

## THE INTERNATIONAL TRAFFIC IN HAZARDOUS WASTES

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### ABSTRACT

Some waste producers and handlers in the developed countries ship hazardous wastes to the less developed countries. Numerous cases of such exports have been documented, but an overall assessment of the nature, scope, causes, and consequences of the problem, and of potential solutions to it, has been lacking. As a result, these issues remain a subject of some speculation and controversy. These issues are reviewed and an effort is made to put them in focus.

### INTRODUCTION

Growth in the volume of hazardous wastes and increasingly stringent regulatory controls on the disposal of hazardous wastes have increased waste disposal costs in the developed countries (DCs) [1-4].<sup>1</sup> Waste producers have responded to these economic pressures by shipping hazardous wastes to the less developed countries (LDCs) [3, 9-25].<sup>2</sup> The consequences for LDCs are potentially adverse because many of these countries have a limited capacity for effectively treating and disposing of hazardous wastes.

<sup>1</sup>Hazardous waste is typically defined as waste (possessing chemical, physical, or biological characteristics) that threatens the environment or human health. Wastes can be classified according to their hazardous nature, including toxicity, flammability, reactivity, and corrosivity. Most hazardous wastes are composed of acidic resins, arsenic residues, compounds of lead and mercury, organic solvents, pesticides, or radioactive materials [3, pp. 20-22; 5-7].

Defining hazardous wastes is not as clear cut as suggested here [4, pp. 45-83]. There are underlying cultural, political, economic, and social processes involved in defining wastes as hazardous. For a sampling of national differences in definitions of hazardous wastes, see [5, 8].

<sup>2</sup>Hazardous products and production processes also flow from the core to the periphery [12, 15, 26-38]. There is also increased concern with the movement of pollutants from DCs to LDCs through the air, soil, and water [39].

Numerous cases of waste exports to LDCs have been documented, but an overall assessment of the nature and scope of the problem, basic causes, consequences, and potential solutions to the problem has been lacking. As a result, these issues remain a subject of some speculation and controversy. I review what is known about these interrelated issues and try to put them into focus. The article consists of five parts. The scope of the hazardous waste flow between DCs and LDCs is first examined. Political and economic forces characterizing relations between (and within) DCs and LDCs that have created the hazardous waste stream are then identified. The degree to which this waste stream contributes to health and environmental risks in LDCs (as well as other problems for both DCs and LDCs) is briefly examined. Major unilateral initiatives and international policies that have been proposed as solutions to the problem are briefly reviewed. The article concludes with the recommendation that the export of hazardous wastes to the LDCs be outlawed.

### **SCOPE OF THE INTERNATIONAL HAZARDOUS WASTE FLOW**

Little is known about the scope of the international hazardous waste flow problem [10, 16, 40]. The environmental organization Greenpeace claims to have documented over 1,000 attempts (involving 160,000,000 tons of wastes) to export hazardous wastes from various DCs to African, Asian, and Latin American and Caribbean countries between 1986 and 1990 [24, 25, 41]. Although many of these attempts failed, Greenpeace claims that at least 3,000,000 tons of hazardous wastes flowed to the LDCs between 1986 and 1988 [24]. Wastes have included everything from PCBs, acids, sludge, used batteries, paint solvents, and dioxin-containing incinerator ash to radioactive waste [25]. Selected examples of incidents are reported below by major shipping route.

#### **From Europe and the United States to Africa**

- Prior to the 1985 coup the Sudan agreed to allow U.S. and German utility companies to store nuclear waste in various desert locations [42-43].
- In 1988 the fishing village of Koko, Nigeria became the subject of worldwide attention when 8,000 drums of toxic waste were discovered. The wastes (exported by an Italian firm) included methyl melamine, dimethyl formaldehyde, ethylacetate formaldehyde, and about 150 tons of polychlorinated biphenyls (PCBs) [44].
- In 1988 an Italian firm (Jelly Wax) shipped 2,000 barrels of toxic wastes to Beirut, Lebanon. Reports indicate that part of the waste was burned, some was dumped into the sewers, and the remainder was buried at different locations in the country [45].

- Greenpeace reported in 1992 that a Swiss-based firm (SPANCO S.A.) planned to construct and operate a million ton a year capacity toxic waste incinerator in Mozambique [46, p. 14].
- The U.S. company American Cyanamid and several European companies ship tons of mercury waste each year to a British reprocessing plant (owned by Thor Chemicals) located at Cato Ridge, South Africa just outside the homeland of KwaZulu. Villagers located downstream from the facility on the Mngeweni River used the river water for drinking, bathing, and washing. Mercury levels in the river have been found to be 1,000 to 1,900 times higher than the World Health Organization's (WHO) recommended level [47, 48, pp. 12-13]. One report indicated that the mercury level in one area around the plant was 1.5 million times higher than WHO's recommended level [49, pp. 7-8].

