

9 *Remaking the Land: Environmental Change in the Copperbelt's History, Present and Future*

Introduction

For seventy years, the Copperbelt's surface land and subterranean mineral wealth were regarded as 'natural' resources, freely available for use by humankind in general and commercial exploitation by companies in particular. Nation-states, mine communities and international donors attributed different kinds of value to these resources, but – in retrospect – extraordinarily little thought was given to the ways in which minerals and mining shaped human experience and society. Partly because the region was essentialised as urban, a place where mine-created wealth was the sole basis of development and employment, mining's impact on land and especially on agricultural activities – on which tens of thousands of Copperbelt residents depended – was almost entirely absent from policy or intellectual consideration.

The impact of mineral extraction on the environment has, in the twenty-first century, become the central theme in analysis of (former) mining sites. Western countries' attempts to address the legacy of mining's despoliation of air, water and land has focussed on identifying human responsibility for historical pollution.¹ Academic analysis has, with the anthropocenic turn, come to appreciate that, while human agency was once considered able to subordinate the natural world to its will, non-human agents and forces should now be understood to have historical agency.² While this can appear an abstract conceptualisation,

¹ See, in particular, Timothy J. LeCain, *Mass Destruction: The Men and Giant Mines That Wired America and Scarred the Planet* (New Brunswick, NJ: Rutgers University Press, 2009).

² John Robert McNeill and Peter Engelke, *The Great Acceleration: An Environmental History of the Anthropocene Since 1945* (Cambridge, UK: Belknap, 2014); Christophe Bonneuil and Jean-Baptiste Fressoz, *The Shock of the Anthropocene: The Earth, History and Us* (Brooklyn, NY: Verso, 2016).

one only needs to consider the unforeseen consequences of mineral extraction and the ways in which smelting, fracking and the use of mercury disrupt and pollute the living world in ways that humans barely understand and certainly do not control. Applying anthropocentric approaches to mining history enables a deeper consideration of its multiple timeframes, including the relevance of geological time to the comparatively brief period of extractive mining operations, as well as its long-term legacies. While mining booms and busts have conventionally been periodised in terms of economic cycles, environmental studies of mining necessarily extend forward into an uncertain future during which their impact will continue to be felt. An obvious example is the tendency for disused mines to flood with rain or river water that mixes with chemicals used in the production process and that, in the absence of expensive pumping operations, spills into communities resident on land above and adjacent to former mine sites.³

While environmental concerns are increasingly integrated into histories of mine sites and communities in the Western world, this is less true for the global South and Africa in particular.⁴ Corey Ross's important environmental history of the British empire, building on the pioneering work of Alfred Crosby, demonstrates the centrality of ecological exploitation to imperial economies and the way it was justified by modernising discourses that celebrated the 'civilisation' of the wilderness and 'development' of the non-Western world.⁵ Ross's work contains an exemplary analysis of the colonial-era Central African Copperbelt's linked ecological and social change, which helpfully complements this chapter's focus on the late and post-colonial period.⁶

The rising tide of (initially Western) environmental activism meant that by the 1970s and 1980s, mining and industrial activities were

³ Sara E. Pratt, 'All That Glitters . . . Acid Mine Drainage: The Toxic Legacy of Gold Mining in South Africa', *Earth Magazine*, October 2011: www.earthmagazine.org/article/all-glitters-acid-mine-drainage-toxic-legacy-gold-mining-south-africa (accessed 4 August 2020).

⁴ One important exception is Gabrielle Hecht, *Being Nuclear: Africans and the Global Uranium Trade* (Cambridge, MA: MIT Press, 2012).

⁵ Alfred Crosby, *Ecological Imperialism: The Biological Expansion of Europe, 900–1900* (Cambridge: Cambridge University Press, 2004 [1986]); Corey Ross, *Ecology and Power in the Age of Empire: Europe and the Transformation of the Tropical World* (Oxford: Oxford University Press, 2017).

⁶ Corey Ross, 'Peripheral Centres: Copper Mining and Colonized Environments in Central Africa' in *Ecology and Power*, chapter 6.

increasingly regulated in Western Europe and north America, but still operated in less regulated ways in non-Western countries, an early stage of what is now understood as the offshoring of pollution to the global South.⁷ Analogous to this, Western approaches to environmental management and concerns, and the production of knowledge about them, were, as Ann Hironaka shows, transplanted from the West via international organisations to ‘less developed countries’.⁸ Environmental protection was, then, the latest iteration of the elite bodies of knowledge that, this book has shown, have provided frameworks for understanding Copperbelt societies. The new international attention on mining’s environmental effects in the early 1990s provided Copperbelt communities with a novel discursive framework within which to express their concerns. This prompted the establishment of new environmental bodies, some funded by international organisations, that sought to hold mining companies to account for polluting activities. The adoption of increasingly stringent environmental standards in Copperbelt mines was partly driven by donor conditionalities, prompting new legislation and the documentation by companies of their impact.

Yet these regulations had an ambiguous relationship with Copperbelt history. Mine companies and the legal regime governing them sought to distinguish between new environmental effects and those that had already occurred: ‘legacy’ pollution was characterised as belonging to the past – and therefore the legal and financial responsibility of an earlier corporate regime – despite the obvious and overwhelming evidence of its contemporary negative effects in communities also affected by contemporary mine pollution. Residual state corporations and the states themselves were made responsible for ‘cleaning up’ historical pollution, at a time when they were least financially equipped to do so. Mine privatisation also involved the eviction of tens of thousands of ‘squatters’ from ‘mine land’, productive farmers whose agricultural activities continued to be represented as out of place.

⁷ Xiaoyang Li and Yue Maggie Zhou, ‘Offshoring Pollution while Offshoring Production’, *Strategic Management Journal*, 38, 11 (2017), pp. 2310–29.

⁸ Ann Hironaka, ‘The Globalization of Environmental Protection: The Case of Environmental Impact Assessment’, *International Journal of Comparative Sociology*, 43, 1 (2002), pp. 65–78.

Copperbelt societies have always had their own understanding and conceptualisation of environmental concerns concerning land and water usage and the effects of mine pollution on them; these, however, went largely unrecorded, even unspoken, during the mid-to-late twentieth century boom. Iva Peša's studies for the 'Comparing the Copperbelt' project demonstrate how both the environmental impact of the region's mining industry and the ubiquity of its 'urban agriculture' were silenced during the Copperbelt's 'golden age' and then 'discovered' during its decline in problematic ways that reinforced misunderstandings about both their novelty and how to respond to them effectively.⁹ This chapter builds on Peša's work to explain how Copperbelt agriculture was understood by its practitioners and producers of knowledge. While farming was represented as inappropriate for the quintessentially urban Copperbelt and treated as a necessary 'hardship' during the region's long period of decline, for many Copperbelt residents it has always been central to their livelihoods and identities.

Copperbelt communities' memories of historical pollution and its relationship to current environmental concerns are, therefore, far from straightforward. Just as conventional historical periodisation is challenged by the temporal relationship of past acts of pollution to their present-day and future manifestations, interviewees disagree about the extent and form of environmental problems in the past and, in particular, about how communities understood and responded to them. The fact that mining continues across the Copperbelt further complicates the ability of analysts to distinguish between past and present manifestations of environmental damage, as does the ongoing importance of mining to state revenues and livelihoods.

