

IMPROVING INDUSTRIAL WASTE MANAGEMENT IN AFRICA

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ABSTRACT

This paper is the result of three years of work supporting international companies operating in Africa in their efforts to find secure and properly operated facilities for management of their industrial waste. Multiple studies have concluded that the African infrastructure has not kept up with the legal and regulatory changes that have taken place in recent years. While changes in enforcement and permitting, technical assistance and new international environmental standards through the Basel Convention will all be helpful, the underlying problem is the lack of regional markets sufficient in size to promote private investment. The United Nations and others have recognized that public investment will not be sufficient to make the necessary changes. Yet the system of prior governmental approvals for hazardous waste shipments has basically shut down cross-border waste trade. This paper describes how a system of due diligence in facility reviews could be used to reduce regulatory uncertainty and improve risk management within Africa with the goal of making cross-border markets a reality.

Keywords: Industrial Waste Management, Africa

THE PROBLEM OF INADEQUATE WASTE INFRASTRUCTURE

Hazardous waste in Africa is a problem that increasingly makes the news and excites public opinion. Many of the stories in previous years have featured hazardous waste illegally coming from abroad to Africa, but now there is a significant rise in stories about local waste management problems. As the public focuses more on the issue, there are many theories for what needs to be done to improve the situation. People of good will suggest “environmental management standards” (ESM),ⁱ more education, better laws, more government enforcement, more penalties for illegal waste management, and a variety of other measures. No doubt many of these suggestions would improve the situation, but the thesis of this article is that there is an underlying problem that must be addressed before anything else will work: a *de facto* freeze of cross-border shipments within Africa.



Figure 1: Woman scours Dandora landfill for recyclable material (Sam Wolson).ⁱⁱ

The fears aroused by illegal international dumping in Africa have created a detailed regulatory scheme under the Basel Convention, supplemented by the Bamako Treaty in Africa, that requires trans-border shipments be approved on both ends of the transaction, while banning imports from Europe altogether. Given the political risks of sending waste to an inappropriate destination, the reaction of African Governments has been reluctance to approve of these shipments even within Africa itself, whether exports or imports. Generally, the country of origin of the waste has little information on where the waste producer wants to send it and the recipient country’s government has only a bit more information, i.e. whether it has formal permits or even informal government recognition.

For the reasons discussed in detail below, the system is functioning in a way that precludes the commercial development of adequate industrial/hazardous waste management facilities across the continent. Changes in education or enforcement or permitting will have little effect if there is no commercial incentive to invest, build, and operate modern waste management facilities. The facilities to treat, recycle or destroy hazardous wastes are increasingly specialized and require significant economies of scale to economically function. Without adequate regional markets, that are cross-border by definition, the capacity to properly manage the waste will simply not be built or utilized.

While African countries have made huge progress in revising their laws and regulations on waste management, infrastructure development has not kept pace with these changes.

“The gap between waste management policy and legislation and actual waste management practices is widening due to perennial capacity constraints and lack of waste management facilities for various waste streams. Access to major investments and acquiring the technical know-how needed to resolve the capacity constraints remain a tall order.” United Nations Economic Commission on Africa, Executive Summary, “Africa Review Report on Waste Management,” 2015 (emphasis added).

HISTORY OF ILLEGAL DUMPING

Multiple historical incidents have created a huge climate of mistrust for waste imports in Africa. Well before the widely publicized electronic waste exports to Africa, several cases caused public outcries. *“The late 1980s saw a series of incidents in Africa, which highlighted the poor treatment and management of hazardous waste shipments originating from OECD countries.”*ⁱⁱⁱ One of the most outrageous involved 18,000 drums of wastes “stored” in Koko, Nigeria that were shipped from Italy.^{iv} The waste had a vague description, but actually contained polychlorinated biphenyls (PCBs).ⁱⁱⁱ *“From Morocco to the Congo, virtually every country on West Africa's coast reports receiving offers this year[1988] from American or European companies seeking cheap sites to dispose of hazardous waste.”*^{iv} This phenomenon has been characterized as the waste flows following the course of least resistance (or lowest cost).^v Unfortunately, there have been many examples that illustrate this point. In 1988, a Norwegian shipping company dumped 15,000 tons of material in Guinea, which turned out to be incinerator ash from Philadelphia.^{vi} The waste is reported to have had a significant adverse effect on local vegetation. These improper disposal cases were highly publicized and created an unstoppable narrative that Africa would not be allowed to be a dumping ground for the West.

This history led to not only the Basel Convention, but the more restrictive Bamako Treaty in Africa, both discussed below. The concept of prior informed consent for waste shipments arose and later was modified to ban hazardous waste shipments from OECD countries to Africa altogether, while requiring prior consent for other shipments.

