
A SILENCED SPRING? EXPLORING AFRICA'S 'RACHEL CARSON MOMENT': A SOCIO- ENVIRONMENTAL HISTORY OF THE PESTICIDES IN TOBACCO PRODUCTION IN SOUTHERN RHODESIA, 1945–80

ELIJAH DORO AND SANDRA SWART

History Department
Stellenbosch University

Abstract

Rachel Carson's impact on the modern environmental movement is widely debated, but her 'African moment' has only received cursory historiographical attention. Environmental historians have not yet unpacked how her ideas have been appropriated, applied and contested in the continent, beyond the recent pejorative description of Carson as a 'killer of Africans'. This paper uses the lens of political ecology and environmental history, drawing mainly primary sources from the National Archives of Zimbabwe, to interrogate the use of pesticides in tobacco farming in Southern Rhodesia (now Zimbabwe) from 1945 to 1980, and their effects on the human body, the body politic and the natural environment. It traces the growth of pesticide use beginning with the end of the Second World War, which saw a turning point in the global pesticides' regime as crop chemicals such as DDT became widespread. It explores the problems that arose with the use of these pesticides and connects this narrative with the various global debates on 'environmentalism' that arose in the 1960s, and how this impacted on the evolution of legislation and policies to curtail pesticide use in tobacco production in Southern Rhodesia. In doing so, the paper constructs a contextual reading of *Silent Spring* within Southern Rhodesia and argues that despite the neglect of Carson within the tradition of African environmental historiography, her ideas significantly shaped the emergence and growth of modern environmentalism within the continent.

Keywords: environmentalism, DDT, Rachel Carson, pesticides, tobacco, Southern Rhodesia, Zimbabwe, Africa

Introduction

In 1962, Rachel Carson, an American marine biologist, penned *Silent Spring*, a highly controversial book that revolutionised global perceptions of the widespread use of pesticides and chemicals in agricultural production.¹ In this book, Carson critiqued conventional views of organochloride persistent pesticides, particularly DDT and their toxic effects on ecological systems, as well as plant and human life. She portrayed a dystopian civilisation teetering on the brink of self-imposed extinction because of the contamination of the air, rivers, forests and sea with chemical sprays that ‘lie in the soil, entering into living organisms, passing from one to another in a chain of poisoning and death’.² *Silent Spring* became a contentious and contested text that put pesticide use within the domain of public debate and environmental policy globally. Although initially maligned by the defenders of the pesticide and chemical establishment, the book precipitated our contemporary discourse and debates over the ecological dimensions of pesticide use.³ *Silent Spring* galvanised environmental activism and public policy in most countries⁴ as the problem of pesticides gained public notoriety and slowly became a subject of enquiry investigated by environmental scientist and, even more slowly, environmental historians.⁵ However, concerning tobacco production, *Silent Spring* was reticent, noting only as an aside the permanent poisoning of the soil by tobacco chemicals.⁶ This silence caused ‘Big Tobacco’ to receive the book less critically and even embrace it, as they had feared an overt critique might draw attention to the industry’s own massive use of pesticides.⁷

1 Rachel Carson, *Silent Spring* (London: Hamish Hamilton, 1963).

2 *ibid.*, 5.

3 The book was heavily attacked by the defenders of the pesticide industry as being unscientific and an hysterical, apocalyptic fantasy. Environmental revisionists like David Ropeik also blamed her for fostering a set of accepted beliefs that actually caused much damage to the human and natural environment, blogs.discovermagazine.com/collideescape/2012/06/22/the-lessons-and-echoes-of-silent-spring/#.WzvC-RaxWEC, accessed 5 July 2018.

4 It is important to note that even before *Silent Spring*, environmental issues were already being made visible in public policy from the late 1950s by several other writers and practitioners in the global North. This movement, however, was not firmly entrenched, and it was Carson who gave much impetus to this wave. These early writers include the British–South African Sir Solly Zuckerman, who coined the term ‘environmental science’ in 1959 and played a huge role in the establishment of the UK Natural Environment Research Council in 1964, and the American Lynton Caldwell who authored ‘Environment: A Focus for Public Policy’, in *Eikistics* 17, no. 102 (May 1964). See Paul Warde, Libby Robin and Sverker Sörlin, *The Environment: A History of the Idea* (Baltimore, MD: Johns Hopkins University Press, 2018), 18–20.

5 Also see *DDT, The Silent Spring and the Rise of Environmentalism: Classic Texts*, ed. Thomas R. Dunlap (Seattle, WA: University of Washington Press, 2008); Frank Graham, *Since Silent Spring* (London: Hamish Hamilton, 1972); Andrei Vinogradov and Stanislav Petriashin, ‘Chemical Industry, the Environment and Russian Provincial Society: The Case of Kokshan Chemical Works, 1850–1925’, *Ambix* 1, no. 26 (April 2018): 1–26, doi.org/10.1080/00026980.2018.1451451.

6 Rachel Carson discusses how tobacco chemicals then widely used in the United States, such as arsenic and benzene hexachloride, contaminate the soil and make it toxic for food crops such as carrots and sweet potatoes.

7 Standard Schaeffer, ‘The Greening of Big Tobacco’, *Counterpunch Magazine*, counterpunch.org/2007/12/15/the-greening-of-big-tobacco/, accessed 10 July 2018.

Was there an African Rachel Carson? No, but Africa had its 'Rachel Carson moment(s)', as this essay will show. Despite this, however, as well as over 50 years of considerable historical analysis of pesticides in the United States and the global North, Africa has been neglected—there is a strange historiographical lacuna. Perhaps this omission could be explained by the distinctive quantitative disparities in pesticide use between the global South and North. The World Health Organization (WHO) estimates that despite rising use since the 1940s, the global South only consumes 25 per cent of total global pesticide production, while the North consumes a disproportionately higher 75 per cent.⁸ More worryingly, however, and ironically within the context of the historiographical lacuna, 99 per cent of deaths due to pesticide use occur in the global South!⁹ This inevitably begs the question whether *Silent Spring* represents a form of only European and Anglo-American environmentalism, which has been simply *projected* as a global movement. Is it because *Silent Spring* pontificates from the lofty parapets of a technologically modernistic, racially privileged society and fails to appeal to similar chemical, calamitous tragedies and disasters in the developing world that largely affect marginalised racial groups such as blacks, Asians and Latinos? This profoundly racially tinged accusation is, of course, a reminder that modern environmentalism is in itself the progeny of Western post-war cultures of prosperity and consumerism that ignited concerns about quality of life and other aesthetic values to which the natural environment became a public good, and which rested on perceptions of nature as being an entity somehow separate from humans.¹⁰ This classed and raced identity of modern environmentalism has resulted in Carson's work not being fully appreciated or even investigated more robustly in the global South.¹¹ Moreover, once a new wave of iconoclastic scholarship on environmental histories emerged in the 1990s, the universalism of environmentalism was challenged and a call was issued for more contextualised and nuanced interpretations.¹² These scholars argued that Northern environmentalism is not relevant to poor countries because of different development paths taken as well as differences in economic strength, sociopolitical structures and cultural attitudes between North and South explained (crudely) by poverty and weak democratic systems.¹³ Under the banner of 'environmental

8 www.who.int/ceh/capacity/Pesticides.pdf, accessed 25 February 2019.

9 'Communities in Peril: Global Report on Health Impacts of Pesticide Use in Agriculture', Pesticide Action Network (September 2010), www.pan-germany.org/download/PAN-I_CBM-Global-Report_1006-final.pdf, accessed 25 February 2019.

10 Gary Kroll, 'The Silent Spring of Rachel Carson: Mass Media and the Origins of Modern Environmentalism', *Public Understanding of Science*, 10 (2001): 403–20.

11 Shawn Miller, *An Environmental History of Latin America* (Cambridge: Cambridge University Press, 2007), 206.

12 Most outstanding in this regard is the work of Ramachandra Guha and Joan Martinez, which rejects a universal theory of modern environmentalism and contends that there are two different traditions of environmentalism for the North and South, all based on their unique historical trajectories. See Ramachandra Guha and Joan Martinez, *Varieties of Environmentalism: Essays North and South* (London: Earthscan, 1997), 12.

13 Miller, *An Environmental History of Latin America*, 206.

justice’, this scholarship further criticised the unfair and disproportionate impact of environmental policies along the lines of race, colour and class, even within the global North.

This critical scholarly tradition seems to have evoked the derision for Carson in Africa and in the global South, where environmentalism has struggled to connect with the historical problems of poverty, inequality and the legacy of colonialist and racist environmental violence. The ecocentrism of Carson’s *Silent Spring* has been viewed by anthropocentric environmentalists as diametrically opposed to the more human-oriented environmentalism appropriate for Africa and the global South.¹⁴ Contemporary critics of her work have even called her a ‘mass murderer’ responsible for the death of millions of Africans from malaria due to her hyperbole and apocalyptic alarmism, which led the WHO to suspend the Global Malaria Eradication Program in 1969 and to stop funding anti-malaria spray programs in Africa.¹⁵ This program had started in 1955 and was discontinued directly as a result of the global outcry instigated by *Silent Spring* about the cumulative effects of DDT on the ecosystem. However, African governments still remain opposed to the global ‘ban’ on DDT.¹⁶ This background has clouded a critical understanding and historical reading of Carson in the contextualised realities of Africa, where *Silent Spring* has been approached by most critics of ecocentrism with a hostility almost amounting to hyperbolic.¹⁷ This polemicisation springs from the tension between what Ramachandra Guha and Joan Martinez have termed ‘full stomach and empty belly environmentalism’.¹⁸ Implicit in this dichotomisation is the racial legacy it reveals within the context of Africa’s colonial history of racial domination, exploitation and subjugation. Subsequently, ‘full stomach environmentalism’ has

14 See Paul Driessen, *Eco-Imperialism: Green Power, Black Death* (Bellevue, WA: Free Enterprise Press, 2003). Driessen attacks the ecocentric environmental lobby groups from the global North that value wildlife and ecology above human lives. He also further questions the scientific pedigree of the DDT claims in *Silent Spring*.

15 David Kinkela, *DDT and the American Century: Global Health, Environmental Politics and the Pesticide that Changed the World* (Chapel Hill, NC: University of North Carolina Press, 2011), 145. Also, US Senator Tom Coburn declared in 2007 that ‘millions of people, particularly children under five, died because governments bought into Carson’s junk science claims about DDT’. The bestselling novelist Michael Crichton in one of his novels, titled *State of Fear*, blames Carson for the DDT ban that ‘killed more people than Hitler’, and he puts the death toll at 50 million. See e360.yale.edu/features/rachel_carsons_critics_keep_on_but_she_told_truth_about_ddt, accessed 26 February 2019.

16 In July 2013, the heads of state and government of the African Union adopted a resolution calling for the continued use of DDT for malaria eradication in the continent despite mounting concerns from some environmentalists in the global North.

17 As a result of propaganda from critics of ecocentrism and other localised experiences, most African governments continue to use DDT for the control of malaria and they have criticised the ban as being irrelevant in Africa where malaria kills millions of people every year and is a more serious threat than DDT environmental contamination. In 1996 for instance, South Africa withdrew the use of DDT for malaria control and this resulted in a huge surge in malaria cases, forcing the country to revert to DDT. Data for global use of DDT between 2000 and 2014 reveal that of the 19 countries listed as still openly using DDT, 14 are in sub-Saharan Africa. See Henk van den berg et al., ‘Global Trends in the Production and Use of DDT for Control of Malaria and Other Vector-borne Diseases’, *Malaria Journal* 16, no. 401 (2017): 1–8, doi.org/10.1186/s12936-017-2050-2.

18 Guha and Martinez, *Varieties of Environmentalism*, 12.

been described as anti-human, elitist and driven by rich, white non-governmental organisation (NGOs) and wealthy nations that impose environmental agendas that are either irrelevant or actively harmful to Africa and black Africans.¹⁹

However, in this paper we argue that it is imperative to go beyond strident polemics and attempt an historically contextualised understanding of Carson in Africa since the concerns she raised have continued to permeate current debates on the use of pesticides in agricultural production and the attendant human and ecological cost in the global South. In the realm of tobacco farming, for example, Patricia Díaz Romo produced a 2011 documentary film that graphically portrayed the pesticide exposure of Huichol Indians who work as labourers in Mexico, exposing fatal poisonings, attendant poverty, vulnerability and reckless exploitation of labourers in the toxic zones that are Mexican tobacco farms.²⁰ There has also been increasing concern about the neuropsychiatric effects of pesticide exposure experienced by tobacco workers, with reports of incidences of depression and suicide linked to organophosphate pesticides.²¹ More revealing in that regard is a study on Brazil's tobacco farms that found 48 per cent of workers suffered from pesticide-related health problems.²² In Africa, the situation is equally disastrous. During a WHO public hearing on the Framework Convention on Tobacco Control in August 2000, a Kenyan member of parliament pointed out the scourge of pesticide use in tobacco farming in Africa and the impacts on poor black peasant farmers and the natural environment.²³ These include pesticide-related ailments, unexplained miscarriages, infant mortality and poisoned rivers.²⁴

19 Andrew Ross, *Strange Weather: Culture, Science and Technology in the Age of Limits* (New York: Verso, 1991), 207–12.

20 Patricia Díaz Romo, 'Huicholes y Plaguicidas' [Huichols and Pesticides], www.youtube.com/watch?v=-5k7Xg8JuMI, accessed 11 April 2018.

