in ASGM is largely uncontrolled and unregulated. To further compound this problem, elemental mercury destined for dentistry is often diverted for use in ASGM and for this reason a better understanding of the flow of elemental mercury within the SADC region may serve to justify better control measures for the SADC region.

Global mercury sources and supply

Globally, five common sources of elemental mercury supply exist. These include:

- Elemental mercury from the mining and processing of primary mercury ores;
- Elemental mercury recovered as a by-product from refining other ores (gold, zinc etc.);
- Elemental mercury recovered from decommissioned mercury cell chlor-alkali plants;
- Elemental mercury from historical strategic stockpiles; and
- Elemental mercury recovered from recycling activities from products and wastes.



groundWork

Data statistics and sources

Country-reported statistics concerning the commercial trade of elemental mercury among United Nations (UN) member states are publicly available through the United Nations Commodity Trade Statistics Database (COMTRADE)¹. COMTRADE contains detailed import and export statistics reported by Customs and other government authorities. These data are processed by the UN Statistics Division (UNSD) into a standard format with consistent coding and valuation. Additional data are available from various Inter-governmental Organisations (IGO) and Non-governmental Organisations (NGO).

Case study 1: South African COMTRADE imports and exports (2000 – 2004)

Data from the COMTRADE database of mercury trade shown in Table 1 below reveal that between 2000 and 2004 South Africa imported 59 438 kilograms (kg) and exported 80 849kg of mercury. Most – 36 186 kg – of the imported mercury comes from the Netherlands, however, South Africa only reported receiving 5 608kg from the Netherlands. Furthermore, Swaziland reported exporting 20 000kg of mercury to South Africa with no reported import data. This indicates that mercury is traded legally and illegally in South Africa with possible cross-border trafficking taking place into Southern African destinations. Worryingly, most of South Africa's mercury imports are from countries that are members of the Organisation for Economic Cooperation and Development (OECD), which includes the Netherlands, Spain, United Kingdom, the United States of America (USA) and Russia.

It would be interesting to learn what most of the imported mercury into South Africa is labelled as. Anecdotal data from Brazil indicate that most of their imports are labelled as imported for dentistry but are ultimately destined for ASGM. South Africa reported total exports of 80 849kg of mercury between 2000 and 2004. These exports are reported destined for Southern African destinations such as Namibia, Botswana, Zimbabwe, Swaziland, Democratic Republic of Congo (DRC), Mozambique, Zambia, Lesotho and also India among others. Reported exports to Saudi Arabia in 2001 were 45 859kg and 165 031 Kg and 71 753 Kg was reported to be received by Botswana in 2000 and 2001 respectively.

This clearly indicates that there are serious gaps in our understanding of the trade flows of mercury into and out of South Africa, potentially an import destination for much of the unregulated mercury destined for ASGM in Southern Africa. In this regard, much work can potentially be done in the form of a situational analysis to better quantify these trade flows and assess the sensitivity and effectiveness of the South African customs and excise systems (and Green Customs Initiative).

See Table 1: South African COMTRADE data for mercury imports and exports 2000-2004

Additional data of mercury flows in the SADC and East African Region

The Global Mercury Project (GMP)² is a collaboration between United Nations Industrial Development Organisation (UNIDO), United Nations Development Programme (UNDP) and the Global Environment Facility (GEF) and was established in 2002. The aim is to address the environmental issue of mercury contamination in ASGM. Foundational objectives of the project have been: to introduce cleaner technologies, train miners, develop regulatory capacities within national and regional governments, conduct environmental and health assessments and build capacity within participating countries to continue monitoring mercury pollution after the project finishes. Six countries initially participated in the GMP, namely Brazil, Lao PDR, Indonesia, Sudan, Tanzania and Zimbabwe.

Part of the project estimates the amount of mercury diverted for use in ASGM, using import statistics and anticipated consumption for legitimate uses in the six GMP pilot countries and neighbouring nations. In most participating countries, mercury is readily available to miners at the mining sites. In some cases it is given for free, contingent on gold being sold to the mercury provider (usually the gold dealers).