One of the most publicized cases was the Trafigura incident which occurred after the Basel Convention and raised many questions about the effectiveness of its implementation. Cox, G. (2010), The Trafigura Case and The System of Prior Informed Consent Under the Basel Convention – A Broken System? *6/3 Law, Environment and Development Journal*. The Trafigura Beheer BV owned an oil tanker that had some waste that needed to be disposed of. The waste was the result of a

caustic washing of coker gasoline to produce naphtha, a commercial product. The Netherlands port required an expensive treatment of the material from the ship “Probo Koala” after odor complaints. The ship traveled to the Ivory Coast, where its managers sought a disposal alternative from the local government. The local contractor ended up dumping the waste in a number of locations in the Ivory Coast. A huge public outcry arose and major civil and criminal litigation, including thousands of personal injury claims.

Figure 2: Clean-up of the Ivory Coast sites
Intellivoire.net, November 13, 2015.^{vii}



The incident in 2006 has served to make every African Government politically even more nervous about accepting international waste into their countries.

The Trafigura case arose after the Basel Convention and the Bamako Treaty, discussed below. So the issue of the enforceability of the ban of OECD exports and the notion of mutual prior informed consent present in the treaties was challenged by a real case. The incident exposed the gap between paper promises and conditions on the ground in Africa. “...[F]or a state of import to have any real control over hazardous waste imports, a well-developed legal, institutional and technical infrastructure must be in place.” Cox (2010) 279 (emphasis added). Have the Bamako and Basel agreements gone very far to make this a reality?

Since the Trafigura case, it is clear that international dumping from the OECD is being carefully policed. The e-scrap controversies in West Africa are the most visible continued issue, revolving around the issue of what is waste and what is reusable product.^{viii} Waste “leakage” via this route is now being vigorously pursued.^{ix} While imported e-scrap is problematic, there are major efforts underway to address it. The economics of e-waste has reduced incentives to export it to countries where it is not fully recovered.^x The issue is now being overshadowed by locally produced hazardous wastes which have very

limited outlets for proper disposal, treatment or recycling. As Hewlett Packard expert Klaus Hieronymi noted: “*Independent of the source, the real issue is the lack of recycling / waste treatment facilities in developing countries.*”^{xi}

“...the domestic generation of wastes in developing countries has increased and continues to increase. Globally it is outstripping the importation of waste: in most countries managing domestic waste is the issue, rather than imported waste.” Jim Willis, Former Executive Secretary of the Secretariat of the Basel, Rotterdam and Stockholm Conventions, Switzerland.^{xii}

The international incidents that created the political fervor in Africa have now been generally replaced by the large number of local waste problems getting publicity. One of the most tragic involves the death of a three-year girl in South Africa and injuries to several other children from illegal dumping of chemical waste on the roadside in Delft.^{xiii} The chemical waste was produced by a local South African chemical plant. This is unfortunately not unusual in some ways: the City of Cape Town reports that it has spent R350 million a year cleaning up illegal dumping of wastes.^{xiv}



Figure 3: Acid mine pollution from discharge into a local lake.
(Zwanga Mukhuthu, May 22, 2014).^{xv}

Other African countries have now had repeated reports of waste disposal problems stemming from locally produced hazardous waste. In South Africa, acid mine pollution is a major concern. *See* Figure 3. In Algeria, the press has reported on problems disposing of 30,000 tons of medical waste a year.^{xvi} The Sudan reported problems with local factory waste containing lead and other hazardous substances in 2011.^{xvii} In Egypt, the uncontrolled burning of medical waste in Tanta was reported as a problem in the media in January 2016.^{xviii} The UN Food and Agriculture Organization reports over 100,000 tons of old pesticides are improperly being stored or managed in Africa and the Near East.^{xix} In Nigeria, the Agip Oil Company is being investigated for dumping over 450 tons of wastes on local roads.^{xx} All of these cases were locally produced wastes. There are dozens more examples from all over Africa.

Every country produces medical wastes, discarded batteries and e-scrap, spent solvents, used oil, pesticide waste, and many other unavoidable and potentially toxic materials from commercial and even household activities. Most manufacturing involves production of some hazardous wastes as does the development of natural resources from mining and oil exploration.

Cumulative use of pesticides and herbicides produce inevitable additional waste that should be properly managed. After decades of fighting international illegal dumping, Africa countries today find themselves confronting their own local hazardous waste with a weak or even non-existent infrastructure to deal with it.

These local problems will grow as waste generation is projected to increase significantly in the future. “*Waste generation is expected to increase significantly as a result of industrialization, urbanization, and modernization of agriculture in Africa.*” United Nations Economic Commission for Africa (2015).

How do the solutions developed to fight international exports of hazardous wastes to Africa affect the growing problems of locally produced hazardous wastes? Ironically, the solutions to one problem seem to have aggravated finding any solutions to the other problem.