This chapter, then, focusses on the recent discovery of mine pollution as a central element of the region's history. It explores the paradox that such 'pollution', hidden in plain sight, was nonetheless central to the lived experience of Copperbelt societies, intrinsic to the endeavour of extracting minerals from the earth and commodifying them by industrial and chemical processes that equally necessitated the application of human labour, provided by communities that were poisoned by them. It first steps back briefly into the Copperbelt's recent past to establish

⁹ Iva Peša, 'Crops and Copper: Agriculture and Urbanism on the Central African Copperbelt, 1950–2000', *Journal of Southern African Studies*, 46, 3 (2020), pp. 527–45; 'Mining, Waste and Environmental Thought', *Environment and History* (2020).

the way patterns of land use, official and unofficial, shaped industry and society's impact on the environment. It briefly explains how and why widespread pollution existed during the region's post-World War Two boom alongside a relative silence about it. Finally, it identifies how changing attitudes to the environmental effects of mining and changing perceptions of urban agriculture have generated new understandings of the relationship between society, production and the 'natural world'. It explains how recent struggles over the past and present effects of Copperbelt mining have been characterised by elite actors – states, mine companies and international environmental actors – and by communities themselves.

Land Use and Farming in the 'Golden Age'

As we have seen, colonially connected mine companies acquired exclusive use of vast concessionary territories, deliberately preventing other activities such as settler or indigenous agriculture. Ross demonstrates the deep and sustained environmental impact of copper mining, in which scientific innovation enabled local refinement in facilities such as UMHK's leaching plant in the Shituru area of Jadotville (Likasi) that opened in 1929.¹⁰ The company's emphasis on open pit production, which enabled the substantial reduction in its workforce discussed in Chapter 1, left vast scars on the Katangese landscape that contrasted with the mainly underground mines south of the border. Ross emphasises the cutting-edge technological prowess that placed the Copperbelt, in the imagination of mine engineers, at the scientific 'frontier', highlighting the supposed chasm between this new industrial modernity and rural societies dependent on subsistence agriculture.¹¹

The notoriously poor quality of agricultural land across the central African Copperbelt justified the marginalisation of commercial farming in official policies. African agriculture was consistently characterised as unproductive or backward and, as discussed in Chapter 5, gendered as carried out primarily by women, reinforcing its supposedly 'traditional' nature. In Haut-Katanga, women were encouraged to produce foodstuffs to feed the growing mines, while in Northern Rhodesia indigenous agriculture was generally discouraged as an uncontrollable and unproductive activity that threatened to encroach

¹⁰ Ross, *Ecology and Power*, p. 171. ¹¹ Ross, *Ecology and Power*, pp. 172–5.

on mine-owned land. While late colonial officials and research institutions in Haut-Katanga promoted indigenous agriculture as an alternative to scarce mine employment (Chapter 2), mine areas themselves remained exclusive industrial domains in which farming in household gardens was explicitly banned, partly because it was viewed as a malaria risk. The continuing provision of company rations was predicated on the assumption that mineworker households could not feed themselves: the stereotypical UMHK housewife sewed and cleaned, but never farmed. So, while Katangese authorities provided opportunities for African farmers to supply the urban market, their idealised and highly regulated notion of urban life ensured that independent African farmers had no legitimate place in town.

While RST did provide houses with garden plots to some of its workers, particularly in Luanshya, they were never seen as anything other than a minor contribution to household subsistence, which was – Northern Rhodesian mine companies believed – ensured by rations and then wholly cash wages. Colonial reports were consistently dismissive of the contribution of indigenous agriculture to the economy and community welfare, for example in a 1960 report on Kitwe: 'There is no real African agriculture in the district although as always every available and suitable piece of vacant ground is hoed and planted with mealies, ground nuts, etc.'¹² A 1959 report on Luanshya demonstrates the extent to which African farming was 'out of place' in town and needed to be controlled:

There never can be much to fill a chapter about agriculture in an urban district. All attempts at agriculture are for one reason or another on a small scale. . . . cultivation must not be allowed in future to reach the point where drastic action has to be taken to prevent erosion and excessive tree-cutting. It is not easy to survey cultivation nor for that reason to discover just how much land is under the hoe.¹³

Plans were in hand to conduct aerial surveys of the problem, but neither companies nor colonial officials had the capacity to effectively control small-scale African farming. As this report indicates however, officials frequently criticised its damaging environmental effects. This tendency

¹² NAZ, WP 1/2/64, Special Commissioner for Western Province Reports on Copperbelt, 1959–60, Annual Report, African Affairs, Kitwe.

¹³ NAZ, WP 1/2/43, African Affairs Annual Report, Luanshya, 1957–60, 'Luanshya African Affairs Annual Report', 1959, n.p.

to assume that autonomous African activities such as farming and charcoal burning were environmentally damaging is consistent with Moore and Vaughan's critique of colonial and anthropological understanding of rural '*citemene*' agriculture and, as Peša argues, revealingly inconsistent with their tolerance of mine pollution.¹⁴

There was a significant degree of continuity of such attitudes into the early independence era. Post-colonial state officials shared the negative attitude of mine companies to 'urban agriculture', emphasising a clear division between the urban industrial Copperbelt and 'rural' areas where agriculture was practised. Farming was, for President Kaunda, emblematic of a productive African society, ideationally bound up with his notion of a communal societal order. Amid persistent concerns about unchecked rural–urban migration (Chapter 3), authorities sought to control specific instances of agricultural activity on mine land. In 1965, for example, seventy 'individual subsistence farmers' applied for government assistance to establish a vegetable growing co-operative on Anglo-American land. A government request to AAC's Bancroft Mines company for permission for this initiative made it clear that any such development would 'take place on the understanding that at no time will they prejudice mining operations, and that Bancroft Mines Limited will have the right to give these societies, say, six months' notice to leave the area altogether without compensation for any damage to crops that may occur'.¹⁵ Despite these reassurances, the company refused permission because 'there may be some difficulty in clearing the settlers from the area when prospecting is due to commence'.¹⁶

That year, new guidelines were introduced by RST for land usage, encompassing its allocation for employees' gardens, the risks posed by 'unauthorised cultivation and charcoal burning' and the legal powers at the company's disposal to deal with 'squatters'.¹⁷ Its officials were

¹⁴ Henrietta Moore and Megan Vaughan, *Cutting Down Trees: Gender, Nutrition, and Agricultural Change in the Northern Province of Zambia, 1890–1990* (Oxford: James Currey, 1994); Peša, 'Mining, Waste and Environmental Thought', pp. 14–15.

¹⁵ ZCCM-IH, 17.3.3A, Land Use, Squatters and Co-operatives 1956–67, Asst District Secretary Bancroft to GM Bancroft Mines Limited, 11 June 1965.

¹⁶ ZCCM-IH, 17.3.3A, Land Use, Squatters and Co-operatives 1956–67, Chief Geologist (Zambia) Anglo-American to W. M. Younger, Mining Titles Department, 10 August 1965.

¹⁷ ZCCM 12.1.7A, 'Regional Development, Land Policy and Land Usage', 1963–5, Lands Memorandums Nos. 1 and 3.

encouraged to avoid taking direct action against those cultivating or otherwise illegally occupying company land, but equally instructed on the specific offences of, for example, theft committed by charcoal burners or ‘intentional damage’ caused by digging up land or cutting down trees.¹⁸

Mine companies thus retained vast territories for potential future exploitation, much of which was never utilised, and sought to keep Africans off mine land. They and government officials continued to stereotype Copperbelt agriculture, despite the sale of produce by women in urban marketplaces, as unproductive ‘subsistence’ farming. It is nonetheless clear that farming was a dominant economic activity carried out by tens of thousands of Copperbelt residents, including mineworkers’ wives, but also those living outside mine areas in the wider Copperbelt towns. Many interviewees recall their experiences of acquiring access to farm land to which they had no legal claim, for example Nathan Mwamba: ‘Following the laws and rules, farming in those areas was illegal and they were so strict such that if they found you, they would even grab your tools. It’s just that the people were forcing themselves to do the farming. It still is unaccepted to farm on that land’.¹⁹

Such activities, particularly in Haut-Katanga, remain largely undocumented, but our interviewees provide glimpses into the ubiquity of urban farming for the period from the 1970s onwards (see below).