21 Thomas Arcury and Sarah Quandt, 'Health and Social Impacts of Tobacco Production', *Journal of Agromedicine* 11, no. 3–4 (2008): 71–81, doi.org/10.1300/J096v11n03_08.

22 R. M. Salvi et al., 'Neuro-psychiatric Evaluation in Subjects Chronically Exposed to Organophosphate Pesticides', *Toxicological Sciences* 72, no. 2 (2003): 267–71, doi.org/10.1093/toxsci/kfg034.

23 World Health Organization, 'Tobacco and Poverty: A Vicious Circle' (2004): 6. Kenya has approximately 55,000 tobacco-farming households. Despite the narratives of prosperity of the smallholders, research has revealed that these farmers are poor, vulnerable and exposed to dangerous chemicals. An epidemiological study revealed that 26 per cent of tobacco workers in the country suffered from pesticide poisoning; see G. J. A. Ohayo-Mitoko et al., 'Acetylcholinesterase Inhibition as an Indicator of Organophosphate and Carbamate Poisoning in Kenyan Agricultural Workers', *International Journal of Occupational Environmental Health* 3, no. 21 (1997): 195–200, doi.org/10.1179/oeh.1997.3.3.210. Also see Qing Ling et al., 'The Economic Geography of Kenyan Tobacco Farmers' Livelihood Decisions', *Nicotine and Tobacco Research* (2019): 1–4.

24 Statistics reveal that 86 per cent of global tobacco production is concentrated in the low- and middle-income economies (i.e. the global South) where the use of agrochemicals imposes severe health and socio-environmental problems on the poor populations engaged in production. See Natacha Lecours et al., 'Environmental Health Effects of Tobacco Farming: A Review of Literature', *Tobacco Control* 21, no. 2 (2012): 191–6, doi.org/10.1136/tobaccocontrol-2011-050318.

While there are several historical works on pesticides and pest control in Africa, most of these examine the problem from the perspective of colonisation of land and control of nature, particularly from an epidemiological perspective.²⁵ These studies focus on colonial pest control programs for diseases such as trypanosomiasis, rinderpest, malaria and sleeping sickness that became popular in the discourses of colonial conquest and development from the 1930s. However, they do not construct these histories within the narratives of environmentalism that were fashionable from the 1960s and put global scrutiny on some of the chemicals that were widely used for these large-scale pest and disease control projects.²⁶ There is also remarkably little research into southern Africa's historical reliance on pesticides. In particular, there has not been much research into the historical use of agricultural pesticides in Southern Rhodesia²⁷ and Zimbabwe.²⁸ In April 2018, Human Rights Watch released a report focusing on child labour and other human rights abuses in the tobacco farms in Zimbabwe.²⁹ Even this report only glancingly alluded to the risks of nicotine poisoning and exposure of farm workers to tobacco chemicals.³⁰ We thus take this report back in time by offering an historical survey of the pesticide problem and the pest control infrastructure in tobacco production since 1945 when pesticide use started gaining its global reputation. The major challenge, however, is that until the 1960s much of the conversation on the use of pesticides in agricultural production

25 These authors focus more on African colonial ecology, entomology and epidemiology and neglect pest control programs in agricultural production. See John Ford, *The Role of Trypanosomiasis in African Ecology: A Study of the Tsetse Fly Problem* (Oxford: Clarendon Press, 1971); John Mackenzie, 'Empire and the Ecological Apocalypse: The Historiography of the Imperial Environment', in *Ecology and Empire: Environmental History of Settler Societies*, ed. Tom Griffith and Libby Robin (Edinburgh: Keele University Press, 1997), 215–28. Also see James Giblin, 'Trypanosomiasis Control in African History: An Evaded Issue?', *Journal of African History* 31, no. 1 (1990): 59–80, doi.org/10.1017/S0021853700024786; K. A. Hoppe, *Lords of the Fly: Sleeping Sickness Control in British East Africa, 1900–1960* (Westport, CT: Praeger, 2003); Ian Scoones, 'The Politics of Trypanosomiasis Control in Africa', STEPS Working Paper 57 (Brighton: STEPS Centre, 2014).

26 Ford, although writing around 1970, simply provides a cursory mention of the use of these insecticides in pest control and argues that their effects were less durable than social control, but he ignores the environmental and public health debates about their use, which had gained momentum during this time.

27 Southern Rhodesia is modern-day Zimbabwe. The country gained its independence from white minority settler rule on 18 April 1980.

28 Existing literature is largely from the agricultural and environmental sciences and focuses on the contemporary challenges of pesticide use in production from a technical perspective. See Blessing Maumbe and Scott M. Swinton, 'Hidden Costs of Pesticide Use in Zimbabwe's Smallholder Cotton' (unpublished paper), American Agricultural Economics Association Annual Meeting, California, 28–31 July 2002; Hakan Berg et al., 'DDT and Other Insecticides in Lake Kariba Ecosystem', *Ambio* 21, no. 7 (November 1992): 444–50; Allen Mbanda and Mark Zaranyika, 'DDT Residue in Terrestrial Environment in the Mount Darwin–Rushinga Area: Zimbabwe', *Journal of Applied Science in Southern Africa* 7, no. 2 (2001): 83–96; Shepherd Ndlela, 'Phasing out Harmful/Hazardous Yet Effective Synthetic Insecticides: How Will the Tobacco Farmer Manage the Pesticide Intensive Tobacco Crop?', *TRB Technical Report* (April 2017).

29 Margaret Wurth, 'A Bitter Harvest: Child Labor and Human Rights Abuses on Tobacco Farms in Zimbabwe', *Human Rights Watch* (5 April 2018): 48–57.

30 The above report uses only oral interviews to look at the problem of nicotine and pesticide poisoning, thus relying exclusively on oral testimony not supported by documented cases of chemical poisoning. The interviews, though important as windows into the social life of tobacco farm workers, neglect the prevalence of nicotine and pesticide poisoning. Consequently, many of the conclusions reached are superficially circumstantial, and an epidemiological study might be necessary to validate the findings of the report.

generally reflected only utter obliviousness to the link between pesticides and the contamination of the human and natural environment. Consequently, official records and archival material afford us only scanty detail on the problem, and much that can be gleaned is from anecdotal data. This paper hopes to open the floodgates for more surveys in future to understand the environmental costs of using chemical pesticides in agricultural production in Southern Rhodesia. In attempting this reconstruction, we are led by the dictum of Donald Worster that as environmental historians we should tell a story of the past that discourages 'irresponsibility in the present'.³¹ Consequently, in telling this story, we invoke Carson's *Silent Spring*, reading it in an African context to show how the local and the global can interact within the broad spectrum of modern environmentalism—thus 'glocalising' and not 'globalising' *Silent Spring*.³² In taking the context of the global South seriously, this paper bridges the neglected study of Carson with the ongoing attempts to understand environmentalisms that do not fall into the typical model offered by the global North. Thus we engage with the concept of 'slow violence'—that is, ecological violence that unravels itself gradually, is subtly invisible and scattered in temporal space.³³ We also discuss the concept of the 'environmentalism of the poor', which looks at environmentalism through the perception of livelihoods, necessity and survival, as opposed to the 'environmentalism of the rich', which concentrates on aesthetics and quality of life.³⁴ We further extend the class-based concept of the 'environmentalism of the poor' into illuminating how racial identity also created biases that led to discrimination in environmental policies and practices and the construction of 'environmental racism' in colonial Africa.³⁵ In this sense, Filomina

31 Donald Worster, 'The Two Cultures Revisited: Environmental History and the Environmental Sciences', *Environment and History* 2, no. 1 (February 1996): 3–14, doi.org/10.3197/096734096779522446.

32 We use the term 'glocalisation' to denote a rejection of framing linear prescriptive global narratives around *Silent Spring*. Rather, we favour a more contextualised and ideographic framing based on a different set of social, economic and political local realities. This does not, however, delink the local from the global, but simply gives it a more comprehensible context. William Vogt's epoch-making book in 1948 *Road to Survival* (doi.org/10.1097/00010694-194901000-00018), written long before *Silent Spring*, was novel in its ability to illustrate this interconnectedness of global environmental histories and how local ecologies were integral to a larger global whole.

33 The concept of 'slow violence' caused by pesticide contamination and nuclear fallout is the chief motif in *Silent Spring*. For a more comprehensive conceptualisation of 'slow violence' see Rob Nixon, *Slow Violence and the Environmentalism of the Poor* (Cambridge, MA: Harvard University Press, 2011), 2.

34 Guha and Martinez popularised the concept in the 1990s. Nixon captures the term as signifying a condition where a new official landscape is formally imposed on a vernacular one. A vernacular landscape is one that is integral to the socio-environmental dynamics of the community, and an official landscape denotes a bureaucratically rewritten landscape devoid of existing socio-environmental norms. For further readings on the concept see Joan Martinez-Alier, *The Environmentalism of the Poor: A Study of Ecological Conflicts and Valuation* (Cheltenham: Edward Elgar Publishing, 2002).

35 The concept of environmental racism emerged from the 1960s during the American civil rights movement. It was connected to how race was at the heart of social policy in the urban environment where toxic waste was dumped in African-American areas, leading to widespread protests in the late 1970s. These protests led to the publication of a seminal report by the Commission for Racial Justice entitled 'Toxic Waste and Race', which concluded that race was the most definitive variable in the location of waste facilities even more than poverty. See Robert D. Bullard, *Confronting Environmental Racism: Voices from the Grassroots* (Boston, MA: South End, 1993); Clenora Hudson-Weems, 'Environmental Racism: Black Landowners, and the Making of a New Hilton Head—An Emmett Till Continuum', in *Environmental Justice in the New Millennium: Global Perspectives on*

Steady has underscored that ‘environmental racism’ is based on the ‘structural expendability’ of black Africans that is traceable to Western hegemonic proclivities derived from the history of the slave trade and colonialism in which Africans were reduced to ‘no-humans’ or subhumans to justify their oppression based on race and white privilege.³⁶ She further argues that the expendability of Africans and minority agricultural populations, built for many years on the basis of racial identity, still continues to shape the agenda of the contemporary neo-liberal global economy where African and Caribbean countries have been ruined by Northern chemical processes that destroy the environment and sustainable agriculture.³⁷ Although *Silent Spring* did not allude explicitly to race, class or any power dynamics, we will show that it strongly connects with the ‘environmentalism of the poor’, ‘slow violence’ and ‘environmental racism’ because of its passionate activism against the power of big chemical companies and their toxic hold on the American subalterns.³⁸ The colonial pest control programs in Africa were also much of a reflection of this intersection between science, power, race, ecology and politics, and this had significant leverage in shaping the intervention strategies and the impact on the human and natural environment.³⁹

In contemporary postcolonial Africa, environmentalism has continued to be defined through the perceptions of the west to the detriment of local capacities and conditions.⁴⁰ Robert Nelson identifies a tendency where, under the banner of saving the African environment, African people have been subjected to a new form of ‘environmental colonialism’, and environmental activism in Africa has come to exhibit a neocolonial character.⁴¹ Paul Driessen categorises the ideological environmental movement from the North operating in the global South as

Race, Ethnicity and Human Rights, ed. Filomina Steady (New York: Palgrave Macmillan, 2009), doi.org/10.1057/9780230622531_13; Filomina Steady, ‘Environmental Justice Cross-Culturally: Theory and Praxis in the African Diaspora and in Africa’, in *Environmental Justice in the New Millennium*, ed. Steady. In Africa and the global South, environmental racism involved the deliberate pollution of the environment and settlements with toxic chemicals, leading to death and disease, and the physical dislocation from the natural environment through forced removals. See M. F. Phakane and Filomina Steady, ‘Nuclear Energy Hazardous Waste, Health, and Environmental Justice in South Africa’, in *Environmental Justice in South Africa*, ed. David A. McDonald (Cape Town: University of Cape Town Press, 2002); Farieda Khan, ‘The Roots of Environmental Racism and the Rise of Environmental Justice in the 1990s’ in *Environmental Justice in South Africa*, ed. McDonald.

36 Steady, ‘Environmental Justice Cross-Culturally’, 49.

37 *ibid.*, 51.

38 Nixon, *Slow Violence and the Environmentalism of the Poor*, xi.

39 See Ford, *The Role of Trypanosomiasis in African Ecology*; and Scoones, ‘The Politics of Trypanosomiasis Control in Africa’, 11.

40 In most cases, pest control programs for public health in Africa are run and sponsored by NGOs from the global North who set the ‘environmental agenda’. This agenda is usually influenced by global discourses and not vernacular experiences.