THE BAMAKO FRAMEWORK

The Bamako Treaty requires specific notification and consent on each shipment and does not provide a mechanism for a blanket approval of continual shipments of the same waste stream. ^{xxi} Some of the results from both the Bamako Treaty and the Basel Convention in Africa – despite their good intentions - have been problematic. The movement of waste within African countries is not prohibited by the Basel and Bamako provisions,^{xxii} but the effect seems to have been a fully rigid *de facto* ban. This is difficult to quantify because even basic information is simply not available. The Basel Convention signatories are asked to annually and voluntarily report hazardous waste imports and exports. Most African Governments do not report any import and export information as is apparent on the Basel Convention website. “*While the majority of parties submit the basic information required under Article 13(2), there is substantial and persistent under-reporting by developing country parties regarding the transboundary movement data required under Article 13(3)(b).*” Cox (2010). The latest available online data from the Basel reporting (2011)^{xxiii} contains very little information:

Figure 4: Generation and Transboundary Movements of Hazardous Wastes Reported by Parties in 2011(metric tons)

<i>Country</i>	<i>Generation</i>	<i>Export</i>	<i>Import</i>
Côte d'Ivoire			
Madagascar			
Mauritius	8,825	6,200	
Morocco	256,000	1,316	
Nigeria		111,334	
Swaziland			

Data taken from Basel website for 2011. Blank entries were not completed by the reporting country. Most African countries filed no report at all.

Virtually every country in Africa signed the Basel Convention and many years later there is still not widespread reporting of the data. No African country has reported receiving any imported hazardous waste. We know that there are some legal hazardous waste trans-boundary transactions, but they are an extremely small part of the market and remain confidential and unreported.

In the same vein, a recent private survey of all African governments asked for lists of licensed facilities for treatment, disposal or recycling of hazardous waste in African countries. The response rate – just getting a list of licensed facilities – was below 25%.^{xxiv} The author has encountered numerous anecdotal examples of companies unable to obtain basic information about licensed facilities. Hazardous waste management in Africa remains non-transparent and often falls short of the new legal requirements.

One clear disincentive to allow imported waste is the obligation imposed on the importing country if something goes awry.^{xxv} A number of other Bamako provisions go substantially beyond the Basel Convention and ironically may actually contribute great reluctance of African government officials to approve any actions under the agreement. Ogunlade(2010).^{xxvi} This is particularly true in that so many requirements involve discretionary decisions based on the assessment of each situation in a complex area. It is easier to say “no.”

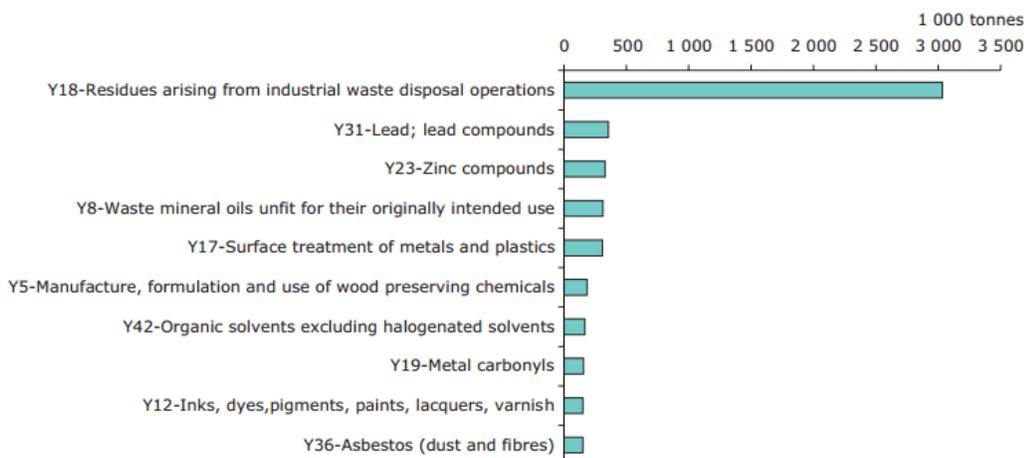
“First, ...[developing] countries may not have the administrative capacity and technology to assess the potential risks to human health and the environment, which makes it difficult for them to assess whether the disposal facilities are suitable. Second, corrupt officials can also abuse the process.” Lipman(2015).^{xxvii}

THE NECESSITY OF TRANS-BORDER WASTE TRADE

The export of hazardous waste in mature regional markets is commonplace. This occurs due to the need for economies of scale and the resultant advantage gained by aggregating waste flows from multiple countries and sources. Specialization within the European Union market, for example, has fostered the development of specific waste facilities in some Member States that depend on trans-boundary waste trade. Generally speaking, the more specialized the waste treatment or recycling process that more need for a regional market to develop a sufficient volume of material for commercial handling. As markets grow more sophisticated, the specialization of the waste management technology increases and the need for a larger regional market grows. *See e.g.* United Nations Economic Commission on Africa (2015).

Within the European Union, approximately 7 million tons of hazardous wastes are exported every year.^{xxviii} Recent reports done for the European Commission also indicate that these numbers may be higher than reported, given that about 28% of the hazardous waste generated in the EU cannot be accounted for in official reports of treatment, disposal or exports.^{xxix} It is also quite interesting to see which hazardous wastes are exported in Europe (keeping in mind that 97% of the total amount goes to other EU Member States).