Pollution and Environmental Impact – Hiding in Plain Sight

The assertion of sovereignty over company territory equally applied to the ‘problem’ of pollution: while the dangers of poisonous emissions in underground mining in particular were well established by the early twentieth century, less attention was paid to the spread of pollutants to residential areas that housed mineworkers and their families, often built adjacent to the mines. The influence of mine unions and the ILO led to the adoption of workplace health and safety rules and awareness campaigns, concerned with industrial accidents and addressing the dangers of gas and other pollutants.²⁰ However, corporate responsibility for the effects

¹⁸ ZCCM 12.1.7A, ‘Regional Development, Land Policy and Land Usage’, 1963–5, Lands Memorandums No. 4.

¹⁹ Nathan Mwamba interview.

²⁰ For the ILO in Africa see Daniel Roger Maul, Luca Puddu and Hakeem Ibikunle Tijani, ‘The International Labour Organization’, in Stefano Bellucci

of pollutants generally evaporated once they flowed out of production sites, even as they passed into the communities where the same workers lived. Many of the worst risks arose from the processing of ore to add value, for example the use of local smelters. Although the Zambian mineworkers' union regularly raised 'community' concerns (such as health and education provision) in their negotiations with mine companies, there is a striking absence regarding any similar concern about pollution in the minutes of their meetings.²¹ The same applies to the tripartite forums overseeing *Gécamines'* *cités* management in the 1980s.

The fact that air pollution was known about is, however, evidenced by the geographical positioning of European and/or skilled worker quarters relative to those of unskilled workers. In Mufulira, for example, Kankoyo sits directly adjacent to the plant and has long been affected by air pollution, as well as the damage caused to its houses by underground mining (see below). European and more senior African workers were housed further from the plant in areas that were not downwind of these fumes.²²

Peša has painstakingly recovered evidence of how companies managed pollution and avoided responsibility for its effects on water and air, in a context where newly independent states prioritised mine production over environmental considerations. Company engineers and managers were always confident that technical solutions would be found in the future to address environmental problems being created today, particularly the steady build-up of waste deposits across the region's landscape.²³ Many reports and publications explained that the inevitable 'global' problem of mine-related pollution, including effluent discharge and erosion of old tailing dams, was being addressed by the gathering of data by mine companies using the latest scientific methods, so as to avoid the damage already suffered by fully industrialised countries.²⁴ The

and Andreas Eckert, *General Labour History of Africa* (Oxford: James Currey, 2019), pp. 223–64.

²¹ Larmer, *Mineworkers in Zambia*, pp. 150–1.

²² ZCCM-IH, METS, ZCCM Copperbelt Environmental Project, Volume 2.5, Mufulira EIA, p. 4, cited in Jennifer Chibamba Chansa, 'Houses Built on Copper: The Environmental Impact of Current Mining Activities on "Old" and "New" Zambian Copperbelt Communities', in Larmer et al., *Across the Copperbelt*, pp. 233–63.

²³ Peša, 'Mining, Waste and Environmental Thought', p. 13.

²⁴ ZCCM-IH, 5.14.5B, 'Konkola Division Water Quality Evaluation'; H. Matschke, 'River Pollution by Mine Effluence in the Kitwe Region', *Zambia Geographical Association Handbook* (Lusaka: ZGA, 1974), pp. 125–8.

Industry Pollution Adviser for NCCM, H. Matschke, while raising concerns about occasional breaches of discharge limits, generally conveyed a sense of a system carefully designed to mitigate dangerous pollution.²⁵

In 1972, NCCM Nkana's Superintendent of Metallurgical Control, G. Armstrong-Smith, attended the landmark UN Conference on the Human Environment in Stockholm. He subsequently reflected that 'metallurgical processes on this scale mean ... [t]hese operations are inevitably actual or potential sources of pollution'. His solution to such problems was typically technical, involving, for example, the more efficient collection of sulphur gases and their conversion into sulphuric acid, for which there was a local market. Taller smoke stacks, including the 100 m chimney then under construction in Kitwe, would dissipate the remaining gas into the atmosphere, thus avoiding ground pollution. Armstrong-Smith stated with confidence:

the Zambian mining industry will continue to strive to take advantage of any new technological developments to increase the efficiency of its operations and ... this policy is more likely to lead to better control of fumes emission than to worsen it.²⁶

Similarly, quality controls for the rivers on which most Copperbelt residents relied for drinking water involved 'the most searching monitoring system for water in the country ... [with] ... chosen sampling points stretching from above Konkola Mine to below the confluence of the last Copperbelt effluent downstream of Kitwe'.²⁷ The author concluded 'that, at present, fume emissions can intermittently give rise to local pollution, [but] the extent of this cannot be described as an "unacceptable risk"'. Such risks had to be set against mining's centrality to national development:

Whatever earnings it spends on projects that directly or indirectly do not contribute to the making of saleable metal are, in effect, so much lost for financing the country's needs. ... the industry has a duty to restrict its

²⁵ ZCCM-IH, 5.14.5B, Pollution general correspondence up to 1984.

²⁶ ZCCM-IH, 5.14.5B, 'Konkola Division Water Quality Evaluation', G. Armstrong Smith, 'Pollution and the Mining Industry', 12 July 1972.

²⁷ ZCCM-IH, 5.14.5B, 'Konkola Division Water Quality Evaluation', G. Armstrong Smith, 'Pollution and the Mining Industry', 12 July 1972, p. 5.

expenditure on the non-productive, usually costly, means of controlling pollutants so that the nation is not needlessly deprived of essential revenue.²⁸

When asked about their experiences of pollution during the ‘golden age’, interviewees mainly recall the sulphur gases (known as ‘*senta*’ or ‘*kachoma*’) released into the atmosphere by smelters. As well as poisoning the air, sulphur dioxide emissions damaged vegetation and buildings. Fridah Mwale recalls:

When the emission was too high, it used to cause windows to have cracks and the roofs used to have holes. . . . Sometimes the [tap] water got mixed with the acid which they brought and sometimes we were informed not to draw water because it was mixed with acid.²⁹

Likewise, Stephanie Mumba remembers: ‘We have experienced moments of air pollution caused by *kachoma* from *Gécamines* . . . People were coughing, the vegetation was affected; nothing was growing because of this smoke’.³⁰ In Likasi, such pollution particularly affected the Shituru area, with its leaching plant and smelter.³¹ Emile Ngoy Muyondwe explains:

If you look at the environment near the factories, it is rare to see a tree above two metres. When we burned sulphur in these factories there was a suffocating smoke that we called *kachoma*, it means dirty. It stung and it was the whole camp – SNCZ, Shituru, UCS – that was affected . . . The chimney was lengthened so that the smoke went further but there were also people there [living in the location where the smoke now reached].³²

Asked to periodise this phenomenon, interviewees give diverse responses that in some respects reflect the official silence of mine pollution in the region’s boom period. Washeni Mweni argues, for example, that although sulphur pollution has long been present, nobody spoke about it in the past.³³ Samson Chama claims: ‘*Senta* has been there. It is not a big challenge because even when I came in 1959 I found *senta*. It was more than it is now. It hasn’t been a very dangerous thing as some people would say’.³⁴ Chama believes that more recent claims regarding its damaging effects have been driven by

²⁸ ZCCM-IH, 5.14.5B, ‘Konkola Division Water Quality Evaluation’, G. Armstrong Smith, ‘Pollution and the Mining Industry’, 12 July 1972, p. 6.

²⁹ Fridah Mwale interview. ³⁰ Stéphanie Mumba interview.

³¹ Séraphin Musoka interview. ³² Emile Ngoy Muyondwe interview.