41 Robert Nelson, ‘Environmental Colonialism: Saving Africa from Africans’, *The Independent Review* 8, no. 1 (Summer 2003): 65–86.

constituting a form of 'eco-imperialism'.⁴² Within the context of all this, therefore, this paper hopes to contribute to the historiography of pesticide use in Africa and the framing of a more contextualised understanding of Carson's environmentalism within the global South.⁴³

The post-Second World War 'pesticide treadmill' and pest control in Southern Rhodesia, 1948-64

The Second World War saw a prodigious growth of the pesticide and chemical industry.⁴⁴ During the development of chemical formulas to use as agents of chemical warfare, a substantial number of chemicals were created and stockpiled that had lethal potency to both humans and insects. These chemicals were being manufactured by big chemical companies such as the Swiss-based Geigy company, which had subsidiaries in various countries in the global North such as England, Canada and the United States.⁴⁵ It was in the United States, however, that the chemicals industry grew most substantially to meet the demands of the war effort.⁴⁶ The production of these synthetic pesticides in the United States had reached 124,259,000 pounds in 1947.⁴⁷ When the war ended these chemicals slowly found wonder uses in agriculture where they were hailed as the saviours of mankind from pests and assumed an unparalleled global reputation. The most famous of these synthetic chlorinated hydrocarbons, dichlorodiphenyltrichloroethane (DDT) had been synthesised by a German chemist in 1864 but became well known as an insecticide in 1939. It was used extensively during the war to spray Allied soldiers against typhus in the Mediterranean and malaria in the tropics.⁴⁸ DDT catalysed an explosive revolution and expansion of the pesticide industry. This was largely a result of the lower costs and unprecedented effectiveness of the insecticide and other chlorinated hydrocarbon pesticides, which led to their widespread use in the

42 Paul Driessen, *Eco-Imperialism: Green Power, Black Death*. Also, Alfred Crosby uses the term 'ecological imperialism' to denote the changing face of vernacular ecologies as a result of European colonial settlement in North and South America, which introduced new human beings, new weeds, new animals, new pathogens and new diseases. See Alfred W. Crosby, 'Ecological Imperialism: The Overseas Migration of Western Europeans as a Biological Phenomenon', in *The Ends of the Earth: Perspectives on Environmental History*, ed. Donald Worster (Cambridge: Cambridge University Press, 1988), 111.

43 See also Hedley Twidle, 'Rachel Carson and the Perils of Simplicity: Reading *Silent Spring* from the Global South', *ariel: A Review of English Literature* 44, no. 4 (2014): 49-88, doi.org/10.1353/ari.2013.0028. This is, however, an eco-critical analysis and frames *Silent Spring* as more a literary text, deploying textual criticism for its analysis. Nevertheless, Twidle juxtaposes the work of Arundhati Roy and Carson in trying to understand how Carson's ideas of ecology and toxicity carry meaning in the global South.

44 Christopher D. Cook, 'The Spraying of America', *Earth Island Journal* 20, no. 1 (Spring 2005): 34-8.

45 O. T. Zimmerman and Irvine Lavine, *DDT: Killer of Killers* (Rochester, NY: The Record Press, 1946), 39.

46 Between 1943 and 1944, 15 American chemical companies were producing DDT and other chemicals for the armed forces.

47 Carson, *Silent Spring*, 14.

48 William Cronon, 'Silent Spring and the Birth of Modern Environmentalism', in *DDT, Silent Spring, and the Rise of Environmentalism*, ed. Thomas Dunlap (Seattle, WA: University of Washington Press, 2008), xi.

fields of agro-industry and public health.⁴⁹ The result of this monumental success was the expansion of the pesticide industry in general, which was so widespread and rapid that it ‘steamrolled’ pest control technology as chemical pest control expanded in scale.⁵⁰ As development experts came to put their faith in the power of science and American capitalism to modernise backward communities in the post-war years, the large-scale use of DDT in the global North was replicated in the global South as an important technology ‘to break the cycle of poverty, malnutrition and disease’.⁵¹

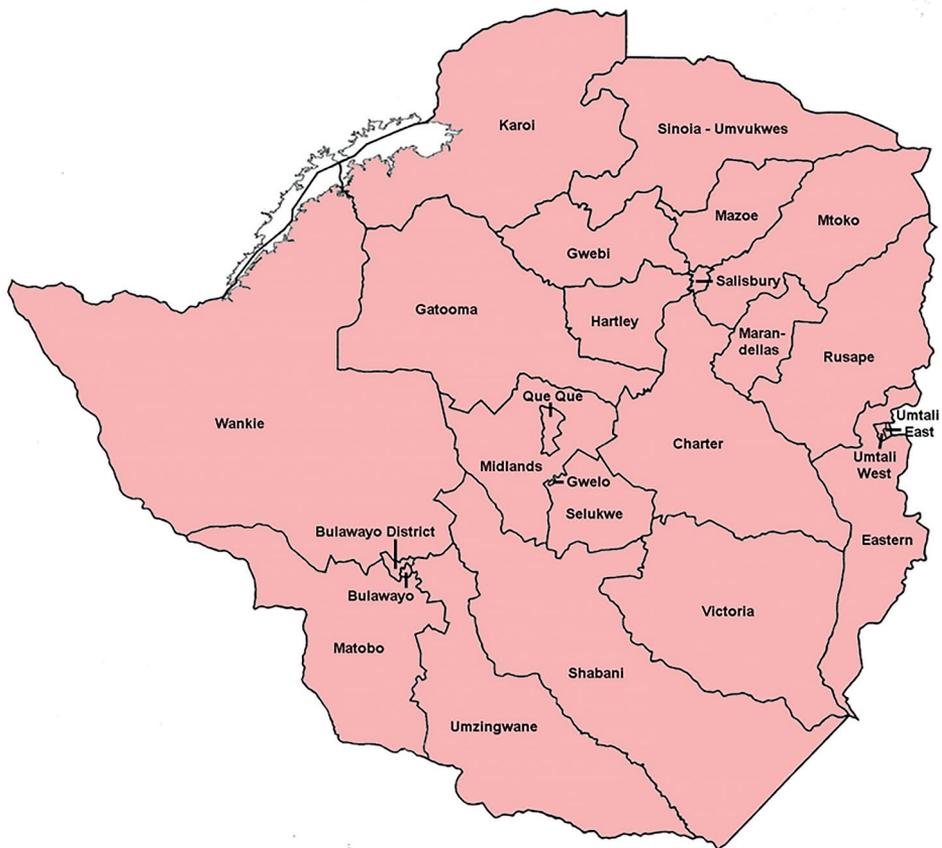


Figure 1: Southern Rhodesia districts, 1970.

Source: commons.wikimedia.org/wiki/Category:Maps_of_Rhodesia#/media/File:Rhodesia1970a.png, accessed 3 October 2019.

49 Robert Van den Bosch, *The Pesticide Conspiracy* (Berkeley, CA: University of California Press, 1978), 21.

50 In the United States during the post-war period, public health and agricultural experts engaged in development projects to eradicate famine and disease through deployment of modern pest control technologies using DDT and other chlorinated hydrocarbons. Carson documents several such government-sponsored spray programs. In 1954, the US Department of Agriculture started a spraying program to eliminate the Japanese beetle in Illinois and applied dieldrin to 1,400 acres by air; in 1955, another 2,600 acres were treated similarly. In 1959, 27,000 acres in Michigan were dusted with pellets of aldrin.

51 Kinkela, *DDT and the American Century*, 9.

In Southern Rhodesia, DDT was registered for agricultural use in 1946, and by 1947 it was being used following an army worm outbreak in maize in early January (first in Gatooma before spreading to Victoria, Salisbury and Nyamandlovu districts (see Figure 1))⁵². DDT was found to be effective and was considerably cheaper than using gangs of African labour to physically pick up the worms; consequently, it formed the basis of tentative government recommendations for control in maize.⁵³ In 1947 the Pest Control Research Committee was set up by the Rhodesia Tobacco Association (RTA) to speed up research on tobacco pest control.⁵⁴ This followed the admission by the association in its report that year that work on the control of pests and diseases troublesome in Rhodesia had not progressed as far as could be wished. This pest and diseases control infrastructure became more important following the post-war tobacco boom that witnessed production increasing on the back of favourable market conditions and the entry of many new growers.⁵⁵ The government, through a subsidised scheme, agreed to cooperate with the RTA and a private company Pest Control Africa Ltd to investigate tobacco diseases. Spraying was to be carried out on various tobacco farms over four years starting from June 1947.⁵⁶

Field-spraying operations were conducted on an extensive scale on the tobacco farms, beginning in 1948.⁵⁷ In 1948 DDT was listed by Pest Control Africa as one of the new insecticides to be tested on tobacco, amongst other chlorinated hydrocarbons that included benzene hexachloride, chlorinated camphenes and Thiophos 3342.⁵⁸ By 1955, DDT and the organochlorine insecticide aldrin were being recommended by the Tobacco Research Board (TRB) and were also being widely used by many growers for the control of cutworm (*Agrotis ipsilon*) in both the nursery and field operations.⁵⁹ Not only was DDT being used in the field and nursery, it was also used in the cleaning of tobacco shades and applied as whitewash to leave a residual coating on the walls to control the tobacco beetle (*Lasioderma serricornis*) in cured leaf.⁶⁰ Nematocides and soil fumigants such as

52 Report of the Division of Entomology, December 1947.

53 *ibid.*

54 J. C. F. Hopkins, 'Field Spraying and the Control of Leaf Diseases on Tobacco: Review Report—1948'. S25101/1, TRB Tobacco Pest Spraying Scheme. National Archives of Zimbabwe (NAZ).

55 See Frank Clements and Edward Harber, *Leaf of Gold: The Story of Rhodesian Tobacco* (London: Methuen, 1962), 150–1.

56 TRB Tobacco pest spraying scheme, 1948.' S25101/1, NAZ.

57 *ibid.*

58 Pest Control and Plants, 1947–52, E. Parry Jones (Managing Director Pest Control Africa), 'Research on Tobacco Pests and Diseases'. S2708/1, NAZ.

59 Tobacco Research Board, 'Recommendations for Flue-Cured Tobacco' (1955), 8.

60 *ibid.*, 1961, 12.

ethylene dibromide (EDB) and methyl bromide⁶¹ for the control of eelworm and root knot nematodes were also being recommended because of the dwindling supply of so-called virgin lands.⁶² Soil fumigation experiments were started at the tobacco research station in 1949.⁶³ By 1957, the TRB reported that soil fumigants were extensively used throughout the federation⁶⁴ both in seedbeds and in lands for the control of eelworms.⁶⁵ A 1961–62 survey revealed that out of the total of 224,000 acres of tobacco, the amount of land fumigated for nematode control was approximately 104,832 acres (46.8 per cent).⁶⁶ Carson identifies nematocides and other forms of soil treatment as being harmful as they eliminate the biological life in the soil.⁶⁷ She further posits that biological control of eelworm and nematodes through planting resistant crops such as marigolds was more helpful than chemical sprays.⁶⁸ In Southern Rhodesia during this time, although grass-ley rotations were used in tobacco to control eelworms, the use of nematocides on rotated lands was highly recommended by the TRB.⁶⁹

By the 1960s, the proliferation of pests and diseases on the tobacco farms was becoming a growing concern to the state, especially since some of the insect pests were evidently becoming resistant to chlorinated hydrocarbons.⁷⁰ Organophosphate pesticides became more popular with farmers around the mid to late 1950s.⁷¹ The pest control infrastructure that was developing in tobacco farms and the pest complex reflected the general trend in much of Africa from the late 1940s as colonial governments sought to expand the area of land available for occupation

61 EDB was first used in 1926 as an insecticide in the United States, although it was first commercially registered in 1946. In 1973, several studies showed that it was carcinogenic and caused birth defects, leading to its ban as a soil fumigant in the United States in 1983. Methyl bromide is an organic bromide compound used as an insecticide. It first came into use in 1932 and was registered for use in the United States in 1961. It contains ozone layer-depleting chemicals and is highly toxic. For this reason, it was banned for use in tobacco fumigation and has been phased out in many countries, including Zimbabwe, by the 2005 Montreal Protocol.

62 Nematodes had been a recurring and perennial problem on tobacco farms since the expansion of tobacco production in the 1920s. Before the advent of nematocides in the 1940s, the only form of control was cultivating virgin lands, as tobacco grown on second-year lands would be badly affected.

63 H. Weinmann, *Agricultural Research and Development in Southern Rhodesia, 1924–1950* (Salisbury: University of Rhodesia, 1975), 78.

64 Between 1953 and 1963, the three Central and Southern African British colonies of Southern Rhodesia, Nyasaland and Northern Rhodesia amalgamated into the Federation of Rhodesia and Nyasaland. The federation amalgamated most services under one authority and the TRB became a federal institution responsible for tobacco research in all the three territories.

65 'Chemical Control of Eelworm', *Rhodesia Tobacco Journal* (July 1957).

66 A. Daulton, 'Survey of Land Use and Plant Parasitic Nematodes Control', *Rhodesian Agricultural Journal* 59 (July–August 1962).