Figure 3.4 Top 10 hazardous waste types by amounts exported according to 'Y-code' categorisation, 2007



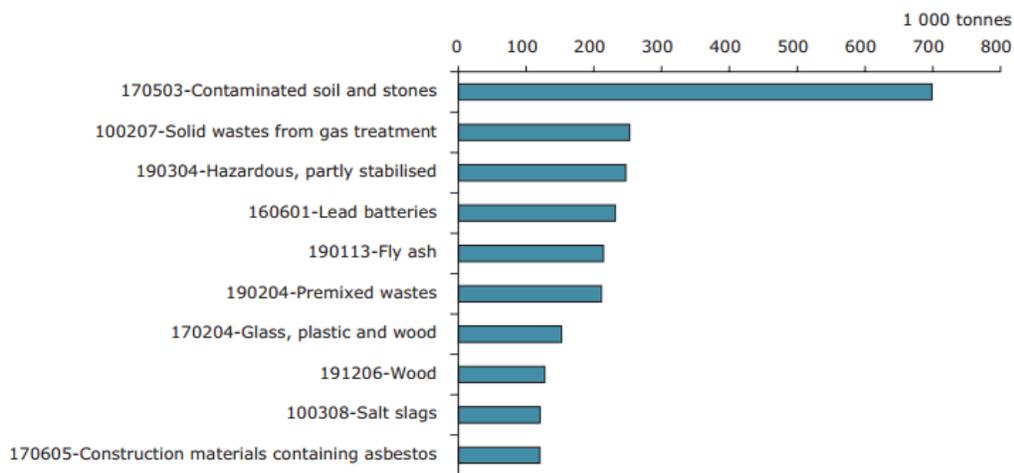
Source: ETC/SCP, based on national reporting to the European Commission (Eurostat).

Figure 5: European Environmental Agency, “Movements of waste across the EU's internal and external borders,” No. 7/2012.

Exports occur even in very large European countries, like Germany. Specialized waste processing and treatment uses cross-border markets to create sufficient economies of scale in Europe. This has been true in Europe where the national economies are much larger and more industrialized than Africa. The need for economies of scale is even more pressing in Africa, where the cost of proper disposal will be more significant to the local economies. Smaller specialized operations for waste recycling and destruction, for example, will have much higher unit costs, even if the market exists for their construction (which is not typically occurring due to trans-border restrictions). Larger scale facilities will allow for lower unit costs and would encourage proper waste management across the region.

The European data – far from being irrelevant – illustrate why Africa needs trans-border markets even more than Europe. The same EEA report breaks down the exported hazardous waste in more detail by waste codes:

Figure 3.5 Top 10 hazardous waste types by amounts exported according to ELW code categorisation, 2007



Source: ETC/SCP, 2009, based on data from 16 countries.

Figure 6: Hazardous Waste Trans-shipped by waste type, European Environmental Agency (2012).

The basic point of this data is that even in a very sophisticated regional market in the EU, hazardous wastes are exported across borders in large amounts for legal treatment, recycling and disposal. Many of the categories of exported wastes are commonly occurring from normal industrial and commercial operations. Remediation wastes are also a very large and common object for export. Addressing the legacy of improper disposal operations in Africa will necessarily raise the need to treat remediation waste streams. Nothing suggests that the export of hazardous waste in Europe is somehow unique or reflective of unique economic activities in the EU. Moreover, experience has taught that making legal shipments difficult or impossible promotes illegal shipments that often cannot be detected or regulated.

For multiple reasons, it is essential that a normal, regulated mechanism for cross-border hazardous waste trade be functional, transparent, and practical.

CASE STUDY IN AFRICA – PROBLEMS AND LIMITATIONS

The history of hazardous waste management in Africa has been problematic due to scandals, lack of non-landfill alternatives, and arrested development. If the Basel and Bamako restrictions have reduced the incidence of illegal international dumping, it is clear that domestic waste disposal problems are growing.

“The single largest implementation challenge remains creating sufficient capacity for environmentally sound management, including, where appropriate, recovery and recycling of various waste streams across Africa. The effort to do this is constrained by access to finance and technical know-how.” United Nations, Economic Commission for Africa, “Africa Review Report on Waste Management.” (2015).

A classic example of technology and know-how transfer to Africa was the East African Compliant Recycling (EACR) center in Nairobi, Kenya. Established by Hewlett Packard, Dell and other organizations in late 2012, EACR was started to be a model for e-waste recycling.^{xxx} Kenya produces about 3000 tons of e-scrap a year and the facility was to start with this market and then become “a hub for the management of e-waste in the broader East Africa region,” according to Herve Guilcher, HP Environment Director for Africa.^{xxxii} This regional effort is part of a broader electronics industry effort by a group called “the E-Waste Solutions Alliance for Africa” which includes HP, Dell, Nokia, Philips and Reclaimed Appliances (UK) Ltd. The Alliance position paper at COP13 describes the objectives and the issue:

