

'Lifescaping' toxicants

Locating and living with e-waste in Tanzania

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It is March 2019 at the 'Refrigerator Court' (Mahakama Ya Friji), a small and informal scrap recycling workshop in Dar es Salaam, Tanzania. Waste collectors Calvin and Dinho hold long neem sticks, which they use to turn burning electricity cables as dense smoke fills the air. They are vigilant of harmful smoke and constantly alter their positions to avoid direct contact with and inhaling the fumes. Their focus is on the red flames that melt the plastic castings covering the shiny copper threads. 'That's money,' they tell me.

Meanwhile, keeping his distance, George is pressing a grinder blade as it penetrates a refrigerator compressor. The refrigerant liquid drips to form a small pool on the dark soil around him as copper wires coiled in two yokes emerge from inside the compressor. Copper and other metals mined at this workshop end up in containers travelling upstream back to the beginning of the production cycle in electronics production located in East Asia and Europe. Meanwhile, scavenged aluminium and iron plates are turned into charcoal stoves supplying the local market in Dar es Salaam.

The Refrigerator Court and other informal recycling workshops in Dar es Salaam are located downstream of the electronics value chain. They receive the afterlives of the commodities in late capitalism and are vital nodes in the value chain and return flow upstream to produce new commodities. Based on ethnographic fieldwork from October 2018 to June 2019 at the Refrigerator Court workshop and following electronic scavenging and recycling across the city, this essay explores the toxic exposures workers face and how these are embedded in daily work and livelihoods. Taking up Edelstein's concept of 'lifescaping' (Edelstein 2003), I pay attention to the micro-adjustments (some) workers deploy to avoid or minimize exposure to toxins.

A headline in *The East African*, a leading regional newspaper, reads, 'E-waste: An increasing threat in the region' (E-waste 2019). The article describes growing local concerns about the hazards surrounding electronic waste. It reports that a lack of policy frameworks and infrastructures for handling e-waste has led to a mushrooming of informal e-waste recycling in East African cities, as it has at the Refrigerator Court. The same assertion is put forward in a *New York Times* article, 'Electronic marvels turn into dangerous trash in East Africa' (Yee 2019). Both articles condemn informal recycling as the source of haz-

ardous compounds in the city's landscapes. However, the articles show one side of the story and do not discuss the complex roles of informal e-waste recyclers in the value chain or the local value of their quotidian labour.

They do, however, underline a general perception of informal recycling workshops shared by many Tanzanians. People working with e-waste are regarded as matter out of place (Douglas 2003 [1966]), and recycling work is assumed to be unskilled, marginal and precarious, regardless of its potential in global and local value chains. Yet e-waste sites, common throughout Dar es Salaam, are stable features of low-income neighbourhoods and fill the enormous gaps left by the city's waste management systems. Moreover, as I discovered during fieldwork with workers, informal e-waste recycling offers a skilled vocation, with a sense of stepped progression, secure revenue and entrance into a social support network that sustains and enhances local lives. This level of 'upscaling', 'recycling' or 'repurposing' waste, as it is known in the Global North, is already normalized as part of 'modern' Tanzanian work practices and provides the men who informally work on the e-waste sites with capital, reputation and opportunities to create a livelihood and life.

There is no denying that these e-waste sites release hazardous chemical compounds. Electronic devices contain carcinogenic toxicants such as persistent organic pollutants (POPs) that can damage DNA and disrupt hormonal functioning when released. The same chemical compounds that help our electronic devices function have detrimental effects on our environment and health when poorly handled (Grossman 2006). The workers on these sites often have no way of knowing the exact chemical compounds and their associated effects or the risks associated with the materials they are touching or inhaling. Information on toxins and pollution is confined to circles of experts, NGOs and government institutions. Even when discussed in local media, the language and channels hinder access to those working directly with e-waste.