1 The database can be accessed at <http://unstats.un.org/unsd/comtrade/>

2 Global Mercury Report. 2006. Global Impacts of Mercury Supply and Demand in Small-Scale Gold Mining. GMP Report to the UNEP Governing Council Meeting, February, 2007. Dated October, 2006.

Table 1: South African COMTRADE data for mercury imports and exports 2000-2004

Target country:										
Period	Exporting partner countries			South Africa				Importing partner countries		
		Reported exports to target country		Reported imports from partner country (on left)		Reported exports to partner country (on right)		Reported imports from target country		
Year	Country name	kg Hg	Value (\$US)	kg Hg	Value (\$US)	kg Hg	Value (\$US)	kg Hg	Value (\$US)	Country name
2000	Area not established			3	204	253	727			Areas, nes
2000	Finland			3437	19626			165031	2854	Botswana
2000	Netherlands	7875	41780	898	4548	1125	2071			Dem. Rep. of the Congo
2000	Russian Federation			3625	17113	5937	12438	7000	25557	India
2000	Spain			3437	17650	30	945			Mozambique
2000	Swaziland	20000	572					113	1348	Namibia
2000	United Kingdom			429	4701			4062	1744	Swaziland
2000	USA			667	609			82	515	Zambia
2001	Area not established			3	290	88	68			Areas, nes
2001	Finland			6875	33398			71753	850	Botswana
2001	France	97	4476			363	3288			Dem. Rep. of the Congo
2001	Netherlands	4812	14330	1375	6887			0	5541	Lesotho
2001	Spain	207	949	3687	19415	60	946			Malawi
2001	United Kingdom			261	2825	45859	12726			Saudi Arabia
2001	USA			250	983	20	1184			Zambia
2001						101	591			Zimbabwe
2002	Finland			6875	39697	56	588			Areas, nes
2002	Kyrgyzstan			3437	20417	753	6038			Dem. Rep. of the Congo
2002	Netherlands	4625	24567	1062	9006			0	1393	Lesotho
2002	Spain	1500	16868	269	2267	62	866	62	714	Mauritius
2002	United Kingdom			312	1466			97	1516	United Kingdom

2002	USA			21	816	66	592			United Rep. of Tanzania
2002								222	764	Zambia
2002						238	1916	0	5375	Zimbabwe
2003	Area not established			13	361	35	714			Angola
2003	Finland			3437	23393	3	426			Areas, nes
2003	Netherlands	10812	71309	898	8663	60	1319	60	1158	Mauritius
2003	Rep. of Korea			2437	19244	4812	13863			Netherlands
2003	Spain			6875	43335	125	1543	66	1638	Saudi Arabia
2003	United Kingdom			136	6230			97	1578	United Kingdom
2003	USA			156	1645	70	966			United Rep. of Tanzania
2003						24	599			Zambia
2003						4125	35317			Zimbabwe
2004	Area not established			7	89	128	945			Areas, nes
2004	Germany	97	1000	2	773	85	3070	82	3437	Mauritius
2004	Netherlands	8062	98293	1375	18442	15750	47330			Netherlands
2004	Spain			6875	82344			82	951	United Rep. of Tanzania
2004	United Kingdom			226	3650	621	11104	2250	40581	Zimbabwe
2004	USA			78	553					
00-04	Total			59438		80849				Total

GMP case studies on mercury flows in Africa

In 2005, Kenya imported almost 14 tonnes of mercury from Germany, 9.5 tonnes from Georgia and 4.1 tonnes from Japan. Evidence suggests that most of Kenya's imported mercury was then – and still is – exported, legally and illegally, to Tanzania, Uganda and the DRC, where it is primarily used in ASGM.