“While recognizing the important role of the provisions of the Basel Convention and the Bamako Convention in addressing transboundary shipments of hazardous materials - and e-waste in particular - it is important to realize that efficient e-waste recycling solutions may require a regional approach instead of national approaches. The E-waste Solutions Alliance for Africa believes that, on regional level, it is possible to generate sufficient volumes of e-waste to run state of the art treatment facilities while this may not be economically feasible on national level. Such a regional approach requires harmonized e-waste legislation, and transboundary shipments of e-waste between countries in the region.” (emphasis added).^{xxxiii}

EACR encountered problems with its regional vision. EACR expanded its market in Kenya^{xxxiii} but that expansion did not include imported e-scrap from outside Kenya. Ultimately, the facility had to be closed. The trans-border shipments of equipment for refurbishment or recycling of materials is essential for the e-scrap business model to function. Hieronymi (2016).

Until regional markets can function smoothly in waste management in Africa, the incentives for commercial investment in new facilities will be very limited. While the Kenya case involves e-scrap, the need for regional markets is even more pressing with other types of hazardous wastes, such as the major types of wastes routinely trans-shipped within Europe. Yet the EACR case study illustrates that even with the best intentions and major market players, improving waste management and recycling requires a regulatory climate that does not generally exist in Africa.

REQUIREMENTS FOR COMMERCIAL INVESTMENT IN INFRASTRUCTURE

The criticism of the state of hazardous waste management in Africa often cites the lack of the technical infrastructure to properly manage the wastes. Academics frequently assume that a legal mandate to create the infrastructure and technology transfer will make something happen of its own force. Other writers assume that forms of international assistance ran through often corrupt governments and local officials will lead to some improvement. The truth is that nothing much will happen without strong incentives for private investment in waste management infrastructure. The United Nations Economic Commission for Africa (2015) noted that “[t]he scale of investments needed for proper sanitation and environmentally sound management of wastes is beyond the capacity of African countries.” If private investment incentives are present, the funding is axiomatic. If these factors are absent, then even a large government or corporate grant for construction of a facility may

well give way to eventual bankruptcy as the market will fail to support operating expenses. *See Kenya e-scrap recycling center example.*

The normal requirements necessary for major private investment obviously apply to waste management. The rule of law is one of the key premises. A stable and predictable system of taxes and regulation is an important part of that premise. But a key element is the adequacy of the market to support a profitably scaled facility. Experience in Europe, for example, clearly indicates that a trans-boundary market will be essential in smaller countries to allow for either their development of proper hazardous waste facilities or their use of another country's facilities. Even larger African countries normally will need regional markets and can also benefit from economies of scale to lower unit costs. As the policies of African Governments more and more reflect the "waste hierarchy" and the need to move away from landfilling (particularly of hazardous wastes), the need for larger markets for specialized waste services will only grow.

Yet it is widely observed that lawful and approved trans-boundary shipments of hazardous wastes in Africa are unusual. The process for approval is problematic and normally the countries on both ends of the transaction lack the information and expertise to have the confidence to approve of the deal. Given the known adverse political consequences of a wrong decision, an impasse is the normal situation.

Solutions for the future

There needs to be a concerted effort to break the deadlock concerning international approval of waste shipments within Africa. This also must involve raising the level of due diligence of facility approvals to promote best waste management practices. The problem is that the government officials involved in the process of approving trans-border shipments lack the means of exercising the requisite level of due care. This is a function of lack of budgets, lack of experience, and the absence of serious technical support.^{xxxv} The proposal to create guidelines on environmental management may help provide a benchmark for countries struggling to find solutions,^{xxxvi} but without a basic viable business model, the guidelines will not themselves produce any facilities on the ground.

"It is very easy for countries to adopt things, but this is something that has to happen on the ground. It is easy to say all you need for developing countries and industries to have the necessary capacities and skills, but how do you get there?" Jim Willis, Former Executive Secretary of the Secretariat of the Basel Convention.^{xxxvii}

Training on hazardous waste management for government officials

Some systematic form of training of officials involved in the Basel process is essential. This has to go beyond the simple set of references to the laws and regulations in effect. The legal prescriptions on treating and handling waste have never been able to anticipate all of the issues and problems that can arise. The only proven methodology is review of each facility's risk factors. This is very site specific and does not lend itself to formulas or prescriptive solutions. In the commercial world, this type of expertise is, however, taught by detailed training. Some mechanism is essential to provide this across the many

governments in Africa and it must include multiple people in each national ministry. A side benefit may be improved technical management of permits, approvals and enforcement as the level of sophistication of the regulatory officials is increased.

It is not clear that merely learning some abstract guidelines will result in any real expertise in reviewing the environmental and public health propriety of using a given waste facility. This type of approach has the same problems as the certification systems: it is impossible to prescribe all of the variables into a set of written rules or standards. The training will have to involve real world examples and site-specific issues. Even certified facilities can change over time and require periodic monitoring and inspection.

