Transnational Trafficking of Hazardous Waste from Developed to Developing Nations: Policies and Recommendations

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Résumé :

(traduction)

La traite transnationale de déchets électroniques est devenue un problème de plus en plus préoccupant avec le temps alors que la quantité de déchets produits dans les pays développés continue à augmenter. Au fil du temps, l'accent s'est déplacé des moyens traditionnels d'élimination de déchets industriels vers la mise au rebut de déchets électroniques. Cette acceptation de déchets dangereux entraîne souvent des effets néfastes pour la santé dans le pays importateur. Dans le cadre d'une étude de cas, on examine l'histoire, les conséquences, les politiques actuelles et des recommandations pour le trafic de déchets dangereux dans le contexte de l'Afrique de l'Ouest. Suite à l'analyse, il est évident que, malgré des politiques rigoureuses de la part des importateurs, d'autres facteurs interviennent, notamment l'expansion économique et la corruption, qui continuent d'alimenter l'importation de déchets électroniques. Par conséquent, les recommandations s'adressent aux pays exportateurs qui disposent généralement d'une économie, de systèmes politiques, et de technologies bien développés, augmentant ainsi la probabilité d'une maîtrise de la situation.

Mots-clés :

E-gaspillage, gaspillage, trafic transnational, politique publique, Afrique de l'ouest

Abstract:

Transnational trafficking of e-waste has become a rising problem over time as the amount of waste produced in developed countries increases. Over time, the focus has moved from traditional industrial waste disposal to e-waste disposal. This acceptance of hazardous waste often leads to adverse health effects in the importing nation. As a case study, the history, consequences, current policies, and recommendations for hazardous waste trafficking are considered in the context of West Africa. Following the analysis, it is clear that despite strong policies on the importers part, there are confounding factors, such as economic expansion and corruption, which continue to drive the import of e-waste. Therefore, the recommendations are addressed to exporting nations which generally have well-developed economies, political systems, and technology thus increasing the likelihood of control over the situation.

Keywords:

E-waste, transnational trafficking, policy, West Africa

Introduction

As the global population continues to increase, accordingly, so does the amount of waste produced. In addition, there is often a lack of resources in industrialized nations to accommodate such waste expansion. As a result, many developed nations often look for alternatives such as exporting their waste to developing countries. Developing countries, despite experiencing adverse health effects, are often inclined to accept these exports in prospect of economic growth.

Traditionally, waste export has been focused on hazardous wastes such as radioactive material and sludge; while recently, e-waste has become center stage. "E-waste refers to end-of-life electronic products, including televisions, monitors, computers, audio and stereo equipment, video cameras, telephones, fax/photocopy machines and printers, mobile phones, wireless devices, chips, motherboards, cathode ray tubes and other peripheral items" (Frazzoli, Orisakwe, Dragone, & Mantovani, 2010, p. 388). Although extensive policies exist concerning transnational trafficking of hazardous waste, e-waste continues to be a problem for many developing nations. As a case study, the history, consequences, current policies, and recommendations for hazardous waste trafficking will be considered in the context of West Africa.

Hazardous Waste Trafficking in the Past

It is currently believed that toxic waste dumping from developed to developing nations began in the late 1980s (Lipman, 2011). From this period on, there have been numerous examples of hazardous waste dumping incidents. These incidents, although negative for the general health of the importing country, often resulted in the creation of policies which will be discussed later. Within this section, a few notable incidents will be described.

Kassa Island, Guinea (1988)

In March, 1988, a Norwegian shipping company dumped 15, 000 tonnes of incinerator ash from Philadelphia into a quarry on Kassa Island. This incident was discovered when the island's vegetation began to die (Vir, 1989). Subsequent investigations led to the discovery of a contract wherein Guinea was to receive a total of 85, 000 tonnes of waste (Vir, 1989).

Koko, Nigeria (1988)

In May, 1988, 900 tonnes of toxic waste was exported from Italy to Koko, Nigeria. Of these 900 tonnes of toxic waste, 150 tonnes were PCBs. Other imported chemicals included formaldehyde and methyl melamine, both of which are suspected carcinogens. This import of toxic waste from Italy was facilitated by a construction company, whose member, Gianfranco Rafaelli, had previously acquired land in Nigeria. As opposed to listing the chemicals that were actually being imported, the construction company applied for a permit to import mineral wax, polishing oil, cinder ash, and other industrial chemicals (Gbadegesin, 2001).