OECD countries are the main source of mercury to sub-Saharan Africa, where mercury imports increased from 34 tonnes in 2000 to 57 tonnes in 2002. In 2005, official import data from Zimbabwe indicated 21.8 tonnes of mercury imported in which SA contributes with 13.8 tonnes, the Netherlands with 2.7 tonnes, Switzerland with 4.6 tonnes, and Germany with 0.7 tonnes. However, results from interviews conducted in 2003 indicated that one single mercury dealer in Zimbabwe unofficially declared importing 20 tonnes of mercury. In the same year, the Zimbabwe official data indicated that the Netherlands accounted for 15.7 tonnes. Given these facts, it is unlikely that import statistics adequately capture the cross-border trafficking of mercury and the extent of diversion from legal sectors.

The GMP assessments also found that monitoring and regulating mercury imports and domestic trade in mercury in many developing countries is more difficult than regulating mercury supply at the export stage, particularly exports from developed countries.

Case study 2: SADC COMTRADE imports and exports (2007 – 2009)

Table 2 shows additional COMTRADE statistics of trade in mercury for the SADC sub-region for the period 2007 to 2009. Imports and exports of elemental mercury are given in mass and value. South Africa and Zimbabwe imported and exported by far the largest amounts of elemental mercury significantly exceeding the volume generally required to meet the demand for dentistry. Although the export destinations for the mercury are no longer indicated specifically, it is commonly accepted that landlocked SADC nations receive their goods from SA as part of the SADC Trade Agreement.

Table 2: SADC COMTRADE data 2007 – 2009

Country or Area	Year	Comm. Code	Commodity	Flow	Trade (USD)	Weight (kg)	Quantity Name	Quantity
Botswana	2009	280540	Mercury	Import	626	51	Weight in kilograms	51
Botswana	2008	280540	Mercury	Import	684	27	Weight in kilograms	27
Botswana	2007	280540	Mercury	Import	98	3	Weight in kilograms	3
Madagascar	2008	280540	Mercury	Import	61	2	Weight in kilograms	2
Madagascar	2007	280540	Mercury	Import	561	61	Weight in kilograms	61
Malawi	2008	280540	Mercury	Import	95	0	Weight in kilograms	0
Mozambique	2009	280540	Mercury	Import	90		No quantity	
Mozambique	2008	280540	Mercury	Import	716		No quantity	
Mozambique	2007	280540	Mercury	Import	52		No quantity	
Namibia	2007	280540	Mercury	Import	1,689	1,200	Weight in kilograms	1,200
South Africa	2009	280540	Mercury	Import	208,953	10,121	Weight in kilograms	10,121
South Africa	2009	280540	Mercury	Export	82,255	2,106	Weight in kilograms	2,106
South Africa	2008	280540	Mercury	Import	299,328	14,198	Weight in kilograms	14,198
South Africa	2008	280540	Mercury	Export	41,267	1,964	Weight in kilograms	1,964
South Africa	2007	280540	Mercury	Import	218,797	11,388	Weight in kilograms	11,388
South Africa	2007	280540	Mercury	Export	59,379	3,579	Weight in kilograms	3,579
Swaziland	2007	280540	Mercury	Import	862	403	Weight in kilograms	403
Zambia	2007	280540	Mercury	Import	5,175	98	Weight in kilograms	98
Zimbabwe	2009	280540	Mercury	Import	412,805	22,116	Weight in kilograms	22,116
Zimbabwe	2008	280540	Mercury	Import	113,960	6,144	Weight in kilograms	6,144
Zimbabwe	2007	280540	Mercury	Import	253,396		No quantity	

Artisanal small scale gold mining

ASGM has become the world's largest 'direct use' emitter of mercury to the environment³. A 2006 report of the GMP to United Nations Environment Programme (UNEP)⁴, estimates at least 100 million people in over 55 countries (now revised to over 70 countries) depend on ASGM for their livelihood, mainly in Africa, Asia and South America. ASGM produces between 20-30% of the world's gold, and involves an estimated 15 million actual miners, including up to 4.5 million women and 1 million children. In Tanzania, over 400,000 people participate in this sector and it is spreading throughout the country as the gold price escalates further beyond \$1 500 per ounce.