Mandatory public list of permitted facilities on central data base

There is no clear way to find licensed hazardous waste facilities in Africa. No central data base provides current information and many governments seem to not have readily accessible answers. One database with all of the facility contact information, type of wastes approved for handling, and confirmation of licensing should be available to the public in a completely transparent manner. Information regarding potential trans-border facilities should be accessible and readily identifiable and periodically updated.

Inter-governmental access to permits and enforcement material

The status of enforcement cases, license restrictions, and known issues that might affect the suitability or legality of using a facility should also be available to other African government officials. Some type of systematic structure and process should be created to allow other African countries' officials charged with Basel pre-shipment approvals to have known problematic information in advance. In a professional due diligence waste program, this information may typically trigger one of the periodic inspections normally used in such programs to manage waste disposal risks (described below).

Creation of facility review mechanism and reports for sharing across the region

Most important of all, every African Government should have access to detailed facility reviews performed by professional "auditors" that objectively review the local risk factors on use of a facility, including its design, technology employed, inventory of untreated waste, regulatory status, pending complaints by neighbors, known releases to air, water or the soil, site specific risk factors (receptors), and financial viability. The international commercial sector has proven that this information can be economically collected by professional reviewers over relatively short time frames and with reasonable cost. An annual program competitively bid to third-party-auditors that bundles reviews into three or four facilities at a time with a fixed protocol can deliver reports at low cost and with high quality. Measures have to be incorporated to assure "calibration" and quality control, but the techniques are now well-established. Many companies have policies now that require that they periodically review facilities for handling their wastes and other spent materials. The risk of liability and bad press creates a

need to know enough about the vendor to reduce the subsequent risks of improper disposal problems. Countries working under a prior informed consent system have very similar interests that can be addressed with similar safeguards. The Basel process basically requires “the competent authority in the country of export to make an independent assessment on a case-by-case basis of the suitability of the processes and facilities in the country of import.” Cox (2010).

The African regional centers for Basel coordination were envisioned to provide some technical support. But they obviously cannot provide this level of expertise and training, at least without extensive external resources. They could play a key role as venues for the training, build on their existing relationships and benefit from the process by also adding to their expertise and experience.

It is impossible to envision a future where more than forty African national governments each have officials trained to do these reviews, have the budget to do them on a sufficient scale, and can be expected to perform them without issues of corruption arising in some places. A commercial set of independent contractors, competitively bidding the work through a central African clearing house, is feasible, cost-effective and proven to work. A variety of possible umbrella organizations could serve this function, especially after an initial project to establish protocols and procedures. Possibly a nominal fee for importing above a *de minimus* quantity could be imposed to cover the cost of reports in the future. Corporate and commercial efforts have demonstrated that a collective system of reviews and reports can be done at a relatively small cost compared to waste management costs. This is also a small fraction of the cost of improper waste management.

In this scenario, each African Government importing or exporting hazardous wastes would have details on the facility where it is destined to be managed, as well as trained personnel to evaluate the reports. We know this approach works and is feasible. This would also provide a direct way to utilize any ESM guidelines developed as part of the Basel Convention process. It is difficult to imagine any other approach that would allow informed consent and risk management of hazardous wastes in Africa to work effectively. It is also imperative that some mechanism be developed to allow the formation of normal regional markets for commercially-viable industrial waste management infrastructure and the responsible stewardship of the industrial waste management sector.

Africa has made a great deal of progress in the codification of hazardous waste management rules that will increase the protection of the environment and public health. The level of public concern over improper waste disposal is growing. The missing piece is practical ways to improve the situation before even more damage is done. The use of proven methods to increase confidence in proper disposal and treatment and to effectively encourage the use of such facilities would be a big step forward.