67 Carson, *Silent Spring*, 65.

68 *ibid.*

69 R. C. Salmon (Officer in Charge Kutsaga Research Station), 'Some Thoughts on Second Year Tobacco'. F257/110/GEN Tobacco General: Bulletins and articles 1963. NAZ.

70 'Pests Cost 20 Million Pounds Every Year', *Rhodesian Herald*, 18 February 1961.

71 Chlorinated hydrocarbon insecticides are persistent and build up in the food chain and fatty acids of mammals; they are, however, less toxic to humans and animals. Organophosphate pesticides can easily be broken down and have no residual effect on the environment, but they are more lethal to humans and animals.

through pest eradication programs.⁷² In Rwanda-Burundi in the Rukwa Valley from August to November 1947 an experimental aerial 'hopper' campaign was launched at an estimated cost of £57,000.⁷³ A ground dusting campaign was conducted in September and October using Messinger machines, DNOC dust and gammadene.⁷⁴ In southern Africa the spraying campaigns became imperative as the numbers of new (white) settlers on the land increased following the post-Second World War settlement schemes and at a time when tsetse fly infestations were hampering expansion of settler agriculture and large-scale ranching.⁷⁵ In Southern Rhodesia, ground spraying operations with dieldrin and DDT were conducted, beginning in 1950 on an extensive scale in both African and European areas to control tsetse flies, with huge numbers of native labourers mobilised to work in unsafe conditions while spraying large areas.⁷⁶ In South Africa, from the 1950s large quantities of a chlorinated hydrocarbon pesticide dieldrin mixed with fuel were sprayed in areas around Kruger National Park to control rinderpest.⁷⁷

These spraying programs were touted as depicting mastery over nature and constituting the colonial vision of modernising Africa expressed in such justificatory ecological catchphrases as 'taming the wilderness', 'conquering the fly' and 'pushing back disease'.⁷⁸ These ecological interventions were steeped in the notion of racial and cultural superiority under which European settlers perceived themselves to be the benchmark of progress and civilisation in Africa. White power and privilege formed the basis of this ideology, which further casts blacks and other non-white racial groups as ignorant of and destructive to the environment, as well as being uncivilised.⁷⁹

Environmental historians have, however, disparaged this racial bigotry as ahistorical in understanding the complex dynamics of colonial ecologies. Alfred Crosby in particular framed the colonial pest and pathogen epidemics that devastated much

72 The Anti-Locust Research Centre in London observed in 1948 that Africa's development was threatened by locust plagues as the hoppers would develop into dangerous pests as soon as suitable soils were found and abundant food created by the clearing of forest areas and mechanised agriculture.

73 *Record of Conference of the International Red Locust Control Service held in Salisbury on the 25th, 26th and 27th of May 1948* (Lusaka: Government Printer, 1948), 11.

74 *ibid.*

75 Scoones, 'The Politics of Trypanosomiasis Control in Africa', 12.

76 *ibid.*, 13. For a comprehensive history of tsetse fly control in Southern Rhodesia, see Rory Pilosof, 'A Brief History of Tsetse Control Methods in Zimbabwe and Possible Effects of Climate Change on Their Distribution', *International Journal of African Development* 4, no. 1 (2016): 88–101.

77 *ibid.*

78 John Mackenzie, 'Empire and the Ecological Apocalypse; The Historiography of the Imperial Environment', in *Ecology and Empire: Environmental History of Settler Societies*, ed. Tom Griffith and Libby Robin (Edinburgh: Keele University Press, 1977), 215–28. Also see J. Giblin, 'Trypanosomiasis Control in African History—An Evaded Issue'; Hoppe, *Lords of the Fly*. These works provide a framework for understanding how colonial pest control programs were justified in the language of modernisation such as 'taming the wilderness', 'conquering the fly' and 'pushing back disease'.

79 David Anderson and Richard Grove, *Conservation in Africa: People, Politics and Practice* (Cambridge: Cambridge University Press, 1987), 4.

of the colonial Americas as ‘exported’ ecological disasters.⁸⁰ Orthodox Africanist scholarship has also challenged the narratives informing these colonial scientific interventions in African ecologies as being limited, disruptive and based on the logic of resource exploitation for settler gain.⁸¹ Helge Kjekshus blames colonialism for the spread of diseases and epidemics such as tsetse fly and trypanosomiasis in Tanzania.⁸² John McCracken, in his study of Malawi, was also highly critical of the role of experts in understanding the pest and ecological dynamics in cotton production.⁸³ Although focusing on the period before the end of the Second World War and the advent of large-scale chemical pest control programs in Africa, these works’ challenge to science and its utility in the reshaping of vernacular landscapes and ecologies share affinities with the environmentalism in *Silent Spring*, which questioned society’s unflinching faith in the scientific control of nature.

Despite the prevalent scepticism of the utility of colonial knowledge systems in African ecologies, revisionist scholars in the 1990s came to view the colonial scientific and technological developments as being core to imperial development and playing a critical role towards the facilitation of effective exploitation of natural resources for agriculture and industry through environmental transformation.⁸⁴ In the case of Southern Rhodesian tobacco, the scientific knowledge of pest control, however, failed because the problem was linked to the increases in production, which followed the post-war boom as tobacco overtook gold to become the principal export earner in 1947.⁸⁵ With increased acreages to meet the huge demands of the export market,⁸⁶ the pest pressure also increased as a result of the changing production patterns, which altered the natural ecosystem and created a pest explosion as a result of human ecological engineering. This evokes Carson’s prescient musing in *Silent Spring*: ‘we are told that the enormous and expanding use of pesticides is necessary to maintain farm production. Yet is our real problem not one of over production?’⁸⁷

80 Crosby, ‘Ecological Imperialism’, 112.

81 *ibid.*

82 Helge Kjekshus, *Ecology Control and Economic Development in East African History: The Case of Tanganyika, 1850–1950* (London: Heinemann, 1987).

83 John McCracken, ‘Experts and Expertise in Colonial Malawi’, *African Affairs* 81, no. 322 (1982): 101–16, doi.org/10.1093/oxfordjournals.afraf.a097384.

84 See Hellen Tilley, ‘African Environments and African Social Sciences: The African Research Survey, Ecological Paradigms and British Colonial Development’, in *Social History and African Environments*, ed. William Beinart and Joann McGregor (Oxford: James Currey, 2003); William Beinart, Karen Brown and Daniel Gilfoyle, ‘Experts and Expertise in Colonial Africa Reconsidered: Science and the Interpenetration of Knowledge’, *African Affairs* 108, no. 432 (July 2009): 413–33, doi.org/10.1093/afraf/adp037.

85 David M. Rowe. *Manipulating the Market: Understanding Economic Sanctions, Institutional Change and the Political Unity of Southern Rhodesia* (Ann Arbor, MI: University of Michigan Press, 2001), 69, doi.org/10.3998/mpub.15943.

86 Southern Rhodesia’s tobacco exports rose from an average of 14,000 metric tons during 1940–45 to 121,000 metric tons in 1965, accounting for approximately one third of the free world’s tobacco exports.

87 Carson, *Silent Spring*, 8.

There were several outbreaks of various tobacco diseases in most parts of the country.⁸⁸ An outbreak of tobacco rosette occurred in the Lomagundi area in December 1953, leading to total losses of seedbeds and November plantings.⁸⁹ Despite a determined effort by growers to spray with parathion, the disease was not checked, and by the end of February 1954 the disease was reported from all over the colony.⁹⁰ The failure of the spraying to contain the disease did little to dampen the firm faith in and conviction of the utility of chemical control. The TRB insect control program for seedbed and field control under a government notice in 1958 recommended aldrin, dieldrin, parathion, DDT and malathion for routine pest control.⁹¹

In 1961, the President of the Pesticides Association of Rhodesia and Nyasaland, W. L. Cosker, lamented that the damage caused by pests to tobacco in Southern Rhodesia amounted to £10 million annually.⁹² In 1960, there was a serious outbreak of 'bushy top disease',⁹³ described as 'the biggest menace to the tobacco growing industry'.⁹⁴ The ravages of the bushy top virus were so severe that there was an urgent call by tobacco farmers exhorting the government to introduce legislation to force all growers to comply with TRB recommendations for regular sprayings.⁹⁵ Because of this huge surge in bushy top, systemic pesticides⁹⁶ were now being recommended by the TRB for use on tobacco. In 1960, the first systemic insecticide used in Southern Rhodesia, Rogor 40,⁹⁷ was unveiled.⁹⁸ The TRB noted that the systemic insecticide would reduce the incidence of virus diseases in certain plants since it was more persistent than malathion and parathion.⁹⁹ In 1962, a second systemic pesticide (Menazone) for the control of bushy top and tobacco rosette was recommended by the TRB.¹⁰⁰ For the first time, the TRB recommended field spraying of Turkish tobacco as a routine measure to give protection against white mould, rosette and bushy top diseases.¹⁰¹

88 Various outbreaks of tobacco anthracnose were reported in the *Rhodesian Herald* between 1953 and 1958 as having been prevalent in Marandellas, Karoi, Lomagundi and Banket Districts.

89 Tobacco extension officer to Senior tobacco extension officer, 21 April 1954. F149/TOB/360, Tobacco Diseases and Pests, 1956–58. NAZ.

90 *ibid.*

91 Federal Government Notice 1958: Plant Pest and Disease Regulations. F149/TOB/360, Tobacco Diseases and Pests, 1956–58. NAZ.

92 'Pests Cost 20 Million Pounds Every Year', *Rhodesian Herald*, 18 February 1961.

93 'Southern Rhodesian Growers Worried About the Spread of Tobacco Plant Diseases', *Rhodesian Herald*, 7 March 1961.

94 *ibid.*

95 'Urgent Call for Law to Force Growers to Curb Bushy Top', *Rhodesian Herald*, 29 March 1961.

96 Systemic pesticides work by being absorbed by the plant tissues and making the whole plant poisonous.

97 Rogor, also known as dimethoate in the United States and fosfamide in Russia, was introduced and patented in the 1950s by a US chemical company, American Cynamid.

98 'How to Use Systematics Recommended for Tobacco', *Rhodesian Herald*, 22 September 1960.

99 *ibid.*

100 'TRB Releases New Systemic for Tobacco Virus Diseases', *Rhodesian Herald*, 15 November 1962.

101 *ibid.*

By November 1962, therefore, tobacco farmers in Southern Rhodesia were armed with the deadly triad of chlorinated hydrocarbons, organophosphates and systemic poisons. The pesticide revolution had been completed, yet the war on pests continued and, despite the accumulating deadliness and toxicity of the chemicals, which kept on escalating at each stage of the chemical evolution, the pest problem remained. Despite a surge in the use of hitherto unknown chemicals whose toxicity to human and natural life kept on escalating, no regulations were put in place to control pesticide usage in Southern Rhodesia, just as was the case elsewhere in the world at this stage. There were several risks of contamination and poisoning, particularly on the tobacco farms where all the work was done by African labourers who were politically largely powerless.¹⁰² Rob Nixon, in discussing environmental 'slow violence', has shown how disempowered social groups are usually the casualties of environmental violence.¹⁰³ He points out that the poor suffer the challenge of invisibility and amnesia, and usually remain on the margins of official memory.¹⁰⁴ This 'slow violence' transcends defined boundaries in time and space and happens over extended geographical and technological displacements, which hides its severity and, in retrospect, the human and environmental costs.¹⁰⁵ Ian Scoones has demonstrated how power dynamics during the colonial period indelibly etched themselves on pest control programs that followed a top-down technocratic approach.¹⁰⁶ This required mobilising a subservient African labour force in highly dangerous ground-spraying campaigns. Africans were the expendable race and, as one observer put it:

under colonialism, you could tell people what to do without masks, without gloves, in the sheer heat of the dry season. Who cared because you could get the people? There were armies of people with knapsacks on their backs. There were used as slaves.¹⁰⁷

This generic reference to the conditions under which pest control programs were conducted in Africa and the plight of the disempowered African labourers is very much akin to the situation in Southern Rhodesia where chemical field spraying was done by black workers. Although in some cases pest control was conducted using aerial sprays, these were expensive, and ground spraying operations using knapsack sprayers and African labour were conducted on a more extensive scale on Southern Rhodesian farms. It is impossible to ascertain the magnitude of the slow chemical violence on the tobacco farms in Southern Rhodesia in the absence of any available

102 The concept of power and class in environmentalism has received a great deal of scholarly attention since the entry of 'environmental justice' as a critical concept in ecocriticism and environmental history in the 1990s. See Robert Bullard, *Dumping in Dixie: Race, Class, and Environmental Quality* (Boulder, CO: Westview, 1990); Andrew Hurley, *Environmental Inequalities: Class, Race and Industrial Pollution in Gary, Indiana, 1945–1980* (Chapel Hill, NC: University of North Carolina Press, 1995).

103 Nixon, *Slow Violence and the Environmentalism of the Poor*, 2.

104 *ibid.*, 6.

105 *ibid.*, 7.