³³ Washeni Mweni interview. ³⁴ Samson Chama interview.

outside intervention (see below). Other interviewees associate the start of pollution with the departure of Europeans from the mining industry: 'Back when we were with white people, we couldn't even smell the gas; not even the smoke. At the slightest detection of smoke, all the engineers were mobilized to remedy this anomaly. . . . The pollution started with the departure of the whites'.³⁵

Levy Chushi, like other interviewees, characterises *sentá* as an unavoidable problem in mine areas: 'People have been complaining but nothing much gets to be done, you know mining is a major economic activity in Zambia.'³⁶ Mwanza Lukinda remembers 'timid' complaints being made to *Gécamines* by its workers.³⁷ Cyprien Ramazani explains the problem thus:

Gécamines worked 24 hours a day and there was smoke. It started from the chimney around 8 pm to 9 pm, the windows and doors had to be closed. And the smoke reached everyone . . . [a]ccording to the wind direction. . . . pollution worried everyone. . . . the answer [from the authorities] was that, the country must work, people must live, the state must have money. People were forced to go to the hospital from time to time for medical check-ups. It was easy for company workers but hard for the unemployed when it came to covering medical costs. . . . The workers talked about it, the doctors talked about it, the population in the city talked about it, everyone talked about it. There were even delegations that were sent to Kinshasa . . . but without success.³⁸

Nathan Mwamba similarly recalls for Zambia:

We used to complain about it saying that the *sentá* was too much. We just used to be told that they have heard and would see what they can do but it always just used to end there. It also used to affect our crops and destroy them a bit but we still used to go ahead and eat them.³⁹

Evans Nsabashi argues that Copperbelt residents tacitly accepted pollution as the price they paid for mine company employment.⁴⁰ William

³⁵ Dieudonné Kalenga interview. Similar sentiments were expressed by interviewees Ilunga wa Kumwanza (8 June 2018) and Nathan Mwamba. Periodising this 'departure' is, however, difficult, as it may be variously associated with the Africanisation policies of the late 1960s and early 1970s or the economic decline of the late 1970s and 1980s.

³⁶ Levy Chushi interview. ³⁷ Mwanza Lukinde interview.

³⁸ Cyprien Ramazani interview.

³⁹ Nathan Mwamba interview. Similar accounts of complaints about unheeded crop damage are made by interviewees Emery Bweupe and Ana Chilufya.

⁴⁰ Evans Nsabashi interview.

Chinda puts it succinctly: ‘Because we were enjoying we were not complaining.’⁴¹ Former Mufulira councillor Chrispin Chani dates the worst period of *sentā* pollution to the 1990s, during which he was involved in legal action about its effects:

It was really worse around Kankoyo area. And nothing can grow in that area. . . . At some point it even went as far as our farms and destroyed all our crops. This was in the 1990s. We even took the mines to the courts and we were compensated. Farmers would complain to us as councillors. We took the case to the council. The council took the case to the mines who reported it to the [Environmental Council of Zambia] ECZ . . . Then the cases would end up with compensation.⁴²

While it is impossible to know if Chani’s account reflects actual pollution levels, it is consistent with the increasing authority of official bodies to challenge environmental damage in the 1990s, as is discussed below.

Urban Agriculture During ‘Decline’: Commercial Enterprise and Coping Mechanisms

Although urban agriculture had been an important economic activity on the Copperbelt from the mid-twentieth century, the region had never been self-sufficient in food. Maize in particular was supplied by largely settler farms in southern Zambia and northern Katanga. Katangese towns were subsequently supplied by imports from as far as South Africa and, both legally and by smuggling, from Zambia. However, in the 1970s and 1980s, the gradual recognition that farming was a useful supplement to the declining value of mine wages led to a greater willingness to encourage agricultural production within and near Copperbelt towns. Copperbelt farming took diverse forms: some mineworkers’ families produced small quantities of maize, vegetables and chickens in their ‘gardens’, while many women (and some men) acquired access to plots of land in nearby areas that could be reached by foot or bicycle. Those who moved to peri-urban informal settlements such as Kansuswa (see Chapter 3) saw farming as central to their livelihood strategy. They entered into a variety of relationships with

⁴¹ William Chinda interview.

⁴² Chrispin Chani interview, 16 July 2018. See below for the establishment of these organisations.

chiefs or authorities in areas demarcated as 'rural' or participated in the growing number of projects that, like INÉAC in the 1950s (Chapter 2), promoted peri-urban commercial agriculture. Many European farmers, meanwhile, departed as a result of indigenisation policies and general economic decline, adversely affecting maize production but also opening up opportunities for local entrepreneurs.⁴³ *Gécamines* and ZCCM, as part of their wider developmental obligations to their respective states, supported a range of agricultural projects, aimed at retired workers and the children of employees, as well as establishing commercial food production programmes of their own. In Haut-Katanga, the *Gécamines* subsidiary, the *Centre d'exécution des programmes sociaux et économiques* (CEPSE) – a successor to CEPSEI that oversaw social service provision in mine *cités* – became responsible for company agricultural production. Starting in 1975, it produced 2,200MT of maize, rising to 9,200MT in 1977. The aim was to make Shaba/Katanga, which imported 168,000MT of maize in 1978, self-sufficient in food by the mid-1980s.⁴⁴ In 1983 CEPSE was abolished and its agricultural programme transferred to a new *Société Agro-Industrielle* (AGRIS), a state-driven initiative to bolster local food production at a time when foreign exchange was increasingly scarce.⁴⁵ The AGRIS initiative produced 20,798MT of maize in 1983–4, but also purchased 20,929MT from local farmers, evidence of the latter's ability to respond to local markets.⁴⁶

Bruneau's useful study of Katangese farming activities identified a general expansion of agricultural activity on the outskirts of mine towns in the mid-1980s. He was, however, dismissive, like many earlier analysts, of the productive capacity of many new small farms owned by local businessmen, which he compared unfavourably to the 'handful of real farms and dairies managed by expatriates'.⁴⁷ But the economic crisis of this period seems to have generated an extraordinarily rapid increase in small-scale food production:

⁴³ Jean-Claude Bruneau, *D'Ici et D'Ailleurs: Quand les Immigrés se Font Autochtones: Citadins et Paysans du Haut Katanga* (Yaoundé: Presses Universitaires de Yaoundé, 1999), p. 153.

⁴⁴ *Gécamines*, Annual Report 1978, p. 28.

⁴⁵ *Gécamines*, Annual Report 1983, pp. 36–7.

⁴⁶ *Gécamines*, Annual Report 1984, p. 49.

⁴⁷ Bruneau, *D'Ici et D'Ailleurs*, p. 155.

The officially imported tonnage no longer represented even a quarter of the approximately 200,000 tonnes of maize consumed by the copper towns. . . . a good third of the total [came] from the mining area itself where, unprecedentedly, cereals can be found. Local contributions came in part from the mechanized production of *Gécamines*, but even more perhaps from the largely spontaneous food ‘halo’ around the copper towns. According to official statistics, the production of Haut-Katanga maize doubled from 1983 to 1984. There is also cassava, edible leaves and charcoal, which come entirely from the immediate hinterland. And all this is confirmed by the tens of thousands of cultivated hectares visible on satellite images, the tens of thousands of urban gardens, the proliferation of artisanal mills in Lubumbashi, Likasi and Kolwezi.⁴⁸

Bruneau suggests this explosion of local production was prompted by the devaluation of the Zaire, which quintupled the local price of maize, and the reduction of food imports by *Gécamines*.