Additionally, there is no systematic testing of toxicity levels or exposures, and there are no mandated health and safety regulations for workers in the informal recycling sector. As a result, many workers ignore or belittle their exposure to toxins in these situations. Others try to mitigate their exposure to toxic chemicals by adopting specific 'lifescaping' initiatives, making adjustments and seeking to counteract toxic effects.

Fig. 1. E-waste dismantling in front of John and Mkali's warehouse.



SAMWEL MOSES NTPAPANTA

Electronics in the Global South

Electronics are a mark of modern society. They symbolize human control over time, distance and space. More importantly, they have become essential in everyday life, to the extent that they may even be apprehended as cyborg prostheses (Haraway 1991; Lupton 2012). The quantity and variety of electronic equipment available are at once mundane and shockingly large, in both the Global North and the Global South. However, most of these electronics have short and finite lifespans and are discarded ever more frequently. The constant flow of new technologies and products in the market – together with their improvements through more recent and better models that people are made to desire (and are often encouraged to discard old devices for) – produced 44.7 million tons of e-waste in 2016 alone, equal to 6.1 kilograms for each inhabitant of the planet (O'Neill 2019), most of it amassed in wealthy countries. Large amounts of the e-waste are dumped in poorer countries (despite conventions in place, like the Bamako Convention of 1991, which made these activities illegal) or are exported as used electronics.

Weak implementation of the Basel, Stockholm and Bamako Conventions (meant to control the disposal of e-waste), as well as the high cost of managing, repairing and recycling e-waste in some regions, enables these global flows (Lepawsky & McNabb 2010). The 2015 Basel Technical Guidelines, titled *Transboundary movements of electronic and electrical waste and used electrical and electronic equipment, in particular regarding the distinction between waste and non-waste under the Basel Convention*, raise the critical problem of categorizing devices as waste (Lepawsky 2018). The loopholes in both international and local regulations facilitate movements of e-waste from the Global North to the Global South and within regions.

Yet, irrespective of whether electronics are exported as waste or used devices, once they reach Tanzania, they become something else. Through assemblages of labour, relations, tools, skills and creativity, informal salvaging and recycling activities, such as those undertaken by Dinho, Calvin and George, convert defunct electronic devices into new objects with new values. However, during these encounters, workers and environments are exposed to the anthropogenic toxicants embedded in electronics.

In *Living downstream*, Sandra Steingraber explores the brutal effects of anthropogenic chemicals on vulnerable communities. The term 'downstream' here denotes those who live and work in marginalized areas, who are often caught between the need to provide for their families and the brutality of late capitalism, and who are the end recipients of a decreasing chain of value, of waste and toxins (Steingraber 2010). Living downstream requires navigating between exposure to toxicants and making a livelihood. In these situations, people adopt what Michael Edelstein calls 'lifescaping' initiatives. 'Lifescaping' involves people making changes when they lose trust in institutions responsible for regulating and informing, when there are changes in perception over the control of the present and future, and when people assess their environment and act accordingly, developing pessimistic expectations about health (Edelstein 2003). 'Lifescaping' is not yet a widely recognized English word. *Collins Dictionary* has placed it as a new word suggestion, defining it as a 'narrative that details the intersection of events in an individual's agency, emotions, health, socio-economic circumstance, cultural norms, and behaviours over their lifespan'.¹

Lifescaping toxins is a quotidian way of living I observed among my interlocutors at the Refrigerator Court. The workers here are aware of toxic exposures they face, and

some seek to make adjustments to their physical exposure, as I explain below.