106 Scoones, 'The Politics of Trypanosomiasis Control in Africa', 5.

107 *ibid.*

evidence, but it may be that there were generations of silent casualties. After all, colonial authorities were notorious for their lack of concern for the health and safety of their black employees.¹⁰⁸

Locating Southern Rhodesia in the global pesticide regime and the environmental backlash, 1965–70

From the 1960s, based on Carson's revolutionary ideas in *Silent Spring*, a nascent global movement had begun that interrogated the impact of pesticides on the environment. This movement, which started in the United States, focused primarily on the residual effects of chemical pesticides on the environment and the accompanying hazards to humans and wildlife. In 1962, Carson's book opened a floodgate. This trickle became a public stream that filtered into official discourses about the long-term effects of pesticide use in agricultural production. Carson's work reached policy makers, government agencies, environmental scientists and chemical manufacturers in the United States and elsewhere in the global North.¹⁰⁹ It evoked a fierce and wide-ranging debate in the United States: Carson faced visceral opposition from the chemical industry who accused her of being an agricultural propagandist and, in a predictably sexist attack, a catastrophising 'spinster with an affinity for cats'.¹¹⁰ Her work, however, culminated in pesticide use becoming a subject of agricultural policy intervention globally by the mid-1960s. The report of the President's Science Advisory Committee (PSAC) in the United States (1963) became the first official government critical evaluation of the hazards of pesticides.¹¹¹ Amongst other things it called for the need to monitor levels of pesticide residues in the environment and for the federal government to restrict wide-scale use of persistent insecticides.¹¹² The report went further and poignantly stated that 'until the publication of *Silent Spring* by Rachel Carson, people were generally unaware

108 *ibid.*, 14.

109 There is an extensive literature that acknowledges the contributions of Carson to the environmental movement. See Mark Hamilton Lytle, *The Gentle Subversive: Rachel Carson, the Silent Spring and the Rise of the Environmental Movement* (New York: Oxford University Press, 2007); Linda J. Lear, 'Rachel Carson's Silent Spring', *Environmental History Review* 17, no. 2 (1993): 23–48, doi.org/10.2307/3984849; Ralph H. Lutt, 'Chemical Fallout: Rachel Carson's Silent Spring, Radioactive Fallout and the Environmental Movement', *Environmental History Review* 9, no. 3 (1985): 210–25, doi.org/10.2307/3984231; Lawrence Culver, 'Reading *Silent Spring* as a Challenge for Contemporary Environmentalism', *RCC Perspectives* 7 (2012): 31–4.

110 Eliza Griswold, 'How "Silent Spring" Ignited the Environmental Movement', *New York Times*, 21 September 2012, www.nytimes.com/2012/09/23/magazine/how-silent-spring-ignited-the-environmental-movement.html, accessed 18 September 2018.

111 For a full understanding of the import of the PSAC report see D. S. Greenberg, 'Pesticides: Whitehouse Advisory Body Issues Report Recommending Steps to Reduce Hazards to Public', *Science News Series* 40, no. 3569 (1963): 878–9, doi.org/10.1126/science.140.3569.878.

112 Linda J. Lear, 'Bombshell in Beltsville: The USDA and the Challenge of "Silent Spring"', *Agricultural History* 66, no. 2 (Spring 1992): 151–70.

of the toxicity of pesticides'.¹¹³ The subsequent PSAC report (1965) concluded that environmental pollution by pesticides could be reduced significantly without losing efficiency.¹¹⁴

In North America, the environmental movement in the 1960s stemmed from the instigation of activists like Carson and drew much of its galvanising force from the power of the mass media and social movements that spoke to diverse national constituencies. But in the global South such prodding emerged largely from the state under pressure from globalising influences from the North, and in most cases this environmentalism was usually a mere smokescreen to comply symbolically with global norms largely for the purposes of national economic interests rather than genuine environmentalism. This must be understood in the context of the dichotomy between the environmentalism of affluent societies and the environmentalism of poor and less developed polities. North American environmentalism was deeply rooted within the liberal agenda of the mid-1950s championed by Arthur M. Schlesinger and John Kenneth Galbraith.¹¹⁵ The liberal agenda espoused during the period of post-war American affluence visualised the environment as a public good that was being defiled by overconsumption, and identified the need to expand the role of government in addressing its degradation.¹¹⁶ The preservation of public spaces for aesthetic and amenity purposes thus framed the discourse of American environmentalism. Shawn Miller points out that for rich nations environmentalism is driven by the alienation of people from nature because of modernisation, while for poor countries it is motivated by the knowledge that livelihoods depend on nature for survival.¹¹⁷ In other words: 'the first is driven by dreamy myth, the second by stark reality'.¹¹⁸ While this binary generally holds true in explaining the contrast in environmentalisms between the North and the South, it is limited in its ability to unpack the various racialised nuances within the global South where racial identity is a big factor and predetermines the different sites of location for blacks and whites within the environmental movement. Thus, in much of colonial Africa, the agenda of the mainstream environmental movement (just as in the global North) appealed to the affluent white minority interests broadly centred on the preservation of nature and wildlife sanctuaries, while alienating black Africans who were often accused of degrading the environment.¹¹⁹ The influence of environmentalism from the global North thus percolated through racial lines, affecting and influencing the black

113 Lear, 'Rachel Carson's Silent Spring'.

114 Graham, *Since Silent Spring*, 179.

115 See Arthur Schlesinger, 'The Future of Liberalism: The Challenge of Abundance', *Reporter*, 3 May 1956, 8–11, and John Kenneth Galbraith, *The Affluent Society* (Boston: Houghton Mifflin, 1958).

116 Adam Rome, 'Give Earth a Chance: The Environmental Movement and the Sixties', *Journal of American History* 90, no. 2 (September 2003): 525–54, doi.org/10.2307/3659443.

117 Miller, *An Environmental History of Latin America*, 215.

118 *ibid.*

119 Khan, 'The Roots of Environmental Racism', 16.

Africans and Europeans in different ways, but largely in a configuration in which black Africans were the victims of the top-down technocratic interventions that were meant to protect the environmental and economic interests of settler society.

The board of the Southern Rhodesian Tobacco Advisory Committee (a body representing manufacturers and merchants in the United Kingdom) was the first in the country to react to the concerns stirred by Carson's work and lobbied the government of Southern Rhodesia on the need for pesticide control regulation of tobacco.¹²⁰ As we will show, the motive behind this was largely to protect the reputation of the lucrative tobacco export leaf for being pesticide contamination-free more than any genuine environmentalism. The state was compelled to act accordingly and promptly launched a Pesticide Approval Scheme to guide growers in selecting suitable pesticides. The scheme emphasised the need for a handbook to inform farmers on how to apply pesticides safely and effectively.¹²¹ The TRB noted that the Pesticide Approval Scheme was becoming more necessary as growers were getting confused by the 'increasing number and complexity of pesticides', and consumers had been alerted to the 'presence of pesticides in some agricultural produce by the recent publicity on the misuse of pesticides'.¹²² This publicity was a result of Carson's work and the seismic waves it had stimulated in influencing governments of various states all over the world over the need for pesticide regulations, and it reflects the far-reaching influence *Silent Spring* had in propagating new narratives on pesticide use—even in Africa. These narratives were, however, scripted to meet local contexts.

In Southern Rhodesia, the TRB insisted that it had to be satisfied that the materials were safe and did not impart undesirable residues to the leaf, increasing health hazards to the consumers and endangering the export market.¹²³ Furthermore, for the first time all chemicals used in tobacco were supposed to carry triangle emblems signifying the level of their toxicity, colour-coded from green to purple.¹²⁴ Instructions for use and safe disposal, and procedures for treatment in the event of accidental poisoning were also supposed to be required in the labelling. The interests of these initiatives were of course disconnected from the concern about the environment, and more intensely attached to securing a global market for Rhodesian tobacco, hence this was more an imposed environmentalism emanating from concerns of British tobacco buyers and merchants. The TRB argued that 'the scheme protects the industry and assures potential buyers of Rhodesian leaf that the use of pesticides on Rhodesian leaf is controlled and responsible'.¹²⁵ These provisions were gazetted under the Fertilisers, Farm Seeds and Remedies Regulations of 1965. During the

120 'How Pesticides Gain the Stamp of Approval', *Rhodesian Tobacco Journal* (May 1965).

121 *ibid.*

122 *ibid.*

123 *ibid.*

124 *ibid.*

125 *ibid.*

same year, the use of the herbicide maleic hydrazide on tobacco was banned in Southern Rhodesia following a report that had been published by the Department of Agriculture in the United States in May 1960 revealing that it changed the chemical composition and physical properties of the leaf in a way that would endanger cigarette smokers.¹²⁶

Just as in the United States, the 1965 legislation marked only a superficial turning point in perceptions of the use of pesticides on tobacco farms as sporadic official voices began a conversation around the responsible use of these products. C. H. Cronin, the technical manager of a Salisbury pest control firm, issued a warning on the dangers to operators on tobacco farms of being exposed to methyl bromide when fumigating seedbeds.¹²⁷ He pointed out that methyl bromide was an extremely toxic substance. He warned:

The effects of a single massive exposure are well known, but it has also been discovered that exposure to low concentrations over a long period of time may have severe prolonged effects on the human body. A number of such cases has been reported in the British medical literature ... these cases underline the view that Methyl Bromide is highly toxic and that recommended safety precautions must be observed. It is disastrous for a labourer using Methyl Bromide whose clothing has become contaminated to either sleep in the garments in a poorly ventilated room or to take them off and leave them beside the bed.¹²⁸

The TRB also advised growers that the modern chemicals used for the control of insects were highly toxic, and special precautions had to be taken by farmers and their labour force using them.¹²⁹ It advised against the drinking of alcoholic beverages before or during work as alcohol promotes the rapid absorption of organophosphates.¹³⁰ These conversations between officials and tobacco farmers were, however, largely limited to technical concerns, with little attempt to ensure limiting the exposure of the African workers who did all of the work on the tobacco farms, by making it compulsory through legislation for farmers to equip labourers with the requisite protective clothing, creating exposure-free work environments and providing information to labourers on safe use. In the absence of consumer pressure from Britain targeting pesticide exposure of workers in particular, farmers showed less regard and concern for that aspect.

Nevertheless, by the beginning of the 1970s, a range of diverse attitudes—from both state and farmers—to the need for responsible chemical use in tobacco farms in Southern Rhodesia were congealing into something resembling a coherent policy. This was reflected in the legislative manoeuvres and initiatives by the TRB. Just as

126 Tobacco Soil and Leaf Analysis Reports. F256/TOB/260. NAZ.

127 'Tobacco Farmers Warned of Poisoning Danger', *Rhodesian Herald*, 22 April 1965.

128 *ibid.*

129 Tobacco Research Board, 'Bulletin on Burley Tobacco Culture in Southern Rhodesia' (1970), 3.

130 *ibid.*

in the United States, these initiatives underwent severe public and state scrutiny. This was particularly true in key turning points between 1968 and 1970 as global perceptions on chemical use gained remarkable consensus on the need for not only controlled use of some of the products, but also their total ban in several spheres of agricultural production. In 1968, for example, the US Government under pressure from the environmental lobby issued notices cancelling four uses for DDT: on shade trees, tobacco plants, around homes and on marshes except for control of disease carriers, before banning it eventually in 1972.¹³¹ In West Germany, for example, the use of chlorinated hydrocarbon pesticides on foodstuffs had been banned, and there were considerations to extend the ban to its use on tobacco in 1973.¹³² Meanwhile a German tobacco-buying company had announced in 1970 that it would no longer purchase tobacco that had been directly or indirectly treated with aldrin, dieldrin or heptachlor.¹³³ As these developments were happening elsewhere, they took centre stage in Southern Rhodesia where an impassioned debate between various government agencies took place. This debate pitted the state Health Department against the Ministry of Agriculture and reflected the unique and stark realities that had to be confronted in domesticating the American template of environmentalism in Southern Rhodesia.

The debate was the result of a report by the Acting Medical Officer of Salisbury in 1969, which had pointed out that toxic agricultural residues existed in food and called for the need for some form of legislation that could ban DDT and other persistent pesticides and replace them with less persistent Sevin and malathion.¹³⁴ D. H. Saunders, the Director of Research and Specialist Services, opposed the ban of synthetic chlorinated hydrocarbons as 'the total replacement of DDT, Lindane, Aldrin and Dieldrin by Marathion and Sevin would result in increased expenditure by the farmer'.¹³⁵ He argued that Sevin and marathion were not replacements for these chemicals and such a substitution would cause 'a most catastrophic breakdown in pest control with consequences on the economy, not only to the farmer, but the nation as a whole'.¹³⁶ As an alternative, he proposed a strict control on usage of these pesticides by a registration scheme which criminalised their sale and unlicensed distribution.¹³⁷

131 Kinkela, *DDT and the American Century*, 145.

132 Minutes of the Meeting on Pesticides on Tobacco held 4 September 1970, 42-12-5F, Box number 126962, Pesticide control legislation, NAZ.