As Peša explains, the expansion of urban farming during this period was officially characterised as either welcome if belated evidence of diversification away from mining dependency or a symptom of the region’s economic decline, in which the ‘ruralisation of the city’ saw urbanites return to the fields of their ancestors. Despite evidence that local farmers were responding to local market conditions and feeding the urban population, ‘agriculture’ could still not be incorporated into observers’ conventional ideas about the city.⁴⁹ While farming was commonly characterised as a (backward) step away from waged labour, it was often practised by more prosperous urban residents, those whose success in business or senior employment meant they had savings to invest in commercial agriculture. Many had been doing so well before the period of decline, to guard against the everyday uncertainties of urban life. Morris Chimfutumba used his savings to buy 150 hectares when NCCM sold some land in the early 1970s. He was assisted by extension workers from Zambia’s National Agricultural Marketing Board (Namboard), which also supplied him with fertiliser.⁵⁰ Ennis Zulu’s family acquired a plot of land when they first arrived in town in 1970: ‘It was important at all times because it’s

⁴⁸ Ibid., pp. 158–9. It is possible that Bruneau’s assumption that local agricultural production was hitherto low partly reflected the failure of earlier policymakers to recognise the productive capacity of informal indigenous farming.

⁴⁹ Peša, ‘Crops and Copper’, pp. 540–2.

⁵⁰ Morris Chimfutumba interview, 13 July 2018.

a source of food and income and there were times when we would have shortages at the mine and we used to depend on that [farming].⁵¹

Henry Longwane started farming to supplement his 'low' salary. He grew maize on a small plot located near Mufulira mine and joined an agricultural co-operative that helped him obtain fertiliser.⁵² In 1987, schoolteacher Thérèse Kyola was provided with a hectare of land 12 km from her Likasi home by the NGO Shalamo, which received a percentage of the crop as payment; she fed her family with the food produced and sold part of it to pay school fees.⁵³ George Mwenda turned to farming on mine company land in 1984 to supplement his family's diet: 'We used to wake up very early around 4 am to start cultivating the land up to 6 am or 7 am because if we went beyond that time the mine police would get us and grab our hoes and other tools that we were using.'⁵⁴ Others, like Defa Ngoma, recall farming on unused mine land: 'We could just identify barren land, clear it up and cultivate since it was a mine area.'⁵⁵ William Chinda turned to Copperbelt farming because retiring to his village of origin no longer seemed attractive:

I thought if you retire you go back to your home . . . But as time went by home became where you were. So we started buying farms and plots. . . . because there in Kasama [in Zambia's Northern Province] I wouldn't have achieved as much and my children wouldn't be educated. But here I have allowed them to go to school.⁵⁶

Patson Katwisi applied to Mufulira district council in 1996 and was granted farm land 16 km from his house on which he and his family grew maize and tomatoes:

My wife was very instrumental. She was always looking ahead of me. . . . I used to say no we shall go to the village. . . . eventually she said we get a farm as it is the only item that you never go wrong with. With a house, there is depreciation. There is no depreciation with a farm and besides when you have a farm, the whole family can come and take over, they can utilise it.⁵⁷

Certainly, small-scale farming provided many with a coping mechanism once mining entered its extended period of decline. In 1986 the

⁵¹ Ennis Zulu interview. ⁵² Henry Longwane interview, 10 July 2018.

⁵³ Thérèse Kyola interview. ⁵⁴ George Mwenda interview.

⁵⁵ Interview, Defa Ngoma, Mufulira, 3 July 2018.

⁵⁶ William Chinda interview. ⁵⁷ Patson Katwisi interview.

inability of Haut-Katanga to feed its one million urban residents led to a World Bank ‘Agricultural Development Project’ to provide supplies and extension services to 38,000 smallholders and 50 larger farms. Routing this aid via new local NGOs overwhelmed their management capacity and the project was eventually completely derailed by Zaire’s early 1990s political and economic crisis (Chapter 8).⁵⁸ During that crisis, farming enabled some urban residents to survive in the absence of either cash wages or rations. International NGOs such as World Vision assisted Copperbelt communities to feed themselves and, to a limited extent, to produce for the market.⁵⁹ Séraphin Musoka recalls: ‘in 1993, we were struck by a major crisis which we were able to overcome thanks to our small field’. There was, he remembers, ‘[s]uffering, misery. If you didn’t grow, you didn’t eat. You could only eat that which you cultivate’.⁶⁰ For many this provided a painful but salutary lesson in the unreliability of mining income and the need to work hard to support one’s family:

Agriculture had come to support the mining activity. We know that mining is exhaustible. While agriculture is still renewable. People understood that they had to be in agriculture. . . . For *Gécamines* workers, it is complicated since they were used to a more or less easy life, they were given almost everything. So working in the field with all that it entailed was painful for them.⁶¹

Copperbelt farming, while far less constrained by state and company controls, was, however, increasingly affected by pollution – not necessarily because pollution was worse, but because access to increasingly populated land was more difficult, making it hard to find good soil that was not affected by mine emissions.

‘Discovering’ Pollution in the 1990s

Various factors combined in the early 1990s to make environmental concerns a key focus of policy and knowledge production. The deteriorating economic situation of mine companies undermined confidence in their technical capacity to solve pollution. It equally led to

⁵⁸ World Bank online, South Shaba Agricultural Development Project Completion Report, 31 May 1995.

⁵⁹ Interview, Justine Karumb, Likasi, 23 June 2018.

⁶⁰ Séraphin Musoka interview.

⁶¹ Interview, Gérard Mwaba, Likasi, 18 June 2018.

the intervention of IFIs in mine management (Chapter 8), which were at this time making loans increasingly conditional on environmental sustainability. The more rigorous environmental standards for mining introduced in Western countries in the 1970s and 1980s were now incorporated into the Environmental Impact Assessments (EIAs) that became central to extractive ventures globally.⁶² As IFIs underwrote loss-making mine operations while they prepared for privatisation, EIAs became compulsory for new mining ventures. New buyers of older mines sought to avoid the potential ongoing costs of legacy pollution and to guard against the 'polluter pays' principle that was, for example, written into US legislation and overseen by that country's powerful Environmental Protection Agency (EPA).⁶³ New state agencies were created and/or strengthened, for example the Environmental Council of Zambia (ECZ), established in 1992. Although lacking capacity, the ECZ was able to identify breaches by ZCCM of water and air pollution standards and fined the company accordingly.⁶⁴ Meanwhile, international environmental NGOs worked alongside new local bodies that sprang up to represent community voices in such assessments. All this prompted a new wave of knowledge production about the region's mining history in order to appreciate its existing environmental impact and its likely legacy for the future.

An early example of this approach can be found in a 1989–91 study of water pollution in Zambia's Kafue river basin by the government's National Council for Scientific Research and Department of Natural Resources. This followed the enactment of the Environmental Protection and Pollution Control Bill in 1990 and took place amid 'growing concern on the observed and potential negative impact of the various development activities on the environment in the Basin'.⁶⁵ The study found that '[t]here is no coordinated approach to the problems of

⁶² Hironaka, 'Globalization of Environmental Protection'.

⁶³ For the history of the EPA and documentation of its interventions in former mining sites, see its website, for example: www.epa.gov/superfund/what-superfund (accessed 29 July 2020).

⁶⁴ John Lungu, 'Socio-Economic Change and Natural Resource Exploitation: A Case Study of the Zambian Copper Mining Industry', *Development Southern Africa*, 25, 5 (2008), pp. 543–60.

⁶⁵ ZCCM-IH, 5.14.5B, 'Konkola Division Water Quality Evaluation', National Council for Scientific Research, 'Development of Institutional Consortium for the Management of Inter-Related Effects of Pollutants and Other

environmental degradation due to fragmentation of responsibilities' and that '[m]ost industries are not paying adequate attention to the environmental degrading effects of their effluences and other activities'.⁶⁶ The public had not been made aware of these effects and the media was criticised for failing to educate them.