### **From Europe and the United States to Asia**

- In the mid-1980s, West Germany, Austria, Switzerland, and the United States expressed interest in storing nuclear waste in the remote areas of the Gobi desert in China [42]. According to [24, 25], rumors have persisted about continued Chinese interest in the venture.
- Since the late 1980s, large amounts of lead scrap and lead acid batteries have been shipped from the United States to southern China for recycling [10, pp. 78-82].
- Since the late 1980s, plastic wastes from West Germany and several other countries (including the United States) were being incinerated in remote desert areas of China [10, pp. 78-82; 50, pp. 6-7].
- In 1992 the U.S. Department of Justice indicted a U.S. company for mixing toxic waste with fertilizer and selling it in Bangladesh [48, p. 17].

### **From the United States to Mexico**

- In the spring of 1987 an American barge loaded with 3,000 tons of garbage was turned back to the United States by the Mexican Navy [41].
- The maquiadoras of Mexico have proven to be an important means for smuggling U.S. hazardous wastes for cheap disposal in Mexican waterways, sewers, municipal landfills, and private property sites [10, pp. 51-62; 51-52].

### **From the United States to Latin America and the Caribbean**

- In 1991, Greenpeace reported that the U.S. company Environmental Development Corporation planned to ship 40,000 tons of industrially contaminated sewage sludge each year to Venezuela and Argentina for disposal [46, p. 6].

- In 1992, four Philadelphia based universities (Penn, Widener, Drexel, and Temple) approached Bermuda, Barbados, and the British Virgin Islands for permission to dispose of their jointly owned waste incinerator [48, p. 25].
- In 1988, 4,500 tons of toxic ash from the garbage incinerators of Philadelphia were unloaded from the ship *Khian Sea* on a Haitian beach [10, pp. 17-32].

## **THE POLITICAL ECONOMY OF THE INTERNATIONAL HAZARDOUS WASTE FLOW**

Political and economic forces characterizing relations within and between DCs and LDCs have created the hazardous waste flow between DCs and LDCs [12, 16, 19-20, 53]. The often contradictory demands between profits and environmental quality within DCs have created a tendency for hazardous wastes to be shipped beyond national boundaries. The economic problems facing many LDCs have in turn led them to accept wastes for hard currency. This hazardous waste stream flows through a world economy that many observers have characterized as a system based on dependent relations between countries holding dominant and subordinate positions [54-58].

### **The Situation in the DCs**

A set of interrelated political and economic forces within DCs underlie the flow of hazardous wastes. They include 1) increased levels of hazardous waste production and reduced disposal capacity, 2) increased environmental awareness and more stringent regulatory controls of hazardous waste disposal, and 3) increased costs of hazardous waste disposal for waste producers.

#### *Increased Hazardous Waste Volume and Reduced Disposal Capacity*

Estimates vary widely, but there is consensus that the production of hazardous wastes (due to technological changes in the production of petroleum, chemicals, electronics, pharmaceuticals, and related products) has grown substantially since World War II [1, 16, 40, 59]. From an annual production of fifteen million tons in the early 1940s, the world currently produces more than 400 million tons of hazardous wastes per year. Only five to ten million tons are produced by the LDCs. The United States is the largest producer of such wastes; it is estimated to produce anywhere from 250 to 300 million tons of hazardous waste each year [2, p. 4, 14n; 60, p. 4]. Although the European countries produce less hazardous waste than the United States because of greater production efficiency, they nonetheless produce millions of tons. The twelve member countries of the European Community (EC) produce thirty to forty million tons of hazardous waste each year [61]. The production of such wastes has been so great in the past few decades that

the ability of many DCs to treat and dispose of it (whether through landfilling, treatment, or incineration) has declined substantially.

#### *Increased Environmental Awareness and Regulatory Controls*

Scientific and public concern with the health and environmental risks associated with hazardous wastes emerged as an important issue in the 1970s [62]. This concern gave rise to increased regulatory efforts of waste disposal in the DCs. The U.S. Resource Conservation and Recovery Act (RCRA) of 1976 was a comprehensive piece of legislation creating standards for the classification, hauling, and disposal of hazardous wastes. Subsequent legislation such as the 1980 Comprehensive Environmental Response, Compensation, and Liability Act (commonly known as Superfund), the 1984 amendment to RCRA, and the 1986 Superfund Amendments and Reauthorization Act (SARA) have curtailed the haphazard disposal of hazardous wastes. Similar legislation was enacted in Europe and Japan [4, 8, 61, 63, 64, Chapters 2, 6].