NOTES

- ⁱ “[20 Jahre Anlaufstelle Basler Übereinkommen](#)” (20 Years Focal Point Basel Convention), *Auswertung des Kolloquiums 20 Jahre Anlaufstelle Basler Übereinkommen*, April 1, 2016 [a conference on the Basel Convention].
- ⁱⁱ Gossman, Christina, “Kenya's e-waste soldiers of ill fortune,” *Mail & Guardian*, February 14, 2014. Photo credited to Sam Wolson. Website <http://mg.co.za/article/2014-02-13-kenyas-e-waste-soldiers-of-ill-fortune> accessed December 5, 2016.
- ⁱⁱⁱ Cox, Gary, “The Trafigura Case and The System of Prior Informed Consent Under the Basel Convention – A Broken System?” *6/3 Law, Environment and Development Journal* (2010).
- ^{iv} American University, “Nigeria Waste Imports from Italy” (NIGERIA). (1999, April 16). Retrieved November 16, 2016, from <http://www1.american.edu/TED/nigeria.htm>
- ^{iv} Brooke, J. (1988, July 17) “West Dumpers Turning to West Africa,” *New York Times*, retrieved November 15, 2016, www.nyt.com.
- ^v Kummer, K., *International Management of Hazardous Wastes: The Basel Convention and Related Rules* (Oxford: Clarendon Press, 1995).
- ^{vi} Brooke, *New York Times* (1988).
- ^{vii} Website <http://intellivoire.net/probo-koala-des-victimes-attendent-des-indemnisations-9-ans-apres-le-deversement-des-dechets/> accessed December 5, 2016.
- ^{viii} The issue is complex since many materials are not functional products but are valuable raw materials or reusable scrap and not really waste. The focus of only allowing products to be shipped out of the OECD actually hurts recycling, since the biggest market for the raw materials – where they can be readily re-used – is often outside the OECD. See “[20 Jahre Anlaufstelle Basler Übereinkommen](#)” (20 Years Focal Point Basel Convention), *Auswertung des Kolloquiums 20 Jahre Anlaufstelle Basler Übereinkommen*, April 1, 2016 [a conference on the Basel Convention]. Restrictions on scrap metal shipments have also made legitimate recycling more difficult. *Id.*
- ^{ix} See United Nations University, “Our World” website, “[Toxic E-Waste Dumped in Poor Nations](#),” December 16, 2013; Basel Convention E-Waste Africa Program, “[Where Are WEEE in Africa?](#)” (noting that about 15% of the electrical material imported is actually wastes and cannot be sold “as is” or refurbished); Dejo Olowu, “[Menace of E-Wastes in Developing Countries: An Agenda for Legal and Policy Responses](#)”, 8/1 *Law, Environment and Development Journal* (2012), p. 59.
- ^x One international expert openly discusses the facts under all of the hype: “*Yet in recent years, academic and UN-sponsored research has shown that the problem is far more complex – and, in all respects, smaller – than what’s being depicted.*” Adam Minter, author of *Junkyard Planet*, [Shanghai Scrap blog](#), June 16, 2015. He argues most of the waste being improperly handled there is not imported. In fact, since 2012, the [emerging economies are producing more e-waste](#) than the United States, for example. A major 2015 [study by Interpol](#) and others found that “*discarded electronics mismanaged within Europe equals ~10 times the volume of e-Waste exported.*”
- ^{xi} Klaus Hieronymi, *Global Resource Efficiency Strategies*, Hewlett-Packard Company, *Kolloquium: 20 Jahre Anlaufstelle Baseler Übereinkommen*, April 1, 2016 (“20 Years Focal Point Basel Convention”).
- ^{xii} *20 Jahre Anlaufstelle Baseler Übereinkommen*, supra, p. 11.
- ^{xiii} See [Cape Times](#) (South Africa), April 24, 2013. “*A further 20 adults and children were admitted to hospital, suffering from nausea, coughing fits and respiration problems after being exposed to the bags of poisonous powder.*” *IOL News*, April 24, 2013.

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- ^{xiv} City of Cape Town, January 22, 2015. [handout on website www.capetown.gov.za/en/Pages/Cityofferscashrewardsflushoutillegaldumpers.aspx accessed July 9, 2016].
- ^{xv} Website <http://amabhungane.co.za/article/2014-05-22-pipelines-pass-their-best-by-date> accessed December 5, 2016.
- ^{xvi} Newsletter online, www.djazair.com/alfadjr/184419, accessed December 5, 2016.
- ^{xvii} Website, <http://sudaneseonline.com/board/290/msg/1276515017.html>, accessed December 5, 2016.
- ^{xviii} Website, <http://www.masress.com/almesryoon/1014015> accessed December 5, 2016.
- ^{xix} Food and Agriculture Organization of the United Nations, website <http://www.fao.org/newsroom/highlights/2001/010502-e.htm>, accessed December 5, 2016. Several companies have also reported to the author problems of securing proper disposal of pesticides.
- ^{xx} Presentation by ENHESA to CHWMEG Spring Meeting, Orlando, Florida, April 2015).
- ^{xxi} *“While the Bamako Convention totally bans the import of hazardous wastes into Africa, it permits the transboundary movement of hazardous wastes generated within Africa subject to very stringent regulatory control. It insists on specific shipment notification notwithstanding the frequency or characteristic similarity of the wastes being carried thus ensuring proper monitoring of individual wastes shipment and safeguarding against the vulnerability to abuse which the general notification under the Basel Convention is susceptible to. Furthermore, the specific provisions on strict, unlimited, joint and several liability of persons and punitive measures against persons involved in illegal traffic and generation of wastes would act as deterrent against engaging in such ‘act of criminality’.”* Adebola Ogunlade *“Can The Bamako Convention Adequately Safeguard Africa’s Environment in the Context of Transboundary Movement of Hazardous Wastes?”* CAR (CEPMLP Annual Review) > CAR Volume 14, p. 12.
- ^{xxii} However, the movement of wastes from industrialized countries (OECD) to Africa is prohibited now under both the Basel Convention and Bamako Treaty. *“A flagship difference between the Basel and Bamako Conventions is the outright ban imposed by the Bamako Convention on the import of hazardous wastes into Africa. Article 4(1) specifically obliges parties to take appropriate legal, administrative and other measures within their jurisdictions to prohibit the import of all hazardous wastes, for any reason, into Africa from non-contracting parties, and that all such imports shall be deemed illegal and criminal.”* Ogunlade, (2010).
- ^{xxiii} Website, www.basel.int/Countries/NationalReporting/StatusCompilations/tabid/1497/Default.aspx accessed December 5, 2016.
- ^{xxiv} Survey conducted by the author in 2014 sent to 43 African government officials listed as points of contact on the Basel Convention website.
- ^{xxv} *“With regards to the handling of an illegal traffic waste, the Basel Convention stipulates that in the event that the illegality is from the importer or disposer, the state of import shall ensure that the wastes are disposed of in an environmentally sound manner by the importer or disposer or if necessary, by itself within 30 days from the time the illegal traffic came to its attention or such other period as the states concerned may agree. The Bamako Convention captures it in more strong wordings that in the event of illegality from importer or disposer, the state of import shall ensure that the wastes are returned to the exporter by the importer and that appropriate legal proceedings be taken against the contravenor(s). Conversely, where the illegality is from the exporter or generator, both Conventions oblige the state of export to ensure that the wastes are taken back by the exporter or the generator or if necessary, the state concerned.”* Ogunlade, (2010), p. 15.
- ^{xxvi} Ogunlade, Adebola (2010) , *“Can The Bamako Convention Adequately Safeguard Africa’s Environment in The Context of Transboundary Movement of Hazardous Wastes?”* CEPMLP review (CAR) 14 (University of Dundee, Centre for Mineral, Petroleum and Energy Law Policy).
- ^{xxvii} Lipman, Zapa, *“Trade in Hazardous Waste,” International Environmental Law and the Global South, eds S Alam, S Atapattu, CG Gonzalez, J Razzaque, Cambridge University Press 2015, chapter 12.*