The contrasting political situation of Zambia and the DRC in the 1990s led to divergent timings regarding environmental assessment of mining activity and liberalisation. In Haut-Katanga, economic and political collapse meant that effective environmental assessment was delayed until the early 2000s. In Zambia, the participatory politics of the Third Republic created a comparatively open context for discussion of environmental concerns. Media coverage of pollution on the Copperbelt increased dramatically. The *Times of Zambia* reported in October 1994:

With the benefits of industry come the problems of waste and we are using the environment as a dumping ground for industrial and human waste, destroying other living creatures and in destroying them, destroying ourselves. . . . Industrial effluent – discharged into our rivers, streams and lakes is responsible for illnesses resulting in loss of school-time, loss of work-time, loss of income and therefore increasing poverty. . . . ZCCM caused that with careless discharges and 'accidents' from its processing plant in Chingola. Poisonous gases . . . are discharged into the air daily throughout the world including right here in Zambia. All the major industries are guilty.⁶⁷

It was reported, however, that ZCCM was co-operating closely with the ECZ in improving its environmental management systems.⁶⁸ The company sought to portray itself as environmentally friendly, for example in its newspaper *Mining Mirror*: 'ZCCM . . . seeks to establish and perpetuate a sustainable balance between the generation of wealth and protection of the environment for the present and future generations'.⁶⁹ The introduction of new environmental laws was, however, not matched by substantially increased monitoring capacity in state bodies such as the ECZ and the Ministry of Mines. On the Copperbelt, the once powerful labour movement was profoundly

Environmental Degrading Activities in the Kafue River Basin',
5 November 1991.

⁶⁶ *Ibid.*, p. 6. ⁶⁷ 'Soiling our Nest: Pollution Dilemma', *ToZ*, 31 October 1994.

⁶⁸ 'ZCCM Acts to Stem Pollution', *ToZ*, 16 December 1993.

⁶⁹ *Mining Mirror*, February 1996, p. 4.

weakened by the decline of formal sector employment. In its place emerged new local NGOs such as Citizens for a Better Environment (CBE), founded in 1997 by Peter Sinkamba. The international championing of 'civil society' provided international NGOs and IFIs with positive stories about the capacity of charismatic community activists such as Sinkamba to hold multi-national corporations to account for their environmental impact.⁷⁰

Privatising Production, Nationalising Waste

The sale of mine companies in the late 1990s and early 2000s ostensibly transformed the relationship between mining operations and the vast tracts of land that companies had always controlled but commonly under-utilised. New mine owners focussed on mine production and sought to externalise the social aspects of their operations. Nonetheless, in Zambia prospective owners sought to retain ZCCM's unused mine land that had been occupied over time by 'squatters'. As part of ZCCM's hasty efforts to prepare for privatisation, it forcibly relocated populations living in informal settlements abutting mine operations (see also Chapter 8):

The Company has had illegal settlers on its land for quite some time and this has been compounded by the lack of a political will to address the issue effectively and decisively in the past. ZCCM is being privatised, therefore, on the assumption that the new investors will bring with them enough capital to develop these mines further, the squatters that had been 'allowed' to settle on mine land cannot now continue to do so at the expense of developing the mines.⁷¹

These communities, totalling *c.*44,556 people, were characterised as engaged in agricultural activities, such as 'peasant farming' and fishing, that were considered inimical to the latest iteration of privatised

⁷⁰ See, for example, the portrayal of Sinkamba in *Forbes* magazine (www.forbes.com/sites/ashoka/2012/10/03/meet-a-playboy-entrepreneur-who-went-from-making-millions-to-making-an-impact/#1068ddc04579) and the characterisation of his activities in his capacity as an Ashoka fellow (www.ashoka.org/en-gb/fellow/peter-sinkamba) (both accessed 17 August 2020). The author has known Sinkamba since 2001. For the history of global civil society see Mary Kaldor, 'The Idea of Global Civil Society', *International Affairs*, 79, 3 (2003), pp. 583–93.

⁷¹ ZCCM-IH, 18.4.7F, 'Report on Illegal Settlements in Mine Areas', 1997, n.p.

Copperbelt modernity. Company officials worried that they would resist relocation to designated resettlement areas because farming land was not available there. Funds were set aside for the rapid resettlement of the residents of places such as St Anthony's compound, an 'eyesore . . . located in the surface rights area . . . to entice them to vacate the land as soon as possible'.⁷²

Between 1993 and 1997 meanwhile, Environmental Impact Statements (EIS) – a truncated version of an EIA conducted in locations with a significant environmental problem – were produced by Steffen, Robertson and Kirsten (SRK), a South African-based international mine consulting company, for the twelve sections of ZCCM to be sold. As the World Bank itself subsequently reported, these revealed the vast legacy of mine pollution and ensured that new investors made their purchase of Zambia's mines conditional on being freed from responsibility for it:

Given the extent and seriousness of environmental and public health impacts documented in the EISs, the KCM Consortium [and following its lead, other aspirant mineowners] was unwilling to accept any legal responsibility for historical environmental liabilities, most notably downstream impacts on populations and ecosystem functions. . . . GRZ [the Government of Zambia] and ZCCM-IH remain responsible for future third party liability claims arising from past environmental damage.⁷³

The privatisation process thus enabled the mines' new owners to divest the resultant companies not only of their social assets but also their environmental legacy. As part of the confidential Development Agreements signed between the Zambian government and the new owners, a process overseen by the IFIs, ZCCM-Investment Holdings, the state minority shareholder, acquired sole responsibility for the industry's historical liabilities, such as tailings dams and waste heaps.⁷⁴

The World Bank, having helped ensure that new investors could avoid these liabilities, then provided funding for a Copperbelt Environment Project that would help the state manage these

⁷² *Ibid.*, p. 8.

⁷³ World Bank online archives, 'Project Appraisal Document on a Proposed Credit and Grant to the Republic of Zambia for the Copperbelt Environment Project', 14 February 2003, p. 6.

⁷⁴ For the Development Agreements, see Alastair Fraser and John Lungu, *For Whom the Windfalls? Winners and Losers in the Privatisation of Zambia's Copper Mines* (Lusaka: Civil Society Trade Network of Zambia, 2007).

'environmental externalities'. These included the 'deterioration of ecological functions in the Kafue catchment of the Zambezi River system, pollution of water supply with contaminated mine leakage and runoff, and contamination of soil by lead, [polychlorinated biphenyls] PCBs, radioactive material and other toxic substances'.⁷⁵ Typically for its time, the assessment carried out for this project involved discussions with 'stakeholders and NGOs', both local (CBE was a key partner organisation) and international (e.g. Oxfam). Such participatory planning processes ostensibly presented a new model in which communities were empowered to participate in knowledge production about themselves. This process, however, found that '[a]ffected communities are generally not aware of the impacts of pollution from mines on their health, except for sulfur dioxide which is visible and odorous. This lack of awareness was an impediment to effective participation from communities on project design'.⁷⁶

As Chansa argues, the post-privatisation regulatory regime was weakened by this separation of historical and contemporary pollution. The ECZ struggled to hold Mopani Copper Mines, which now owned Mufulira's mine, to account for water pollution and smelter emissions of sulphur dioxide.⁷⁷ In 2009, as Chansa documents, the 'ECZ reported that sulphur dioxide emissions from the mine were up to 70 times in excess of those stipulated by the WHO'.⁷⁸ Although a new acid plant finished in 2014 is said to capture the vast bulk of emissions, periodic releases have occurred since, leading to a number of deaths.