#### *Increased Waste Disposal Costs*

The outcome of the trends mentioned is increased disposal costs for waste generators based in the DCs [2, 40, 65]. In the United States, for instance, landfill disposal costs (which currently range from \$250 to \$300 per ton of hazardous waste) grew sixteenfold in the last twenty years and incineration costs (which currently cost at least \$1500 per ton of hazardous waste) increased threefold in the last decade. European countries have experienced similar cost increases [16, pp. 44-46; 40, 61].

Waste generators have responded to these economic pressures by exporting hazardous wastes to LDCs through various "trash for cash" schemes [19, p. 95, 20]. Current practices include what several analysts have called "compliant waste handling," "sham recycling," and "criminal activity" [16, pp. 124-130; 20, p. 56; 52, p. 225]. Costs of waste disposal are considerably less in the LDCs because of limited governmental control of the environment and the health, safety, and well-being of its citizens. Lax regulations translate directly into reduced costs for DC waste producers.

### **The Situation in the LDCs**

Many LDCs face strong economic pressures to accept hazardous wastes generated in the DCs even though they have limited expertise in treating and disposing of such wastes. They are confronted with staggering economic problems such as debt, low agricultural commodity and mineral prices, and a host of other economic problems [54, 66]. Their economic situation not only puts them in a situation of having to swap hazardous wastes for cash, but it puts them in a weak bargaining position in negotiations with DC waste brokers over the terms of hazardous waste exchanges.

## CONSEQUENCES OF THE INTERNATIONAL HAZARDOUS WASTE FLOW

Hazardous wastes like all hazardous substances can damage the environment and adversely affect human health through dispersion in the soil, water, and air or in the form of explosions and fires [7]. LDCs are particularly vulnerable to such risks because they have limited technical and regulatory capabilities for adequately disposing of hazardous wastes originating in the DCs [12, 67]. In addition to potentially serious environmental and human health consequences associated with hazardous wastes, there are a number of other undesirable consequences. These include economic costs for both LDCs and DCs, as well as reduced efforts to curb the generation of hazardous wastes in the DCs [10, 16, 21, 40, pp. 1685-1686; 68, p. 57].

### Environmental Risks

The improper disposal of hazardous wastes in LDCs can contribute to the risk of environmental damage [16, 21]. Environmental damage includes soil contamination, ground water pollution, contamination of rivers and coastal regions, air pollution, threats to plant and animal health, and the like. Since reliable data do not exist on the full breadth and nature of hazardous waste disposal in the LDCs, it is not currently possible to estimate the extent of environmental damage.<sup>3</sup> Such damage is a potentially important problem because it could deplete important natural resources, threaten the stability of larger ecosystems, and threaten human health.

### Human Health Risks

The actual health consequences associated with exposure to improperly disposed wastes in the LDCs are not fully known [3]. Given the experiences of the DCs and random reports from several LDCs [3, 10, 21, 69], improperly disposed wastes pose a threat to those experiencing environmental exposure. Those exposed to contaminated water, food, or air are at a substantially increased risk of death and disease because of their increased susceptibility to various site-specific cancers, skin irritation, respiratory problems, neurobehavioral problems, birth defects and miscarriages, genetic changes and damage to the immune system, and

<sup>3</sup>Recent efforts to rank hazards in the United States according to the degree of threat or risk suggest that the health and environment risks posed by hazardous wastes have been exaggerated [70-72]. The risks are thought to be lower than those posed by such hazards as acid rain, ozone depletion, indoor air pollution, pesticides, and the like. This estimate should not lead to the conclusion that exposure to improperly disposed hazardous wastes is not a problem in the United States (and other DCs) or that improperly disposed hazardous waste does not pose an environmental or health risk problems for LDCs. The situation in the LDCs is very different because few of these countries have the capability of effectively treating and disposing of hazardous wastes.

acute and chronic damage to specific organs of the body. On the other hand, those living near hazardous waste storage and disposal sites are at increased risk of death and injury from fires and explosions. Since reliable data do not exist on the number of people exposed to improperly disposed hazardous wastes in LDCs, it is not possible to estimate the actual number of deaths or cases of disease and injury that can be attributed to hazardous waste exports.

### **Economic Costs**

The short-term economic benefits associated with hazardous waste transfers of DC-based waste producers must be considered in light of the long-term economic costs [16, 68]. Costs associated with the future cleanup of contaminated sites and improperly disposed wastes are potentially high for both LDCs and DCs. The treatment and compensation of victims in LDCs are potentially very costly. Destruction of important natural resources such as marine life, biodiversity, and soil, water, and air quality is also likely to be a potentially costly outcome of hazardous waste export practices. Despite efforts to the contrary [40], there is no accepted factual or methodological basis for adequately estimating the economic costs and benefits associated with the movement of hazardous wastes from DCs to the LDCs.