^{xxviii} European Environmental Agency, “Movements of waste across the EU's internal and external borders,” No. 7/2012.

^{xxix} BIPRO, “[Support to Member States in improving hazardous waste management based on assessment of Member States' performance](#),” Reference: ENV/2014/SI2.689463/ETU/A2, FINAL REPORT December 2015. This has led to new EU efforts to assure more thorough tracking monitoring of waste shipments.

^{xxx} Website, <http://www.eastafricancompliantrecycling.net/about-us>, accessed July 14, 2016.

^{xxxi} Panapress, “US computer firm intensifies battle against e-waste in Africa,” December 28, 2012, website <http://www.panapress.com/US-computer-firm-intensifies-battle-against-e-waste-in-Africa--13-856372-18-lang1-index.html> accessed December 5, 2016.

^{xxxii} Problems with the Basel Convention creating barriers to the recycling and recovery market have been widely noted for the last six or seven years. Efforts to try to streamline the process or create an additional framework to promote recycling have been both extensive and limited in their success. A certification scheme seems to be the main policy option from the signators and stakeholders. See “Shifting Paradigms: From Waste to Resources, Non-Paper, Executive Secretary of the Basel Convention, February 2011. This theme has continued into 2016. Kolloquium: 20 Jahre Anlaufstelle Baseler Übereinkommen, April 1, 2016 (“20 Years Focal Point Basel Convention”).

^{xxxiii} Coast Week, July 29, 2016, website <http://www.coastweek.com/3724-extra-10.htm> Accessed December 5, 2016.

^{xxxiv} Dell Computer presentation at 13th International Electronics Recycling Congress IERC 2014, January 22 – 24, 2014, Salzburg, Austria).

^{xxxv} “...there is the self-verification problem. The Basel Convention places exporters under an obligation to ensure that adequate waste treatment facilities are available in the country of import and that these form part of contractual obligations. At face value, this is simply a two-way exchange of information. The exporter is reliant on the representations made by the competent authority in the country of import. Abrams considers the environmentally sound waste management standard in the Convention to be ambiguous as to the locus of responsibility [footnote omitted]. It could be argued that it should require the competent authority in the country of export to make an independent assessment on a case-by-case basis of the suitability of the processes and facilities in the country of import. There is an obvious tension here between state control over imports and state control over exports, as well as clear practical difficulties with exporters exercising a full duty of care obligation.” Gary Cox, “The Trafigura Case and The System of Prior Informed Consent Under The Basel Convention – A Broken System?” [6/3 Law, Environment and Development Journal \(2010\), p. 263](#).

^{xxxvi} The assumption often made by decision-makers is that policy or guidance will lead to implementation on the ground, as if the words themselves create the power of change. See note 2. The reality is that economics on the ground drives most of these processes, often disregarding the law and normally paying little attention to mere guidelines. Kummer described it as the path of least resistance (i.e. lowest immediate economic cost) and it is a persistent problem in waste management.). K. Kummer, *International Management of Hazardous Wastes: The Basel Convention and Related Rules 6* (Oxford: Clarendon Press, 1995).

^{xxxvii} 20 Jahre Anlaufstelle Baseler Übereinkommen, *supra*, p. 12.