Equivalent analysis of Haut-Katanga's environmental problems waited until military conflict had (mostly) ended in the early 2000s and was equally carried out in the context of mine privatisation. A major World-Bank-funded study conducted following the enactment of the new 2002 Mining Code surveyed thirty-seven *Gécamines*' mining and processing sites, thirteen of which were found to have a 'severe' environmental problem and only nine of which did not represent

⁷⁵ World Bank online archives, 'Project Appraisal Document on a Proposed Credit and Grant to the Republic of Zambia for the Copperbelt Environment Project', 14 February 2003, p. 9.

⁷⁶ World Bank online archives, 'Project Appraisal Document on a Proposed Credit and Grant to the Republic of Zambia for the Copperbelt Environment Project', 14 February 2003, p. 29.

⁷⁷ Chansa, 'Houses Built on Copper', pp. 236–7. See also Lungu, 'Socio-Economic Change', pp. 552–3.

⁷⁸ Chansa, 'Houses Built on Copper', p. 236.

a meaningful problem.⁷⁹ The Canadian analysts noted a policy context that protected new investors from historical liabilities; an emphasis on self-regulation in a context of reduced government budgets; and decentralisation of environmental oversight to local regulators that, however, lacked capacity. Their report identified five major environmental issues: tailing dams incompatible with modern practice, with walls having collapsed allowing runoffs near settlements; liquid effluents that were released untreated; the carrying of waste by wind into inhabited areas, causing lung and eye irritation; the proliferation of small artisanal gold mines using mercury; and the disrepair of obsolete industrial facilities, such as the UCS Shituru plant in Likasi, one of the thirteen severe problems identified:⁸⁰

All the installations are dilapidated. Piles of scrap, waste industrial and debris are common. . . . The exterior appearance of the acid plant and the emanations from it show that this installation is falling apart. The fumes from the acid plant are such that it makes it difficult for visitors to the complex to breathe. These traces of acid are occasionally noticeable even in the heart of the town of Likasi.⁸¹

Mine tailings were accumulating in the Likasi, Buluo and Panda rivers; significant residues were found in a 14 km stretch of river that nearby villagers used for their domestic water supply. It was estimated that making Shituru safe, building a new tailing pond, restoring its waste site and cleaning 30 km of rivers would cost between US\$9.5 and US\$15.5m. The estimated cost for cleaning up all thirty-seven sites was US\$290–US\$575m.⁸²

Pollution Past and Present: Contemporary Attitudes and Campaigns

On both sides of the Copperbelt border, documentation of and campaigning on mine pollution – by politicians, donors, international and local NGOs and activists – means that there is now much greater

⁷⁹ SNC-Lavallin International, '*Étude sur la Restauration des Mines de Cuivre et de Cobalt, République Démocratique du Congo*', Preliminary Report, April 2003.

⁸⁰ SNC-Lavallin International, '*Étude sur la Restauration des Mines de Cuivre et de Cobalt, République Démocratique du Congo*', Preliminary Report, April 2003, pp. iii–iv.

⁸¹ *Ibid.*, pp. 67–8. ⁸² *Ibid.*, pp. iv–v.

awareness of the environmental effects of both historical and contemporary mining. In Haut-Katanga, human rights organisations such as the *Association africaine des droits de l'homme* (Asadho) and *Le Comité de Suivi pour la Contribution des Communautés et Eglises à la Transformation Humaine* (Cosccet) publicise periodic breaches of environmental standards by private companies, for example the discharge of acid effluents by the *Société Minière du Katanga* (Somika) in 2017: 'As a consequence, all the residential houses located downstream of the site have been invaded by these acidic waters causing the death of poultry, small livestock and causing burns on the skin of those who have touched this water, as well as the pollution of well water'.⁸³ In Zambia, the group Green and Justice has worked with international NGOs including Action Aid to campaign for the relocation of communities in Kankoyo severely affected by mine operations.⁸⁴ Meanwhile, the UK law firm Leigh Day brought legal action in the British courts on behalf of 2,500 Zambians for water pollution by Konkola Copper Mines (KCM), resulting in the settling of their claim by KCM's parent company Vedanta Resources in January 2021. This demonstrates both the ability of local campaigners to act globally but also the limited capacity of the Zambian justice system to hold companies to account.⁸⁵

This awareness raising has affected how respondents characterise the periodisation and causation of mine pollution. While some interviewees insist (see above) that pollution in general and *sentá* in particular was always there, those who are most involved in campaigning, such as Margaret Waya, see things differently:

In the 1980s there was what we call *sentá*. . . we had no problem with it and it had no impact on human life. [When] Mopani bought ZCCM, they brought a number of problems, our lives have been impacted negatively. When we complain they say the government should move us from Kankoyo

⁸³ <http://cosccet.org/node/76> (accessed 30 July 2020).

⁸⁴ www.facebook.com/AAZambia/posts/relocation-of-kankoyo-communityactionaid-today-joined-other-civil-society-organi/2796990223649640 (accessed 10 August 2020).

⁸⁵ 'Vedanta Resources Settles Zambia Copper Mine Pollution Claim', *Reuters*, www.reuters.com/article/us-zambia-mining-vedanta-idUSKBN29O1EL (accessed 23 March 2021); Leigh Day, 'Legal Claim by More Than 2,500 Zambian Villagers in a Case Against Vedanta Resources Limited', www.leighday.co.uk/latest-updates/news/2021-news/legal-claim-by-more-than-2-500-zambian-villagers-in-a-case-against-vedanta-resources-limited (accessed 23 March 2021).

and find us another area because they pay tax and it isn't their problem. We went to Ndola, Radio Icengelo and ZNBC [Zambia's state-owned broadcaster] to complain. . . . The government however does not listen. . . . The houses here are completely destroyed because of blasting, all because of Mopani. . . . Here, plants cannot be grown because of the acid, green leaves turn yellow the minute they release this acid. But Mopani says it bought the mine, not the houses.⁸⁶

Damion Kachusa, however, articulates a contrasting historical narrative:

In the 1970s there was complaining but no-one heard. It was colonial rule a long time ago and a black man never really had a voice but now we have human rights and we can air out our complaints. Now it is damaging communities. We have high deaths because of this pollution. . . . They [the mine companies] now use any method to quickly produce more. It is about the money. We expect more deaths now as a result of fumes due to high production. Trade unions are powerless, they are also employees of that company, and are afraid of being retrenched. . . . With huge unemployment, if people complain too much they scare the investors.⁸⁷

Kachusa praises the work of groups like Green and Justice on environmental and social issues: 'Pollution, bad state of housing, no decent water, unemployment and environmental matters. So we speak through these organisations. The government has neglected us so through these NGOs our voices can be attended to'.⁸⁸

In Likasi, Gastonie Ngoy Kalala, who grew up in Shituru, recalls that in the past the sulphur dioxide smoke killed all vegetation but that 'they [residents] did not understand that it was pollution. It is now that the information is popularised that they realize it . . . it is today that we understood why we cough a lot'.⁸⁹ Emile Ngoy Muyondwe believes falling fish numbers and vegetable production has brought about awareness of environmental problems: 'Today we're talking about the environment, we fought for that to be the case. A company must take care of the environment and the people who work there'.⁹⁰ Shituru residents like Séraphin Musoka have a bitter-sweet relationship with the decline of Katanga's mining industry, the jobs it once provided and

⁸⁶ Interview, Margaret Waya, Mufulira, 6 August 2018.

⁸⁷ Interview, Damian Kachusa, Mufulira, 6 August 2018. ⁸⁸ *Ibid.*

⁸⁹ Interview, Gastonie Ngoy Kalala, Likasi, 22 June 2018.