### **Reduced Pressure for Hazardous Waste Reduction in the DCs**

If companies based in the DCs have the option of exporting their hazardous wastes to LDCs, there is little incentive for them to control hazardous wastes through recycling or source reduction strategies [68]. In turn, the effectiveness of current waste reduction strategies in the DCs may be weakened if the export option remains a viable alternative. The export option therefore reduces waste minimization efforts in the DCs and represents a means for DC-based companies to maintain inefficient and waste-generating production practices.

## **WHAT CAN BE DONE?**

Various unilateral, bilateral, and international actions have been proposed to deal with the problem of hazardous waste exports to LDCs. These proposals emphasize actions of governments of DCs and LDCs, international organizations, and non-governmental organizations. Proposed actions for the governments of DCs have included efforts to implement clean production, establishment of restrictions on the export of hazardous wastes, dissemination of appropriate information about hazardous wastes to receiving countries, and the banning of hazardous waste exports to LDCs. It has been proposed that governments of LDCs ban hazardous waste imports, develop risk assessment and management capabilities, and develop liability laws protecting victims and providing criminal liability for

certain export practices. Recommended actions for international organizations have included the dissemination of risk information, technical assistance in the establishment of monitoring and management programs in LDCs, and the establishment of restrictions on hazardous waste dumping through formal codes of conduct and liability laws. Recommendations for DC and LDC non-government organizations include investigation of the problem of hazardous waste exports and the attendant health and environmental risks, as well as the economic and political consequences of hazardous waste exports [12-16, 19, 21-22, 40-41, 73-75].

Many obstacles stand in the way of the effective implementation of these and related environmental proposals [12, 74, 76-79]. These include questions surrounding national sovereignty, who should be responsible for disseminating risk information, and disclosure of corporate practices. Despite such obstacles, however, several national, regional, and international agreements have been adopted that attempt to restrict the hazardous waste flow to the LDCs [16, 19-20, 24-25, 41, 73-75, 79, pp. 85-88; 80-82]. Selected examples of recent activities include:

- A United Nations sponsored treaty (The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal) was signed by 118 countries in 1992. This treaty establishes some controls on the international transfer of wastes such as the requirement that exporting countries receive prior informed consent from the importing country.
- The Lome IV Convention adopted on December 15, 1989 by the twelve European Community (EC) countries and sixty-nine African, Caribbean, and Pacific (ACP) countries ban the movement of EC hazardous waste to ACP countries.
- The Organization of African Unity (consisting of all African countries except Morocco and South Africa) has drafted a convention (the Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa) banning the importation of hazardous wastes into the African Continent.
- As of late 1992 nearly ninety nations had banned imports of hazardous wastes.

These and related attempts to curb hazardous waste flows to the LDCs have been subjected to a number of criticisms. Efforts to control the hazardous waste flow through regulatory mechanisms such as the recent Basel Convention have been dismissed as nothing more than attempts to legalize DC export practices [19-20, 41, 75, 80-81]. On the other hand, LDC efforts to ban hazardous waste imports are unlikely to be very effective, for waste traders will continue to find ports of holding as long as the economic incentives remain for DCs and LDCs to swap wastes and cash.



## CONCLUSION

The image of shadowy, ghost-like ships laden with toxic cargo traveling from the core to the periphery is a deeply disturbing one. Unlike the Flying Dutchman, many of these "gypsy vessels" have reached port and deposited their cargoes of PCBs, cyanide, paint solvents, dioxin-containing incinerator ash, and the like on unsuspecting populations in locations in Mexico, Nigeria, the homelands of South Africa, Haiti, China, the Sudan, and many unknown spots throughout the world. Such export practices do not demonstrate a pattern of systematic racism as several scholars have recently charged [9, 17]; rather, they illustrate the power relations underlying interaction patterns between countries occupying different positions in the world economy. Centrality in the world economy allows some countries to engage in "Not In My Back Yard" behavior.

Ultimately, however, the issue centers on one of responsibility: those who create hazardous wastes and benefit from their production should bear the costs. Failure to accept this responsibility (because of the belief that the international waste trade is either legal, safe, or beneficial for those at risk or based on their consent) is ethically suspect [83, pp. 146-166]. Acceptance of this responsibility leads to the conclusion that the export of hazardous wastes to LDCs should be outlawed [19-20, 68]. Such a policy not only begins to ensure that the DC waste producers do not externalize costs on others, but pushes them to adopt production practices generating fewer hazardous wastes.

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