The workshop

When I approached the Refrigerator Court workshop for the first time at the beginning of the *vuli* (seedling) rains in October 2018, from a distance, a building in full corrugated iron sheet was visible with piles of scrap materials scattered around, from within which emanated banging sounds, loud voices and smoke. Standing a few metres from the entrance, waiting for my host George, I could see men seated on old car seats with pieces of rail gauge positioned between their feet, hammers in hands. As they hammered away, I could attribute the sounds I heard to this rhythmic synchrony of two irons banged together. The sheer physical effort by one of the middle-aged labourers, who wore a second-hand blue t-shirt with the inscription 'Happy to Do It', and whom I came to know by the nickname Mjomba Mjomba (uncle), impressed me greatly. The satirical expression on Mjomba Mjomba's t-shirt aptly references his body's role in actively turning waste into value, bridging different locations and sites of production, consumption and discards. On that first day, while I talked to George, Mjomba Mjomba pummelled the aluminium sheet recovered from a refrigerator, skilfully recast its shape with precision cuts and perfect sculpting, to produce a plate for a charcoal stove that Tanzanians use to prepare everyday food.

In Dar es Salaam, there are thousands of small e-scrap backyard workshops like the Refrigerator Court. A study conducted in 2018 estimates that there are around 85 workshops and an average of 2,125 people employed or self-employed in the informal scrap business in Kinondoni district alone, one of the city's five districts (Kyessi & Omar 2018). The workshops are usually located in small backyard open spaces in dense, low-income neighbourhoods, typically sandwiched between other small businesses. The Refrigerator Court is not easy to find. It is in the middle of a low-income residential area. Public buildings hide it from passers-by at busy Kawawa road just 300 metres away. A strip 15 metres wide and almost 30 metres long is occupied by a tall building made from iron sheets open on both sides. At the front, there is a small road that stretches for at least 250 metres, but it is a dead-end in both directions. Scrap collectors occupy the street in the mornings and evenings without much disturbance from the traffic. Around midday, some workers take their chairs out under a neem tree in front of the workshop. On the other side of the road, a mechanic owns a second-hand car parts shop where he spends most of his time under a car or fixing something in an engine.

Next to the car mechanic's shop stands a wall with a red gate at the front. Behind the wall, there is nothing but empty ground with the ruins of an old house. The workers told me a rich person bought three houses in the compound and then erected the wall around the area two years previously, but construction had not started yet. They are happy nothing is happening as they use the land in front of the gate to burn electrical wires. Next to the wall, there is another wall, with a house behind. At the back, there is an open space where several freshly painted black cooking stoves and BBQs are left to dry in the sun. Some of their interiors are made of clay and need at least a day in the sun to dry. There are also several shade extensions to the main workshop, used by around 10 workers as their stations. The district Blind People's Association occupies a building to the left, followed by a few food vendors' shacks and an evening school attached to the district's Occupational Safety and Health Authority office. A small bar with a BBQ kitchen

Fig. 2. Dismantling e-waste at the Refrigerator Court.

Fig. 3. Inside the Refrigerator Court.

Fig. 4. Metals scavenging from an old air-conditioner.

Fig. 5. A worker with a grinder cutting a water heating tank at the Refrigerator Court.

Fig. 6. Amaranth garden next to the Refrigerator Court.

Workers at the workshop prefer not to buy vegetables cultivated in places they think are contaminated.

Fig. 7. A worker at the Refrigerator Court wearing sunglasses while welding a charcoal stove.

is located on the south side of the workshop, with two kiosks on either side.

The main workshop is subdivided into three sections with specialized workers. Within this space, 25 to 30 artisans who make charcoal stoves, 20 scrap collectors and three scrap dealers work together or separately at different times. Although sometimes the workshop operates along rigid divisions and specializations of labour, at other times they are well defined but flexible, becoming more fluid when there is less work. For example, a scrap collector, who usually would go around the city to collect scrap for households, might sometimes stay at the workshop – especially after having been on the road for several days in a row – to do small cutting and stitching work for a charcoal stove worker or will load scraps onto trucks for a scrap dealer.