Abidjan, Ivory Coast (2006)

In 2006, 17 people died (United Nations Office on Drugs and Crime, 2009) and over 80, 000 were forced to seek medical attention due to vomiting, nosebleeds, and difficulty breathing in Abidjan, Ivory Coast (Mason, 2006). This was the result of 500 tonnes of toxic waste that was dumped by Trafigura management in 14 sites around the city— primarily sites near water and agricultural sources (Mason, 2006). Mason explains that "The waste from the ship had been brought in the hold of the Probo Koala along with a shipment of petroleum that was delivered to Nigeria [from Europe]" (Mason, 2006, para. 5). Mason describes that when the waste was analyzed, sulphur hydrocarbon was found. Sulphur hydrocarbon is highly toxic and is found in several types of crude oil. It is estimated that proper treatment of this waste would have cost the exporting country $250, 000 (Mason, 2006) while in Africa they were charged only $18, 500 (United Nations Office on Drugs and Crime, 2009).

Hazardous Waste Trafficking in the Present

Incidents of toxic waste dumping in developing countries prior to 1992 generally involved wastes that were by- products of industry (for example, petroleum refining and pesticide manufacturing industries) such as radioactive material, sludge, and heavy metals. Post-1992, there have been few cases of such toxic waste dumping; instead, the focus

has become e-waste (United Nations Office on Drugs and Crime, 2009). The United Nations Office on Drugs and Crime (UNODC) (2009) estimates that 94, 900 tonnes of e-waste is trafficked from developed to developing nations annually. Transnational trafficking of e-waste, similarly, is not always straightforward.

"US legislation authorizes the export of second-hand goods [electronics] for reuse or recycling operations" (UNODC, 2009, p. 57); however, recycling operations in developing countries are generally primitive or non-existent (Frazzoli et al., 2010). Common methods of crude recycling include:

i. stripping of metals in open-pit acid baths to recover valuable metals [such] as Ag [silver], Au [gold], Cu [copper] and Pt [platinum],

ii. removing electronic components from printed circuit boards by heating over a grill using

iii. honeycomb coal blocks (coal mixed with river sediment which is contaminated) as fuel,

iv. chipping and melting plastics without proper ventilation,

v. burning cables for recovering metals, and also burning unwanted materials in open air,

vi. disposing unsalvageable materials in fields and riverbanks,

vii. toner sweeping[1], and

viii. dismantling electronic equipment (Frazzoli et al., 2010).

Alter (1997) argues that importing hazardous wastes from developed countries can actually be beneficial to developing countries as it conserves natural resources, reduces energy demand, removes hazardous components, and provides raw materials for industrial growth; however, this is questionable when considering the crude recycling methods mentioned above.

European law, as opposed to US law, prohibits the export of non-functioning electronics to non-Organization for Economic Co-Operation and Development (OECD) countries; however, there are currently no regulations to ensure that all second-hand electronics being exported are functioning (UNODC, 2009). This often results in e-waste being exported to developing countries under the title of 'functioning electronics intended for second hand use'. According to the Basel Action Network (BAN) (2006), in general, 25% of exported electronics are functional and 75% is e-waste.

Frazzoli et al. (2010) support this by explaining that in Africa, e-waste is often discarded by riverbanks where it is subsequently manually disassembled to acquire working pieces, leaving those pieces that are non-functional to be burned. Consequently, residents frequently use the water that resides next to these landfills and open burning sites for washing, cooking, and drinking (Frazzoli et al., 2010). The direct use of water contaminated by toxic waste and their by-products often leads to adverse health effects. Despite the health consequences of importing hazardous wastes, "economic compulsions, the generation of employment opportunities, and the short-sightedness of national governments create[s] incentives" (Sonak, Sonak, & Giriyan, 2008, p. 144).

E-waste and Health

Various forms of e-waste may include chemical compounds such as PCBs and persistent organic pollutants (POPs), as well as chemical elements such as barium, cadmium, mercury, nickel, lead, zinc, lithium, chromium, and beryllium in their components. Additional chemicals such as polycyclic aromatic hydrocarbons (PAHs), polychlorinated dibenzo-p-dioxins and furans (PCDD/Fs), and dioxin-like polychlorinated biphenyls (DL PCBs) may be released as a result of incineration (Frazzoli, et al., 2010). Frazzoli et al. explain that POPs, aluminum, mercury, manganese, and lead affect children's neurological development while chromium, arsenic, and PAHs increase the risk of cancer. Furthermore, POPs (Frazzoli et al., 2010) and DL PCBs (National Institute of Environmental Health Sciences, 2011) have been classified as endocrine disruptors. Endocrine disruptors are chemicals that interfere with the body's endocrine, or hormone, system and may result in undesirable effects experienced in the neurological, immunological, and reproductive systems (such as reduced fertility) (National Institute of Environmental Health Sciences, 2011).