133 *ibid.*

134 D. H. Saunders cites the Report in his correspondence with the Secretary of Agriculture on 3 June 1969. 42-12-5F, Box number 126962, Pesticide Control Legislation. NAZ.

135 D. H. Saunders to the Secretary of Agriculture, 3 June 1969. 42-12-5F, Box number 126962, Pesticide Control Legislation. NAZ.

136 *ibid.*

137 *ibid.*

Dr Timothy Stamps of the Salisbury health department noted on 14 April 1969 that pesticides such as dieldrin remain in the soil for many years after use and contaminate underground water supplies.¹³⁸ He added that research was being directed into the effects of residual chemicals on fish and plants in the dams, and the ecology of the country could be affected if nothing was done.¹³⁹ He also observed that vegetable growers had crops that were found with unacceptably high traces of dieldrin.¹⁴⁰ In response, the Director of Research and Specialist Services countered with: 'we do not propose to ban DDT, or other more persistent chlorinated hydrocarbons such as Dieldrin, but we shall seek to limit their use'.¹⁴¹

The Research Services department continued with their denial, pointing out that in Southern Rhodesia (where pest pressure was more intense than in the United States and other temperate countries) it was very difficult to see how a complete ban on the persistent hydrocarbons would even be possible.¹⁴² In his correspondence with the Secretary of Agriculture, Saunders staunchly stated:

Aldrin, Dieldrin and DDT all have a part to play in controlling the pest complex which prevails in this country, and although research work is proceeding in an endeavour to replace these chemicals with less persistent and toxic ones, it is doubtful if a complete ban will be realised in the near future. Nevertheless, the ministry of agriculture has under consideration new regulations for more effective control of the sale, possession of DDT and other substances will be subject to control which will prove adequate.¹⁴³

The Minister of Agriculture shared similar views to the Department of Research and Specialist Services on the need for more regulation and control, as opposed to a complete ban on these chemicals. During a debate in the Legislative Assembly on 29 August 1969, the minister observed that the most convenient policy initiative would be to amend the Farm Seeds, Pests and Remedies Act in conjunction with and simultaneous to the introduction of a Hazardous Substance Act, arguing: 'I believe that between these two pieces of legislation when they become law, the manufacture, distribution, packaging, sale, possession of DDT and other substances will be subject to control which will prove adequate'.¹⁴⁴

138 Minutes of a Meeting to Consider Action on Control and Distribution of Pesticides Held on 14 April 1969 at 15 Cheshire Road Salisbury, Box number 126962, Pesticide control legislation, NAZ.

139 *ibid.*

140 *ibid.*

141 D. H. Saunders to Secretary of Agriculture, 20 August 1969. 42-12-5F, Box number 126962, Pesticide Control Legislation. NAZ.

142 *ibid.*

143 D. H. Saunders to Secretary Agriculture, 2 September 1969. 42-12-5F, Box number 126962, Pesticide Control Legislation. NAZ.

144 *Votes and Proceedings of the Legislative Assembly* (Salisbury: Government Printer, 1969).

The denialism of the Ministry of Agriculture on the need to ban the use of highly persistent pesticides such as DDT persisted even in the face of growing and terrifying evidence. On 17 December 1969, the Doma Intensive Conservation Area (ICA)¹⁴⁵ wrote a letter to the secretary of the Natural Resources Board, Mashonaland North, reporting that because of DDT spraying in the catchment area of a dam, subsequent rainfall had washed much of the spray down into the dam.¹⁴⁶ In this dam a white farmer had stocked black bass, which died after the subsequent spraying and rains. The bream in the same dam were also dead. The letter went further:

The question arises on whether the water will be safe for humans and livestock and also what the effect will be if humans eat any of the dead fish or meat which has obviously been killed ... But it raises the question previously raised in other countries i.e. whether the use of DDT for field scale pest control is not altogether too risky, or whether it should be banned or severely curtailed.¹⁴⁷

The Natural Resources Board (NRB) noted that the situation was potentially serious and had in fact posed serious problems.¹⁴⁸ Unsurprisingly, however, Saunders denied that the poisoning in the dam was a result of DDT spraying. In his letter to the Secretary of Agriculture, he insisted that conventional application of DDT could never cause the death of large numbers of fish in a distant dam.¹⁴⁹ To him, current information was that once DDT is washed into the soil, it was very quickly absorbed by the soil particles and was not leached out, even in heavy rain. Even if washed into the dams, he argued, the DDT will only be slowly released from the soil particles and it was highly unlikely that it would produce the observed massive kill of fish.¹⁵⁰ He concluded rather ambiguously:

It is more likely that pollution of this type is due to the misuse of DDT for example: drift from the ground (mist blowers and aerial spraying), washing of spray equipment or tipping of excess DDT on the tributaries of the dam for the purposes of catching fish. Properly used on the crops there should be no health hazard and I would emphasize that most poisonings have arisen from misuse.¹⁵¹

145 Intensive Conservation Areas had been set up in white settler farming communities in 1948 for the conservation of natural resources. The ICAs were geographically demarcated units comprising several European farms that would draw resources together with state assistance towards such activities in the area as building contour ridges, afforestation, building dams and monitoring environmental degradation.

146 Doma ICA District Secretary (R. N. Gallico) to Secretary Natural Resources Board, 17 December 1969. 42-12-5F, Box Number 126962, Pesticides Control Legislation. NAZ.

147 *ibid.*

148 Natural Resources Board Secretary (D. J. S. Wilson) to Director of Water Development, cc Secretary of Agriculture and Secretary of Health, 23 December 1969. 42-12-5F, Box number 126962, Pesticide Control Legislation. NAZ.

149 D. H. Saunders to Secretary of Agriculture, 6 January 1970. 42-12-5F, Box number 126962, Pesticide Control Legislation. NAZ.

150 *ibid.*

151 *ibid.*

Despite these denials, however, a vast amount of evidence was building up in different quarters. The Rhodesian Veterinary Association was raising its voice on the accumulation of pesticide residues in animal tissues used for human consumption,¹⁵² the National Council of Women of Southern Rhodesia was also lobbying extensively about pesticide contamination of vegetables and instituted its own investigation.¹⁵³ These pressures, however, failed to elicit a robust state pesticide policy and only resulted in the token withdrawal of DDT for domestic and garden uses in 1973,¹⁵⁴ while it continued to play a bigger part in pest control in most crops (particularly maize, where it was used for the control of stalk borers). During the 1970s, Southern Rhodesia is estimated to have used 1,000 tonnes of DDT per year, with 300 tonnes used on maize.¹⁵⁵ The story was, however, quite different in tobacco where a modicum of control was established, largely because the sector relied on the export market which was insisting on the need to regulate pesticide contamination and could little afford to ignore the economic ramifications of non-compliance to the global pest control template.¹⁵⁶

‘A smokescreen of environmentalism’? The tobacco pesticide control scheme, 1970–80

Unlike other practitioners of agriculture in Southern Rhodesia, tobacco farmers relied more extensively on an export market for their crop. This export market had declined precipitously following the Unilateral Declaration of Independence (UDI) in 1965, as the white minority government severed political connection with Britain and illegally declared independence. Consequently, in 1966 the United Kingdom Government as a punitive measure started encouraging its manufacturers to boycott Rhodesian tobacco. This witnessed the country’s tobacco exports falling drastically by 76 per cent from 120,898 tonnes in 1965 to 28,959 tonnes in 1966 with a corresponding fall of 82 per cent in export receipts from R\$93.9 million to a paltry R\$16.7 million.¹⁵⁷ Thus, when news reached Rhodesia that most European countries (particularly West Germany, which had become an important export market for Rhodesian leaf after UDI) were planning to ban the import of tobacco treated directly or indirectly with DDT or other hydrocarbon insecticides, it was

152 The Rhodesian Veterinary Association had written to the Secretary of Health on 13 January 1970 voicing their concerns about the accumulation of pesticide residues in animal tissues used for human consumption. They noted that they had a collection of results from samples already analysed that showed high levels of such residues.

153 National Council of Rhodesian Women to Minister of Health, 10 May 1970. 42-12-5F, Box number 126962, Pesticide Control Legislation. NAZ.

154 This was legislated for under the Hazardous Substances Act of Southern Rhodesia (1973).

155 Ron Thomson, ‘DDT: The Resurrection of an Old Threat to Africa’s Wildlife’, www.africahunting.com/threads/ddt-the-resurrection-of-an-old-threat-to-africa%E2%80%99s-wildlife.14737/, accessed 12 July 2018.

156 The situation was different for other crops. For instance, the maize export consumer market was not making the same demands as the tobacco consumer market regarding pesticide contamination regulation, and also maize was largely grown for domestic consumption and was not a major export crop in Rhodesia.

157 Rowe, *Manipulating the Market*, 74.

imperative that they act promptly. From 1965, the TRB had operated an ill-defined and inchoate pesticide evaluation system. The scheme was largely voluntary and pesticide evaluation was done sporadically only for those growers who opted to be part of the pesticide monitoring program.¹⁵⁸ There was also no technical and legal infrastructure for a comprehensive mandatory pesticide control scheme. The scheme, however, made some minor headway in eliminating some chemicals with unwanted residues that were on the list of recommended pesticides. At the end of July 1970, heptachlor and dieldrin, which were recommended applications for the soil, had been dropped in favour of aldrin, which was less persistent and resulted in lower levels of residue.¹⁵⁹ In addition, any recommendations for the application of DDT to the leaf in the field was eliminated and replaced by monocrotophos—a systemic poison (now banned for use in the country).¹⁶⁰ The international trends and opinions on DDT use and the need to give assurances to overseas buyers, however, played a bigger part in the setting up of the tobacco pesticide control infrastructure, more than any local concerns about curbing contamination of the environment or human poisoning. The scheme certainly eliminated unacceptable levels of residues from the export leaf but did little to control or even monitor the use of these chemicals on tobacco farms, and the accompanying human and natural hazards. It was a scheme based on the commercial interests of the Rhodesian tobacco industry. The environmental aspect of the program was merely a smokescreen.

By September 1970 the key tobacco stakeholders in Southern Rhodesia considered that the best way to monitor the use of pesticides and create a deterrent in time for the 1970–71 crop would be by means of a random sampling on the tobacco sales floors before selling took place.¹⁶¹ They agreed on the need to set up legislation to enable this and ensure the confidence of the importing countries. They also agreed that the Tobacco Industries and Marketing Board (TIMB) would invoke the powers of the Tobacco Marketing and Levy Act to prohibit the sale of tobacco that had been treated with aldrin, dieldrin or heptachlor.¹⁶² Where the levels of pesticide residues were above the permitted tolerances, or banned pesticides were detected, a full-scale investigation of the remainder of the crop on the farm would ensue.¹⁶³ An analytical unit worth R\$7,000 and running costs of R\$400 monthly was proposed as a preliminary budget.¹⁶⁴ The TIMB noted with concern that although DDT was still recommended, it was highly suspect and there was a need to monitor its continued use to ensure that the West German standard of one part per million (ppm) was not exceeded.¹⁶⁵

158 Tobacco Research Board, 'Pesticides Use on Tobacco: A Review of International Trends and their Impact on Rhodesian Production', Memorandum, 31 August 1970.

159 *ibid.*

160 *ibid.*

161 Minutes of the Meeting on Pesticides on Tobacco held on 4 September 1970. 42-12-5F, Box number 126962, Pesticide control legislation. NAZ.

162 *ibid.*

163 *ibid.*

164 *ibid.*

165 *ibid.*

The TRB also admitted that it had evidence of the presence of DDT in quantities in excess of this standard as a result of drift from cotton spraying.¹⁶⁶ By August 1970, the TRB had begun raising red flags over the use of DDT within tobacco grading and storage buildings, calling for a suitable replacement for pest control in stored tobacco.¹⁶⁷ Its director, Ian McDonald, agonised that ‘there is a real danger of contamination of exposed leaf following contact with treated walls and floors’.¹⁶⁸

Consequently, the Tobacco Pesticide Contamination Investigation Committee came into being in 1970 under the chairmanship of Mike Butler, President of the Rhodesian National Farmers Union, to consider all aspects of chemical contamination arising from crop spraying and to regulate the use of DDT and other banned substances.¹⁶⁹ Representatives on the committee included RTA, the Department of Conservation and Extension, TRB and the cotton and grain commodity associations. The RTA noted that the purpose of the committee was to ensure that tolerance of toxic residues in tobacco remained lower than defined by legislation in other countries.¹⁷⁰ The Tobacco Marketing and Levy General Amendments Regulations Notice No. 3 of 1970 banned the use of DDT and other pesticides¹⁷¹ for field applications, but as a result of lack of satisfactory alternatives its use was retained in seedbeds and as a soil treatment following transplanting.¹⁷² These control measures were adjudged to have been effective in containing the contamination of the tobacco leaf destined for export, so much so that in 1972 the Report of the TIMB gloated glowingly that growers were using pesticides responsibly and every case of contamination was now proved to have arisen from accidental causes, either from applications in farm buildings before the introduction of the regulations in 1970, or from drift during aerial spraying.¹⁷³ The report further noted that as a result of investigations only four flue cured and 10 burley crops were partially or entirely embargoed, resulting in the loss of 70,000 kg of tobacco.¹⁷⁴ By 1974, DDT had been ‘eliminated’ (although there were actually still sporadic incidences of its use despite the comprehensive ban) from tobacco production in Rhodesia and replaced by a new insecticide Neotox, which the TRB said could be used ‘more safely and effectively than DDT’.¹⁷⁵ It was also less persistent and less dangerous to wildlife, with a low dermal and inhalation toxicity.¹⁷⁶

166 *ibid.*

167 *ibid.*

168 Ian McDonald to Head Branch of plant protection, 13 August 1970. 42-12-5F, Box number 126962, Pesticide Control Legislation. NAZ.