Furthermore, ASGM is widely known to be practised in most sub-Saharan African countries including Zimbabwe, Zambia, Swaziland, Mozambique, SA, Botswana, Ghana, Sudan, Kenya, Madagascar, Malawi, Uganda, Ethiopia, Chad, Niger, Nigeria, Mali, Mauritania, Guinea, Senegal, Benin, Cameroon, Gabon, Burkina Faso and Cameroon, making it a regional issue common to most (if not all) sub-Saharan countries.

It is generally unknown exactly how much mercury destined for the ASGM sector in Africa is imported into the countries and within which country it is mainly used. In Tanzania, for example, where the sale of mercury is restricted, mercury destined for use in ASGM is possibly imported illegally from Mozambique or Zimbabwe.

Discussion: Understanding mercury trade flows

Trade flows of mercury between African countries generally do not tally and correspond in terms of reporting exports and imports, which possibly indicates that SA, among others, acts as the port of entry for many SADC mercury imports. This also potentially indicates that mercury is traded legally and illegally in SA and other countries with possible cross-border trafficking taking place into Southern African destinations.

There are serious gaps in the understanding of the trade flows of mercury into and out of African countries. Probably the largest intentional use of imported elemental mercury into Africa is for ASGM, although it is not formally reported that way.

With better understanding of trade flows within and between African countries (and eventually trade regions), governments could build effective strategies and promote specific measures to address national and global mercury challenges⁵.

In Mozambique, ASGM is widely practised in the North, which borders both Zimbabwe and Tanzania. Assessments conducted during a GMP/Blacksmith Institute pilot project in 2005 indicated that mercury emissions resulting from poor amalgamation processing is "widespread and severe"⁷. The problem of mercury emissions from amalgamation burning was clearly widespread and severe, due to the many open-air mercury burning sites. Ambient mercury emissions in some samples showed mercury concentration levels of up to 30 µg/m³ (30 times higher than the World Health Organization's (WHO) guideline for maximum public exposure to mercury vapour). Individuals involved in amalgamation practices also presented extremely high mercury concentrations in exhaled air samples (as high as 60 µg/m³). In some instances, private buyers provide mercury for free (in exchange for a guaranteed gold sale) in areas where mercury is difficult to obtain.

In Tanzania, over 500 000 people are now reported to participate in ASGM and it is spreading throughout the country as the gold price escalates further⁶. The number of those who in one way or another depend on this sector is estimated to be over 1 million people. Older people, women of all ages

3 <http://www.mercurywatch.org/default.aspx>

4 GMP, 2006. Global Impacts of Mercury Supply and Demand in Small-Scale Gold Mining. GMP Report to the UNEP Governing Council Meeting, February, 2007. Dated October, 2006.

5 In this regard much work can potentially be done in the form of an African situational analysis to better quantify these trade flows, assess the sensitivity and effectiveness of the African customs and excise systems (and Green Customs Initiatives).

6 A baseline study conducted under the financing of the World Bank in 1996 showed that there were 550 000 people engaged in ASM at the time (MEM, 1996)

and children mainly work in the smaller artisanal mining properties⁷. Furthermore, ASGM is routinely practised near water sources and poses a high risk to women and children. Tanzania further reported that the data obtained indicated that ASGM is their largest source of mercury uses or releases.

In Ghana, research found more than 50% of miners and 25% of non-miners are considered to have serious mercury toxicity, with up to 7% of the study population being identified with slight (or worse) neurological problems⁸. The annual mercury consumption in the study site was estimated at 450kg/annum and the environmental survey revealed widespread mercury contamination of sediment and fish (60% of fish sampled exceeded the USA's Food and Drug Administration (FDA) action level of 1 (µg.g-1)⁹. More than 50,000 people (non miners) reside in the mining areas targeted by the GMP and may be susceptible to exposures to mercury through fish consumption. It is however important to bear in mind that this case study represents only a small proportion of the extent and use of mercury in the ASGM sector in Ghana.