Many of the above-mentioned chemicals, in addition to their adverse effects, are prone to bioaccumulation and often resist biodegradation (Frazzoli et al., 2010). This co-bioaccumulation of multiple chemicals may result in unpredicted health consequences, as the study of mixture effects is still a challenge (Frazzoli et al., 2010). Further-

more, bioaccumulation facilitates the spreading of chemicals as levels are often amplified in food sources and are able to be passed from mother to child through breastfeeding. A lack of health care services and resources, often experienced in developing countries, typically results in the inability to mitigate the health consequences of e-waste (Sonak et al., 2008) which are most often cancer, congenital malformations (Musmeci et al., 2010) endocrine disruption, and neurotoxicity (Frazzoli et al., 2010).

Current Policies

Harmful Wastes (Special Criminal Provisions) Act No. 42 Chapter 165 (1988)

This act prohibits the "carrying, depositing and dumping of harmful waste on any land, territorial waters and matter relating thereto" in Nigeria (p.1) and was enacted as a "response to the dumping of toxic waste in Koko, Delta State, Nigeria in 1988" (Onyenekenwa, 2011).

Bamako Convention on the Ban on the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa (1991)

This convention bans the import of hazardous waste into many West African countries; however, Nigeria and Ghana are not signatories (UNODC, 2009).

Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (1989) and the Basel Ban (1995) amendment to the Basel Convention

The Basel Convention made it possible for countries to track and monitor the flow of hazardous waste globally; however, it was not able to stop the flow (UNODC, 2009). The Basel Ban amendment to the convention reduced levels of trafficking by prohibiting OECD countries from exporting their hazardous waste to non-OECD countries (UNODC, 2009). This, in turn, placed the responsibility on the exporter rather than the importer in an attempt to address the imbalance of power between developed and developing countries (Sonak et al., 2008). Sonak et al. state that "The exporting State is obliged not to permit any exporter of hazardous wastes to commence transboundary movement without written consent from the importing State, as well as any State of transit" (p. 147). Many countries refused to sign this convention, notably the USA, despite their role as one of the largest producers of hazardous waste (Sonak et al., 2008).

US Environmental Protection Agency (EPA)'s Import-Export Program: International Trade in Hazardous Waste (1998)

This regulation requires US exporters to submit documents, or notifications, in three phases of an export: before a shipment proceeds, while a shipment is in transit, and annually. The US currently has multiple agreements between itself and international countries which all include "the basic principles of notification to the government of the exporting country, government-to-government notification to the importing government, and the consent of the importing government for exports and imports of hazardous wastes" (EPA, 1998, para. 6).

Recommendations

The following recommendations are made in consideration of the US government as the US is currently one of the largest producers of e-waste in the world (Sonak et al., 2008).

Recommendation #1: create sustainable products

As previously mentioned, it is estimated that 94, 900 tonnes of e-waste is trafficked annually (UNODC, 2009). Such a large quantity of e-waste can likely be attributed to short product lives—a quality of technology that is becoming familiar throughout the developed world. Many of the electronics that contribute to e-waste, such as cameras, cell phones, computers, etc. become obsolete quickly due to rapid technological advances. Therefore, it is clear that developing sustainable electronics would likely reduce the amount of e-waste produced. This can be challenging considering that American society is primarily economically driven and any increases in product lives would likely reduce profit.

Recommendation #2: create a federal policy concerning e-waste specifically

In reviewing the current policies that exist pertaining to Nigeria, primarily the *Harmful Wastes Act* and the *Basel Convention*, it is clear that regardless of strong policies,

transnational trafficking of e-waste into Nigeria still occurs. Onyenekenwa (2011) explains that "Corruption makes a mess of implementation of even faultless policies in Nigeria and puts to waste resources employed in producing them" (p. 258).

Therefore, with the knowledge that corruption exists in Nigeria, the responsibility should be placed on the exporting nation to ensure that exported electronics intended for second hand use are indeed functional. Currently, according to the EPA's *Import-Export Program*, the US is permitted to export e-waste to developing nations with their consent. This is not pragmatic when considering the crude recycling methods often employed by developing nations as well as the high levels of corruption previously mentioned. Nigeria, for example, is likely to consent to importing e-waste regardless of health consequences and a lack of proper recycling techniques in prospect of economic gain.

Moreover, there are policies for which either the US or certain developing nations are not party to, principally the *Basel Convention* and *Bamako Convention*. These conventions both protect developing nations from e-waste trafficking; therefore, signing these conventions would likely decrease e-waste trafficking. This is clearly not all that is required to solve the problem, as e-waste trafficking is still prevalent among signatories. This is to be expected when considering the corruption and the promise of economic gain in developing countries as mentioned above.