The Refrigerator Court workshop is where ‘e-waste is reshaped, one life ends, and a new life starts’, as George once told me. In this workshop, defunct things come and acquire new value and functions. Metals (copper, brass, cast iron and platinum) hidden in e-waste are recovered to supply local and international manufacturing with raw materials. The workshop is a space of transience: some materials are revalued, repurposed, reshaped, and some remain waste. Metals including palladium and copper return upstream and are exported overseas, mainly to China, Turkey and India, for new manufacturing chains. Aluminium and iron plates are locally converted into cooking stoves, pots, kettles and roofing materials (as Mjomba Mjomba was doing on my first day). The rest of the scraps end up in local industries to produce iron rods that hold up the gigantic skyscrapers that decorate the Dar es Salaam skyline.

Toxic flows through the city

The workshop is located in the Mwanayamala ward, Kinondoni Municipality, a famous low-income area at Dar es Salaam’s heart. Five kilometres to the east, towards the Indian Ocean coast, lies the city centre occupied by the government, embassies, financial institutions and NGO offices. Kariakoo, a part of town named after the British colonizers’ First World War ‘carrier corps’, whose veterans settled here, is now Tanzania’s leading business district near the city’s harbour. Strategically placed only 1.5 kilometres from Dar es Salaam port, Kariakoo is home to an electronics market famous throughout the Great Lakes region. It has also attracted thousands of repairers and tinkerers. In the market’s streets, second-hand and repair shops are engaged in the economics of e-waste, creating a reliable income from selling ‘refurbished’ products from abroad.

While Dar es Salaam’s top earners prefer branded electronic products from certified dealers, the city’s majority of low- and middle-income earners negotiate between these refurbished products from Europe, the Americas or China to meet their aesthetic values and economic needs. As a result, electronics will usually make several trips back to repairers before embarking on their last journey to the Refrigerator Court, where they are broken up and recycled.

The Msimbazi river valley separates the city centre and Kinondoni. On one side of the valley is Kinondoni’s low-income housing, where the Refrigerator Court is located; on the other bank are the skyscrapers rising from the city centre. The Msimbazi river starts from the Pugu hills 20 kilometres to the southwest. The river meanders through Dar es Salaam, connecting with tributaries that snake across the city. By the time the river reaches the ocean, it has collected residues and waste, keeping them in its sediment core. In addition, the seedling rains that started when I began working with George and others at



SAMWEL MOSES NTAPANTA



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SAMWEL MOSES NTAPANTA

1. <https://www.collinsdictionary.com/submission/145/Lifescape>.

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SAMWEL MOSES INTAPANTA

Fig. 8. Dismantling, sorting and weighing of e-scrap.

the Refrigerator Court will add another layer of toxicants to the Msimbazi valley.

Handling toxicants

Through my participation in the Refrigerator Court, I noted how difficult it was for its workers to take action vis-à-vis the environmental toxins. The workers vary in their concerns about and responses to (potential) toxicity. Some pay attention to potentially toxic substances and use domestic routines or practices (like drinking milk and bathing carefully) to mitigate the effects of toxins on and in their bodies, but others are less overly concerned. On one warm afternoon, I decide to withdraw from the main workshop to sit by the front deck of John and Mkali's scrap warehouse. I find John sitting on an old safe box updating his business records. As he notices me, he closes his book and asks whether I am interested in having lunch, and he signals to one of the *Mama lishe* (women food vendors) to take our orders:

John: *Kuna mboga za majani?* (Do you have vegetables?)

Mama Lishe: *Ndio, kuna mchicha.* (Yes, there are amaranth leaves.)

John: *Sio wa msimbazi huo?* (From Msimbazi valley?) [He wants to know where the vegetables are from.]

Mama Lishe: *Nimenunua buguruni.* (It is from Buguruni market.) [John is thus reassured that the *mchicha* he is ordering is not from Msimbazi, where it may be contaminated.]