Mercury flows within Africa

As is the case of many statistics regarding mercury imports and exports, trade flows of mercury between African countries generally do not tally. That is to say, the mercury exports reported by Country A to Country B are often not the same as the mercury imports reported by Country B as coming from Country A. There are a number of valid reasons to explain certain annual discrepancies, but over time the numbers should be roughly similar. Meanwhile, the evident availability of mercury for ASGM proves that it is actively traded in significant quantities. Considering the relative scarcity of sources of mercury within Africa itself, it is clear that certain nations (knowingly or unknowingly) act as ports of entry for SADC mercury imports, and mercury is traded both legally and illegally in the region.

Understanding mercury trade flows

It is clear from the data reported above that there are serious gaps in the reporting and understanding of the trade flows of mercury into and out of African countries. Surely the largest intentional use of imported mercury into Africa is for small-scale gold mining, although no country formally reports it in that way. In South America, it has been documented that mercury has been imported for "dental uses" and then diverted to ASGM. It would not be surprising if the same happens in Africa.

Moreover, it is well known that many borders between African countries are porous, and the black economy in these areas is important. The same mopeds or other forms of transport that often take gold from rural regions to urban dealers may just as easily carry mercury in the other direction, back to the ASGM sites.

Despite legal restrictions on its use in various countries, the free flow of mercury for ASGM demonstrates the challenges African countries – like many countries in other parts of the world – face in enforcing laws prohibiting mercury use. For this reason, greater international efforts are needed to control mercury supplies at their sources (primary mining and by-product mercury, decommissioned chlor-alkali plants, etc.) especially from countries outside of Africa, and to restrict mercury exports into the global marketplace.

The benefit of improved mercury flow information

With better understanding of trade flows within and between African countries (and eventually trade regions), governments could build effective strategies and promote specific measures to address national and global trade-related mercury challenges¹⁰. Initial priorities should include:

- 7 Final Report for an Assessment of the Environment and Health in the Rwamagasa area, Tanzania. UNIDO Project EG/GLO/01/G34. Environmental Protection Programme Commissioned Report CR/04/129: http://142.103.159.167/countries/tanzania/docs/tanzania_assessment.pdf
- 8 Final Report for an Assessment of the Environment and Health in the Rwamagasa area, Tanzania. UNIDO Project EG/GLO/01/G34. Environmental Protection Programme Commissioned Report CR/04/129
- 9 UNIDO's Strategy for Reducing the Impact of Artisanal Gold Mining on the Health and the Environment - Study case in Ghana – Ludovic Bernaudat, UNIDO http://142.103.159.167/countries/ghana/docs/ghana_summary%20byLudovic%20Bernaudat,%20UNIDO.pdf
- 10 In this regard much work can potentially be done in the form of an African situational analysis to better quantify these trade flows and to assess the sensitivity and effectiveness of the African customs and excise systems (and Green Customs Initiatives).

- Encouraging other regions of the world to restrict their exports of mercury to Africa;
- Improved scrutiny and reporting by all African countries of mercury imports and exports, and routine submission of such data to UNSD; and
- Recording of all liquid mercury imports and exports as elemental mercury (HS code 280540; SITC rev.3 code 52227), including those that may be destined for dental or other uses.

Improved understanding of mercury flows would allow governments to analyse their own specific situation with regard to elemental mercury trade and would help them formulate national and regional priorities, policies and targets.

Regionally, a better understanding of elemental mercury flows could facilitate specific regional actions for countries aimed at reducing the global demand and supply of elemental mercury. Governments can then prioritize specific actions aimed at reducing mercury in various sectors such as products, dentistry and processes.

Globally, better understanding and information on mercury trade flows would provide the basis for the global community to develop global targets and set global priorities aimed at addressing the global mercury problem in line with the priorities and elements of the forthcoming global mercury treaty.



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