⁹⁰ Emile Ngoy Muyondwe interview.

the impact it had on residents' health, following the closure of the plant: 'now that . . . UCS no longer works, we breathe a little more pure air', he states.⁹¹ Ilunga wa Kumwanza, who has lived in the area since the early 1960s, offers a long-term perspective:

When we arrived here in Likasi, there was greenery everywhere here in the UCS District and in the surrounding areas. However, as the plant operated, it was found that this . . . vegetation began to gradually disappear. It is only now, since *Gécamines* is almost completely on the ground, that the trees begin to grow back. . . . Fortunately, *Gécamines* is dead, it no longer produces; and therefore, it no longer pollutes. We are saved.⁹²

As this indicates, improved environmental conditions sometimes result from economic decline. The jobs and pollution associated with Copperbelt smelting have moved south as, for the first time in its history, the region's mineral processing has been integrated with much of Haut-Katanga's ore sent to the Zambian Copperbelt for processing.⁹³ While Zambia has historically sent agricultural produce north to feed Katanga's mining towns, its ability to do so has been adversely affected by the wider impact of climate change: where once southern Zambia was a regional bread basket, increasingly frequent droughts have caused periodic food shortages and famine conditions in some areas.⁹⁴ The changing climate has also rendered the vast hydroelectric operations on the Kafue and Zambezi rivers incapable of generating sufficient power for either Copperbelt mines or communities.⁹⁵ Despite the efforts of its new owners, the inability of the industry to separate its operations from the physical environment in which it operates is evident to all observers.

Today, the physical remnants of the Copperbelt's historical mining activities mark its subterranean and surface landscape, providing

⁹¹ Séraphin Musoka interview. ⁹² Ilunga wa Kumwanza interview.

⁹³ In 2019, however, the Shituru plant started producing copper cathodes or sheets again: <https://miningandbusiness.com/2019/10/01/gecamines-fait-a-nouveau-partie-du-club-ferme-des-miniers-en-rdc-capable-de-produire-du-cuivre-pur-a-9996-2> (accessed 10 August 2020).

⁹⁴ 'Climate Change has Brought Parts of Zambia to the Brink of Famine', the BBC: www.bbc.co.uk/news/av/world-africa-50976829/climate-change-has-brought-parts-of-zambia-to-the-brink-of-famine (accessed 13 August 2020).

⁹⁵ 'Zambia's Power Supply Deficit Worsens as Water Levels Sink', *Reuters*: www.reuters.com/article/us-zambia-electricity/zambias-power-supply-deficit-worsens-as-water-levels-sink-idUSKBN1YG1DZ (accessed 6 August 2020).

potent reminders to its communities of its past even as contemporary companies retreat from their obligations to them. These represent an intertwined legacy of environmental threat and economic promise. As Kristien Geenen powerfully explains, the city of Kolwezi sits directly above of its former underground mine: residents' homes, undermined by underground extraction and adversely affected by the pollutants beneath their feet and in the waste heaps around them, nonetheless provide a precarious access point to that wealth. In 2014, the city's Kasulo area experienced its own boom as residents dug shafts through their floors to access and sell cobalt ore to mainly Chinese traders, feeding the voracious global market.⁹⁶

As Mususa identified, the vicissitudes of global markets and new technologies influence changing patterns of what constitutes mine waste and what is considered a valuable resource. A decade ago she found that women who picked through the waste dumps left behind by the Copperbelt's golden age and that mark the region's landscape were criminalised when rising mineral prices increased the market value of these materials.⁹⁷ Today, the contested control over Zambian waste dumps is a major political issue in communities such as Kankoyo (in Mufulira) and Wusakile (Kitwe), adjacent to these so-called 'black mountains'. In June 2019 hundreds of '*jerabos*', members of local mining co-operatives, marched through Mufulira to demand access to the town's waste heaps.⁹⁸ Zambian politicians, acutely aware of the enduring centrality of the region's copper wealth (and its distribution) to electoral competition, have opportunistically supported these demands.⁹⁹ As in Kolwezi, the authorities turn a blind eye to these activities, representing as they do one way in which local communities have reclaimed their share of the region's mine wealth even as it continues to pose a threat to their health. Indeed, as Chansa argues, 'According to Kankoyo residents, the air and soil pollution they experience as a result of the presence of the slag dump gives them the right to exploit the resource'.¹⁰⁰

⁹⁶ Kristien Geenen, 'Gnawing Away at the City: Narratives of Domestic Precarity in a Congolese Mining Town', *African Studies Review* (2020), doi:10.1017/asr.2020.65.

⁹⁷ Mususa, 'Contesting Illegality'.

⁹⁸ www.lusakatimes.com/2019/06/26/jerabos-march-on-the-streets-of-mufulira-to-demand-the-black-mountain (accessed 10 August 2020).

⁹⁹ Chansa, 'Houses Built on Copper', pp. 248–9. ¹⁰⁰ *Ibid.*, p. 249.

Conclusion

The ‘discovery’ of environmental pollution in the last twenty-five years should not, of course, be taken to mean that mine communities were hitherto unaware or unconcerned about the effects of mine pollution on their health, livelihood or environment. Oral histories presented in this chapter show that, for example, acid pollution had a devastating effect on agricultural produce and did generate complaints. But the economic and ideational dominance of mining production meant that pollution was not generally the focus of Copperbelt communities’ concern or activism during the ‘golden age’. New international attention on the environmental effects of mining in the early 1990s provided Copperbelt communities with a public discursive framework within which to express their concerns.

The Central African Copperbelt’s profound and enduring environmental crisis has, as well as presenting an ongoing threat to the lives and livelihoods of its residents today and for the imaginable future, shattered ideational boundaries that shaped how the region was understood for a century. Privatisation processes, while sloughing off historical environmental effects (which, however, continue to affect today’s communities) and removing agriculturally productive ‘squatters’, attempted to impose new boundaries between productive commercial space and that which new companies considered ‘waste’: not only the mineral and chemical residues left behind by historical mining but also the now unwanted communities created by it. These new operations equally sought to impose a new legalistic periodisation, directly at odds with the ways in which historians now understand the interaction between environmental change and human society. The ‘old Copperbelt’, already characterised as ‘un-modern’ and uncompetitive in neo-liberal terms, was now separated from the present day, while an envisioned future industry would, by legal fiat, separate itself from this past, despite the fact that many of its operations and workers were, in reality, continuous with it. Indeed, as Peša shows, the supposed watershed in environmental scrutiny of mining often masks a striking continuity in an unwarranted faith-based approach that a technocratic future will solve environmental problems, despite its historical failure to do so.¹⁰¹

¹⁰¹ Peša, ‘Mining, Waste and Environmental Thought’.

These attempts have been challenged, to some extent by the Zambian and Congolese states but above all by Copperbelt communities, both as social movements and as local actors who, in various ways, seek access to the mining wealth that continues to be produced all around them. Commercial attempts to define and police company boundaries, challenged by agriculturalists and squatters for many decades, have been fatally undermined by popular recognition that the waste created by mining flows through water and air to mine communities, the wider Copperbelt and far beyond. While new private mine owners successfully off-shored responsibility for historical pollution liabilities, they face ongoing challenges to their operations from better informed and increasingly mobilised societies for whom mine pollution is no longer a price most are prepared to pay, unsurprisingly given the few social or economic benefits that flow from today's extractive companies.

This environmental awareness equally undermines the modernist assumptions underlying representations of historical and social change during the period under analysis in this study. The residual effects of acid pollution poison the soil and water from which tens of thousands of Copperbelt residents seek to extract a living. Waste heaps, composed of rocks forged in the Phanerozoic eon and industrially processed in the mid-to-late twentieth century, tower over the region's landscapes, providing contested opportunities for precarious wealth creation today and a potential if poisonous insurance against the region's highly uncertain future. Not only is Copperbelt history no longer one of inexorable growth and 'development', it is one in which both recent and deeper ecological pasts fundamentally shape its contemporary social realities and its communities' fears and hopes for the future.