169 ‘Committee to Investigate Pesticide Contamination’, *Rhodesian Herald*, 13 November 1970.

170 *ibid.*

171 The other banned pesticides under the Government Notice included TDE (tetrachlorodiphenylethane), benzene hexachloride, CIC, dieldrin, arsenic, Mendrin, endosulfan and aldrin. The ban was to come into use as soon as existing stocks in the shops were finished and these were expected to last until the end of the season.

172 Southern Rhodesia Government Notice No. 3 (1970).

173 Tobacco Industries and Marketing Board, *Annual Report* (December 1972).

174 *ibid.*

175 ‘New Tobacco Pest Control’, *Rhodesian Herald*, 14 June 1974.

176 *ibid.*

While the TRB pest control scheme played a greater part in limiting contamination of the tobacco export leaf on the white farms, the utility of this program was a little weaker amongst black African burley tobacco growers in the Tribal Trust Lands (TTLs). Amongst most African growers, DDT was being used indiscriminately, despite the 'ban' on its use on tobacco. In September 1975, the Acting Agricultural Director of the TTLs, A. M. Coleman, wrote to the Provincial Agricultural Officer, Mashonaland West and Central, complaining about undesirably high levels of DDT found in leaf samples taken from African farmers in Mount Darwin, Karoi and Glendale.¹⁷⁷ During a meeting of the pesticide committee, the TRB director echoed this concern and observed that, as far as the TTL growers were concerned, there had not been much improvement, and in fact there had been some slight deterioration.¹⁷⁸ He pointed out that as long as DDT was still available to the black African grower he would continue to use it as *muti* (meaning 'magical medicine', referring here to a disinfectant chemical), and a great deal of African tobacco was stored in *kias* (African huts), which would have been dosed with DDT as a means of killing various household pests, including mosquitoes.¹⁷⁹ In addition, the use of the product by African farmers to spray their cotton caused problems of drift. The worst offenders in this regard were mentioned as the black farmers in the TTLs of Chiweshe and Chesa (see Figure 2).

To control the problem, the Secretary of Internal Affairs proposed the prohibition of purchases of 85 g packets of DDT in African areas.¹⁸⁰ This he viewed as effective since white farmers could buy this insecticide only in bigger packages of 1 kg or 50 kg.¹⁸¹ Although DDT was still being used by both white and black cotton farmers for the control of bollworms, the concern was that burley tobacco was being accidentally contaminated by drift from cotton spraying in black African areas. The secretary of the Agricultural Pesticides Association pointed out that DDT was a cheaper alternative for the spraying of cotton, and to keep the spraying costs of African cotton within bounds, DDT still had to be used.¹⁸² The problem, he noted, could only be solved by better extension advice and the right educational approach to the cotton grower rather than the removal of the pesticide from the market.¹⁸³

177 Coleman to Provincial Agricultural Officer, Mashonaland West and Central, 15 September 1975. S3700/44, Crop Pests Control, Use of Pesticides and Herbicides, October 1973–March 1977. NAZ.

178 Minutes of the Pesticide Control Committee held at the RTA (Salisbury), 13 October 1975. Crop Pests Control, Use of Pesticides and Herbicides, October 1973–March 1977. NAZ.

179 *ibid.*

180 Secretary of Internal Affairs to Secretary Agricultural Pesticides Association, 8 March 1976. S3700/44, Crop Pests Control, Use of Pesticides and Herbicides, October 1973–March 1977. NAZ.

181 *ibid.*

182 Secretary Agricultural Chemicals Industry (Mrs. P. A. Morgan) to Ministry of Internal Affairs, 4 May 1976. S3700/44, Crop Pests Control, Use of Pesticides and Herbicides, October 1973–March 1977. NAZ.

183 *ibid.*

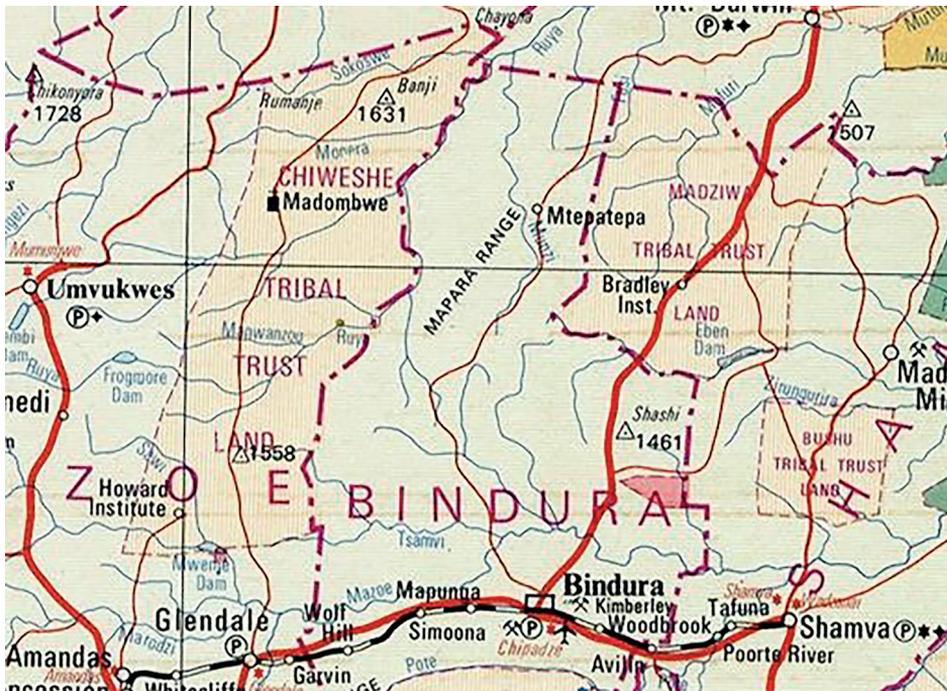


Figure 2: Tribal Trust Lands, Mashonaland North, Southern Rhodesia.

Source: www.rhodesiansoldier.com/hist-bush-war-op-overload.html, accessed 20 September 2019.

In 1974, 28 per cent of African-grown burley that was sampled by the Pesticide Control Committee revealed higher DDT residues (Tables 1 and 2). In 1975, the figure went up to 31 per cent, but what was more worrying was the presence of much higher residues of over 2 ppm, constituting 15 per cent of the sample. In the white areas, the levels of contamination were remarkably lower. In 1974, for instance, out of a sample of 77 growers only two, 6.5 per cent, had crops with high levels of DDT, and in 1975 while 345 kg of black African tobacco was destroyed for containing higher levels of DDT, amongst the European growers no tobacco was destroyed.¹⁸⁴ All in all, these comparative results reflect that there was heavier contamination by DDT in the TTLs that were black African areas. This contamination certainly left residues in the environment and food crops grown on the adjacent pieces of land as black African plots in the TTLs never exceeded 2 acres at most.¹⁸⁵ Unfortunately, this racialised dimension was never considered by the Tobacco Pesticide Scheme and the level of contamination of food crops, land and water in the TTLs by DDT can only be inferred from scientific evidence made available by later studies. A 1999 scientific study on samples from soil, rivers and dams found DDT residues in the

184 Tobacco Industries and Marketing Board, Monitoring Service for Pesticide Residue in Tobacco, 'Pesticide Inspectors Report to the General Manager (TIMB)', 10 October 1975.

185 The Tribal Trust Lands were largely overcrowded and a result of colonial racialised land policy that began with the 1930 Land Apportionment Act, which set up prescribed areas for African settlement.

terrestrial environment of the former TTLs of Mount Darwin and Rushinga, which was attributed to cumulative contamination over 20 years.¹⁸⁶ What this does reveal is how Carson's environmentalism operated unevenly along the lines of race and class in Southern Rhodesia, impacting black Africans and whites in distinctively different ways.

Table 1: Pesticide contamination of burley tobacco in African areas, 1974.

DDT amount	Number of growers	Growers as a percentage
Less than 0.5 ppm	94	51.4
0.5–0.9 ppm	15	8.4
1.0–1.5 ppm	37	20.2
1.6–2.0 ppm	16	8.0

Source: Rhodesia Tobacco Marketing Board, Monitoring Service for Pesticide Residue in Tobacco: Report of Burley Sample, Tribal Trust Lands, 1974.

Table 2: Pesticide contamination of burley tobacco, African areas, 1975.

DDT amount	Number of growers	Growers as a percentage
Less than 0.5 ppm	66	50.5
0.5–0.9 ppm	25	19.0
1.0–1.5 ppm	11	8.5
1.6–2.0 ppm	9	7.0
Over 2.1 ppm	20	15.0

Source: Rhodesia Tobacco Marketing Board, Monitoring Service for Pesticide Residue in Tobacco: Report of Burley Sample, Tribal Trust Lands, 1975.

In the final analysis, the major lesson that can be drawn from the Tobacco Pesticide Control Scheme is that it was rarely about the safe use of chemicals to avoid environmental contamination and human poisoning. Instead, the scheme was about avoiding the contamination of the tobacco crop for the export market. Even then, by 1970, most farmers were unwilling to spend money on extending pesticide protection to include the safety of their labourers because of the costs involved. Increasing agricultural safety was estimated to cost farmers as much as R\$2.1 million in 1971.¹⁸⁷ In 1972, the 'Kutsaga suit' was developed by the TRB for the safe and efficient application of pesticides to burley tobacco.¹⁸⁸ This was a more effective suit than the protective suits available at the time of the jacket-and-trousers type that were not adequately protective against small particle penetration.¹⁸⁹ Despite this, most farmers were still not actually adopting safety practices for agricultural labourers using sprayers. The Ministry of Health in 1978

186 Mbamba and Zaranyika, 'DDT Residue in Terrestrial Environment'.

187 'New Safety Rules May Give Farmers a Shock', *Rhodesian Financial Gazette*, 15 January 1971.

188 'Applying Insecticides with a Knapsack Mist Blower', *Tobacco Forum of Rhodesia*, August 1972.

189 *ibid.*

fretted that some Rhodesian farmers were far too casual with the use of highly toxic pesticides.¹⁹⁰ They noted that labourers using knapsack sprays were not protected against the chemicals used. Tanks were often refilled while still on the operator's back, and unless he was wearing protective clothing spillage would take place, which would mean the chemical would be in contact with his skin.¹⁹¹ As a result, several incidences of poisoning were reported.

A spokesperson for the government's Occupational Safety and Compensation Department said that from April 1977 to March 1978 more than 100 cases of poisoning were reported. Of these, 24 involved pesticides, with 22 occurring in agriculture.¹⁹² The spokesperson added that many more cases amongst black African agricultural labourers went unreported.¹⁹³ In one horrifying case, an African labourer was spraying pesticide on a tobacco crop in the Salisbury area when the hose became clogged. He tried to clear it by sucking with his mouth, leading to him swallowing the solution and dying.¹⁹⁴ In another case, African labourers were spraying chemicals on a tobacco crop at Kutsaga Research Station. The wind suddenly changed direction, blowing the toxic droplets into their unprotected faces, causing severe burns.¹⁹⁵ In yet another case, an African family was working on a tobacco farm where pesticide and water were stored in similar drums. A small daughter of the family drank from the wrong barrel and died.¹⁹⁶ In most instances, tobacco farm labourers exercised very little caution when using harmful chemicals as a result of ignorance. According to the testimony of one former farm worker, water containing DDT would be drunk by thirsty labourers, and some would even consume their food with unwashed hands after handling highly toxic organophosphate chemicals in tobacco nurseries, and there was very little concern on the part of the white farmers.¹⁹⁷ A survey by the Hazardous Substances Inspectorate group of 378 farms revealed shockingly that less than half throughout the country did not provide protective gear for their workers and on 72 per cent of the farms none of the workers interviewed knew the meaning of the purple and red triangle emblems on pesticide containers!¹⁹⁸ Thus while the use of poisonous chemicals in agriculture was increasing, there were no

190 'New Control on Pesticides', *Rhodesian Financial Gazette*, 3 March 1978.

191 *ibid.*

192 'Poisonings Caused by Careless Handling', *Rhodesian Sunday Mail*, 18 December 1979.