Apart from its toxic notoriety, Msimbazi valley is also famous for urban agriculture, which supplies vegetables like amaranth, potato leaves, pumpkin leaves and cabbage to many low-income dwellers. The government has declared the river unsafe for use, as concentrations of toxicants (notably mercury, copper, cadmium, chromium and lead) have been found, exceeding World Health Organization recommended levels (Kihampa & Mwegoha 2010). The river runs through overcrowded areas, an old landfill with toxicants draining into the river and several industrial areas that discharge toxic waters into the waterways. One of the streams that feeds into the Msimbazi river is not far away from the workshop. Msimbazi river pollution is well known; hence people try to avoid vegetables grown in the valley.

A portion of vegetables in a meal is crucial to many urban Tanzanians after many years of public health campaigns promoting the importance of a balanced diet that includes all minerals and vitamins the body needs. Lunch usually contained *ugali* (a stiff porridge made out of corn-flour) or rice with either fish or beef curry, a bowl of beans

and a small portion of vegetables. However, people like John are increasingly worried about toxins in foods, hence his concern to trace their origins. For him, discovering the source of his vegetables is vital.

Yet not all workers of the workshop focused on the toxic risk of food. On one *kiangazi* (dry season) day of 2019, during the last weeks of my fieldwork in Dar es Salaam, the Refrigerator Court's work is continuing as usual. George stops cutting a refrigerator compressor that is lying on the dark oily soil, and, holding a grinder in his left arm, he remarks:

I know there is *sumu* (poison) in this water [the coolant spilling out from the compressor]. I make a living out of these things. My kids go to school, and I put food on the table. The only thing I do is to take a glass of milk every evening to clean out the poison in my body.

George, with whom I spent the most time during my fieldwork at the workshop, is concerned with his exposure to toxicants from the electronics and understands the danger of exposure to harmful compounds through his work. However, the work provides a comfortable income to sustain his family. Several evenings after work, I indeed observed him buying milk at the kiosk. Drinking milk as a detox solution is a common practice in Tanzania, where many people believe in the beneficial role of food to 'detoxify' the body (Langwick 2018). However, drinking milk becomes a quotidian strategy when one is exposed to toxic substances. As a child growing up in a rural area of Tanzania, I was told that when cattle graze, they eat different types of plants and, through digestion, they sequester and mix those plants, which will eventually be part of the milk. When a person is seriously poisoned, milk will be administered while he or she is transported to the hospital (Tironi 2018). George argues that a cup of milk is enough to clean up the small doses of *sumu* (poison) that he is exposed to at the workshop every day.

John and George were concerned with the potential health risks of toxic exposures in their workplace (although other recycling workers hardly reflected upon such dangers at all). However, the overall conditions of work left them little choice for risk avoidance. Instead, they practised what Manuel Tironi (2018) calls 'hypo-interventions' of a personal, somatic nature. More commonly, concerns are directed at consumption – notably food – rather than at exposures in the workshop, which most found unavoidable. Thus, although one could not avoid toxicants, consumer choices and what I call 'lifescaping' strategies, practised within one's economic limits, allowed some degree of risk mitigation.

Conclusion

Active toxic compounds released continuously during e-waste salvaging are a significant concern for those exposed to them, although the concerns surface unevenly. As the e-waste informal economy picks up in a fragile legal setting and feeds market demands, the dilemma of exposure and its effects is an everyday experience for the workers involved. My work shows a high level of cognizant agency at work: people mark and map possible sources of exposure and try as best they can to tackle those threats. This is done by avoiding noxious fumes and consuming 'purifying' liquids like milk, as well as shunning vegetables from polluted areas – all of which, I argue, can be seen as 'lifescaping' initiatives. These initiatives are important because they shift the lenses from pitying the 'victims' of toxic chemicals to acknowledging their adjustments and imaginative attempts to mitigate the (un)known dangers of toxicants that have become deeply symbiotic with everyday lives. For the workers at the Refrigerator Court, these compromises have become a typical 'art of living' in polluted worlds (Tsing et al. 2017). ●

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