In order to avoid such corruption, it falls upon the exporting country to restrict exporting e-waste to developing countries that are incapable of properly processing them. In the US, there is currently no federal policy concerning e-waste specifically. The EPA's *Import-Export Program* addresses hazardous waste as a whole; however, this program does not account for the distinctive characteristics of e-waste, such as their potential use as second hand goods, which allows them to be imported through unique channels. The US, in response to growing e-waste, has delegated the responsibility to the states as opposed to creating a federal legislation. Greenemeier (2009) explains that in 2009, only 19 states had enacted e- waste laws while 14 states had e-waste laws pending. This leaves many states with no laws regarding e-waste and also creates confusion among manufacturers. Different regulations concerning e-waste across states require manufacturers to continuously alter their production, ultimately increasing production costs (Greenemeier, 2009).

In formulating a federal policy regarding e-waste explicitly, the US may look to Europe as an example. In Europe, there are currently several laws which address e- waste. The EU's *Restriction on the Use of Hazardous Substances (RoHS)*, for example, is a policy that "bans new electronics containing more than agreed-to levels of lead, cadmium, mercury, hexavalent chromium, and polybrominated biphenyl (PBB) as well as polybrominated diphenyl ether (PBDE) flame retardants" (Greenemeier, 2009, para. 5). Greenemeier (2009) explains that the EU also has *The European Community's Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) program* which "addresses manufacturers' responsibilities to manage risks from chemicals in their products" (para. 5) and the EU's *Waste Electrical and Electronic Equipment (WEEE)* which "directs e-waste management" (para. 5). A comprehensive, well-implemented, federal policy would likely reduce confusion in the US regarding e- waste as well as reduce overall production and export.

Recommendation #3: invest in local e- waste recycling programs

Presently, the US, like many other developed nations, creates more e-waste than they can physically dispose of. In addition, it is often cheaper to export this large amount of e -waste for recycling than it is to dispose of it in the developed nation. This option, despite economic benefits, often leads to adverse health effects for the importing nation if recycling methods are not current. In order to avoid this, exporting nations might invest in local e-waste recycling programs. Local recycling programs would reduce the cost of transportation, reduce the time needed for proper documentation and communication between countries, and reduce the cost associated with fines for taking part in illegal waste dumping. Quan (2011) describes how a Canadian company in Toronto was fined $30, 000 for transporting 1, 200 used lead acid batteries and 7 cathode ray tube monitors to Hong Kong without China's consent.

Furthermore, if local companies are paid to properly dispose of their e-waste, in theory, the economy of the nation may improve. This would occur by creating job opportunities and possibilities for importing other nations' e-waste. Overall, disposing of e-waste locally ensures that recycling processes are modern, legal, and encouraged.

Recommendation #4: develop partnerships with developing nations

As Alter (1997) previously mentioned, recycling can be beneficial for developing nations if they have appropriate recycling techniques, which currently they do not. If developed nations were to partner with developing nations to create sustainable recycling centers for hazardous waste, it would likely benefit both the exporting and importing nations. Exporting waste to a developing nation would likely remain cheaper than disposing of waste in a developed nation (due to variations in nations' economies), while partnerships would ensure legality, safety, and economic growth in the developing nation.

Conclusion

Transnational trafficking of hazardous wastes, believed to have commenced in the late 1980s, has undergone substantial changes with advances in technology. Over time, the focus has moved from traditional industrial waste disposal to e- waste disposal. More often than not, e- waste is trafficked from developed nations to developing nations through third parties for disposal. This is in part motivated by a lack of resources in the exporting nation to properly dispose of e- waste as well as the reduced cost associated with trafficking. However, due to the crude recycling methods currently in place in developing countries, this transfer of e-waste often leads to adverse health effects—most often cancer, congenital malformations, endocrine disruption, and neurotoxicity in the importing nation. In order to prevent such health outcomes and inequity, multiple policies have been implemented by both the developing nations and the developed nations involved. In analyzing these policies, it is clear that despite strong policies on the importers part, there are confounding factors, such as economic expansion and corruption, which continue to drive the import of e-waste. Therefore, the above recommendations are addressed to exporting nations which generally have well-developed economies, political systems, and technology thus increasing the likelihood of control over the situation. Finally, as e-waste disposal is a comparatively new concern, it is recommended that more research be completed in this topic.

Notes

[1] A method where by workers without any protective respiratory equipment open cartridges with screw drivers and use paint brushes and bare hands to wipe toner into a bucket. In this process, constant clouds of toner are created and inhaled. Material Safety Data Sheets (MSDS) for carbon black and other ingredients indicate that they may cause lung and respiratory irritation while other documentation suggests that they may be a carcinogenic (Puckett et al., 2002).

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