193 *ibid.*

194 *ibid.*

195 *ibid.*

196 *ibid.*

197 Interview with Mrs Saizi (former farm worker, 74 years old), Westbury Farm, Centenary, Zimbabwe, 13 February 2019. Other former farm workers interviewed (Mr Ganizani, 68 years old, Westbury Farm, Centenary; Mr Kavhimbo, 71 years old, Mutwa Estate, Mount Darwin; and Mr Jimu, 63 years old, Avalon Farm, Centenary) narrated horrendous tales of how chemical poisonings were common on the tobacco farms and resulted in the death of several workers, particularly those who worked in the tobacco nurseries, who often developed chronic conditions like tuberculosis, and eventually died after long illnesses. They also testified that protective clothing was not always provided, and in most cases farm workers sprayed these chemicals while exposed to drift spray.

198 'Farm Workers Exposed to Killer Sprays, Says Survey', *Sunday Mail*, 15 April 1983.

training facilities to teach black farm workers how to protect themselves, resulting in a high incidence of poisoning. Between January 1980 and July 1981, more than 120 cases of organophosphate poisoning were recorded on the white farms around Harare only, and the victims were all black Africans!¹⁹⁹ On 10 July 1984, 12 tobacco farm workers from a farm in Centenary were admitted at Mvurwi District hospital and later transferred to a Harare hospital with organophosphate poisoning.²⁰⁰ Upon inspection of the premises where the workers had been poisoned, the health assistant found:

Five dangerous chemicals lying about on the shelf in a workshop where they should have been locked away. On the same shelf as the poisons they found cups and a teapot as well as two mealie cobs. On the veranda of the workshop were a lot of other chemicals, new stock and old stock which were open.²⁰¹

These sporadically reported instances of human poisoning on the tobacco farms are just a few of the many instances of the liminal losses and unseen sufferers that Nixon has argued are under-represented in both strategic planning as well as historical memory.²⁰² This marginalisation of the casualties of chemical poisoning is largely a result of what Mike Davis calls 'the dialectic of ordinary disaster', where a calamity is appropriated into history and made ordinary and forgettable because the burden of risk falls on the unsheltered poor.²⁰³ Consequently, most such disasters are expunged from historical memory and policy planning by their framing as 'accidental and random'.²⁰⁴ To this extent, therefore, the official figures on chemical poisoning of African labourers in Southern Rhodesia must be treated with scepticism.

Also, while the pesticide control scheme focused on the contamination of tobacco by these chemicals, many of them were still being used indiscriminately for other agricultural purposes, mostly within white farming areas. A scientific study carried out in 1972 covering most parts of the country revealed a massive build-up of DDT in lakes.²⁰⁵ Many cases of fish poisoning by DDT, dieldrin, empty methyl bromide tins and tobacco scrap were also reported in most ICAs.²⁰⁶ Reports were also published in the *Rhodesian Herald* (17 and 19 December 1975) on the use in the tobacco-producing districts of Karoi and Sinoia (see Figure 1) of non-selective poisons during a rodent plague, resulting in deaths all along the food chain, including

199 *ibid.*

200 'Poisonous Chemicals Threaten Farm Workers', *The Herald*, 12 November 1984.

201 *ibid.*

202 Nixon, *Slow Violence and the Environmentalism of the Poor*, 2.

203 Mike Davis, 'Los Angeles After the Storm: The Dialectics of Ordinary Disaster', *Antipode* 27 (1995): 221–4.

204 Nixon, *Slow Violence and the Environmentalism of the Poor*, 65.

205 R. J. Phelps and T. Billings, 'Pesticide Levels from Animals in Southern Rhodesia', *Transactions of the Rhodesia Science Association* 55 (1972): 6–9.

206 'Wildlife Must be Conserved', *Tobacco Today*, December 1974.

natural predators such as owls and snakes.²⁰⁷ The Director of National Parks expressed concern over the use of highly toxic and long-lasting poisons as warfarin and Nuvacron (also known as monocrotophos, a systemic tobacco pesticide) for the field control of rodents in the white farms.²⁰⁸ In March 1975, J. J. Buitendag, the MP for Mhangula (another tobacco-producing district), wrote to the Minister of Lands and Agriculture complaining that farmers were using various poisons to combat rats and mice that were digging up and eating their maize seeds, and many predators were killed as a result.²⁰⁹

While forms of control had been established for the use of pesticides on tobacco and other crops, there were inadequate environmental control and policing mechanisms. Dr Hamilton Ritchie (a member of the Rhodesian Legislative Assembly) had posed the very ‘Carson-esque’ question to the Minister of Health in 1978 of whether he was satisfied with the policing systems stopping farmers from using too much pesticide, which could then wash off into rivers and be detrimental to animal welfare and the biological chain.²¹⁰ The minister responded that it was difficult to control the amount of pesticides farmers put onto their crops.²¹¹ Cognisant of these problems, the NRB had created the Environmental Conservation Committee in November 1977 under the chairmanship of Professor Geoffrey Bond. The committee considered pesticide and herbicide usage in the country in detail, in particular that of DDT, by taking evidence from local ‘experts’ and informed by the global trends.²¹² During the same period, a number of local studies had begun to confirm through scientific data that DDT contaminated the environment.²¹³ The interim report of the Environmental Conservation Committee was the first comprehensive official study on the effects of pesticide poisoning on the environment in Southern Rhodesia.²¹⁴ The report was presented to the new government of independent Zimbabwe in late 1980. The new political context had little influence on the report as its findings were compiled over a long period of time. The report concurred with the global data that pesticide residues could accumulate in the environment, creating an insidious effect on the ecosystem.²¹⁵ It pointed out that although the threat to human life within the

207 *Rhodesian Herald*, 19 December 1975.

208 *ibid.*

209 J. J. Buitendag to Minister of Lands and Agriculture, 5 March 1975. S3700/44, Crop Pests Control, Use of Pesticides and Herbicides, October 1973–March 1977. NAZ.

210 ‘Control Over Pesticides Difficult’, *Rhodesian Herald*, 29 November 1978.

211 *ibid.*

212 Under the supervision of the Ministry of Agriculture, a nationwide pesticide monitoring program was started in 1979 to determine whether residues of chlorinated hydrocarbon poisons were present in dangerous quantities in the country. This came after repeated calls by conservationists for the banning of pesticides that had been recognised as dangerous to humans and wildlife. The monitoring program was being carried out by the Ministries of Health, Agriculture and National Parks and Wildlife through sampling of water bodies, water life and soil.

213 Y. A. Greichus et al., ‘Insecticides, Polychlorinated Biphenyls and Metals in African Lake Ecosystems II: Lake Mcllwaine, Rhodesia’, *Bulletin of Environmental Contamination and Toxicology* 19 (1978): 444–53, doi.org/10.1007/BF01685824.

214 Natural Resources Board, ‘The Pesticide Dilemma’, *Newsletter* no. 8 (September 1981).

215 *ibid.*

country had been negligible, there had been human fatalities through accidental overdose and suicide. In addition, certain bird species had been endangered.²¹⁶ The report further exhorted the NRB to consider the matter dispassionately from the point of view of what was best for the country.²¹⁷

The report by the Environmental Conservation Committee thus confirmed what had already been articulated by sporadic official voices in Southern Rhodesia, including the Ministry of Health, since 1969 about the effects of pesticide residue on humans and the environment. A parallel can be made between the significance of the report and that of the American PSAC 1965 report, as it goaded the pesticide control agenda into the official policy corridors and called for relevant monitoring instruments, particularly through the NRB. For its part, the NRB noted that it was deeply concerned about the continued use of DDT in light of the adverse reports emanating from other parts of the world, mostly the developed world, in which several countries had banned this pesticide. It was concerned about the general misuse of pesticides and herbicides in the country, particularly the spraying of monocrotophos at two or more times the rate recommended for aphid control in tobacco for which it was registered.²¹⁸ The board noted that the pesticide was lethal to game birds such as guinea fowls, and a host of other birds, and as a result there had been a serious depletion of birdlife in some tobacco farming areas.²¹⁹ This perhaps evokes the eerie silence captured poetically by John Keats in 'La Belle Dame sans Merci', from which *Silent Spring* takes its title, two lines of which read:

The sedge is wither'd from the lake,
And no birds sing.²²⁰

From the 1980s, following the end of white colonial rule, the use of DDT fell under severe scrutiny in Zimbabwe, largely because of the build-up of evidence on its residual effects on wildlife and the environment. In 1982, the widespread use of DDT as an agricultural insecticide was banned by the newly independent government.²²¹ In 1985, DDT was declared a Group 1 hazardous substance, and its use was restricted to research purposes for malaria and tsetse fly control.²²² By 1991, it had been banned for outdoor control of malaria because of concerns over the contamination of tobacco.²²³ Currently, DDT is being used only for indoor malaria

216 *ibid.*

217 *ibid.*

218 *ibid.*

219 *ibid.*

220 John Keats in M. H. Abrams, *The Norton Anthology of English Literature*, vol. 2 (New York: W. W. Norton and Co., 1970).

221 S. M. Mpfu, 'DDT and its Uses in Zimbabwe', *Zimbabwe Science News* 21 (1987): 31–6.

222 M. E. S. Flint and M. J. S. Harrison, 'DDT Impact Assessment Project: Zimbabwe', *Department of International Aid, Evaluation Report*, no. 621 (December 1998): 9.

223 *ibid.*

control in the country.²²⁴ However, concerns over the contamination of tobacco as a result of indoor DDT spraying have resurfaced in recent years, particularly with the entry of many black farmers into production after the chaotic Fast Track Land Reform Programme in 2000.²²⁵ In 2018 there were concerns that the country's tobacco would face a ban over DDT residue contamination. Research findings by global tobacco merchants presented at the Cooperation Centre for Scientific Research Relative to Tobacco (CORESTA) showed that, of all producing countries, Zimbabwean tobacco was the only one contaminated by DDT.²²⁶ Other highly toxic insecticides such as monocrotophos (warfarin and Nuvacron) and methamidophos (Tamaron) were banned for use in tobacco, but they have continued to be used by most black smallholder producers as they are easily available on the black market and cheaper than the recommended alternatives.²²⁷

Conclusion

The history of pesticide use in Southern Rhodesia is a story of environmental pollution and contamination that has never been studied before by historians. Yet it is evident that the use of these chemicals posed serious hazards. Irresponsible and casual use of pesticides, because of lack of proper pest management and safety facilities, claimed a significant number of silent and silenced casualties—in both the human and natural environment. The story of this 'slow violence' and invisible deaths in tobacco farming does indeed conjure up Carson's *Silent Spring*. In fact, the local narrative connects with the global movement that Carson stirred, which brings us back to the question we asked at the start: was there an African Rachel Carson? An engaged understanding of Carson in Africa needs to be understood in tandem with the triple concepts of 'slow violence', the 'environmentalism of the poor' and 'environmental racism', as we have argued. But this should not be an historiographical ending, rather a beginning of the quest for the African Carson moment. This paper has not intended to write an environmental history epitaph or to rehabilitate Carson in Africa, but rather awaken an historiographical debate on *Silent Spring* as it relates to Africa. Already it is clear that Southern Rhodesia

224 The current national spraying program is largely funded by USAID under the President's Malaria Initiative Indoor Residual Spraying Project.

225 There are over 165,000 smallholder tobacco producers registered for the 2018–19 season. Some of these producers are in areas that have high incidences of malaria and they use DDT for indoor control. Consequently, their tobacco is contaminated from storage in the sprayed houses.

226 See 'Zim tobacco faces ban over DDT residue contamination', *AgriNews*, 14 December 2018, agrinews.co.zw/crops/2018/14/2153zim-tobacco-faces-ban-over-ddt-residue-contamination/, accessed 25 February 2019 (webpage discontinued).

227 See Doreen Badze, 'Farmers Still Using Banned Pesticide', *The Standard*, 11 December 2016, www.thestandard.co.zw/2016/12/11/farmers-still-using-banned-pesticide/, accessed 25 February 2019. Other tobacco chemicals banned in the country include the soil fumigant methyl bromide, because of its negative effects on the ozone layer, and EDB, which was banned in the United States on 19 September 1983 because it was shown to cause cancer and birth defects.

had its own 'Silent Spring' moment(s), but these moments were idiographic and vernacular encounters within a global environmental movement. While Carson sparked modern environmentalism and brought pesticide use into critical focus, her meaning within Africa must be critically understood within a strongly diachronic context. First, as argued in this paper, *Silent Spring* did not invent environmental consciousness, but rather channelled it into a global environmental zeitgeist. It provided the impetus and vocabulary for a new kind of challenge post-1960. Second, this movement assumed new meanings and forms in Africa, where unique problems of technical innovation in agriculture, costs of harnessing new pest control management systems, economic and political inequalities, and the more hostile pest-prone climatic conditions required pragmatic approaches to pesticide control. To this end, the 'African Rachel Carson moment' must be seen as a vernacular experience drawing inspiration from its own local and global realities. Even in the United States, there never was a monolithic and homogenous 'Silent Spring'. Rather there were several silent springs. Finally, we must guard against the dangers of reading Carson in Africa in teleological terms; as historians, just as much as we need to reconstruct knowledge, we need to painstakingly reconstruct ignorance.

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