

CHARGING RESPONSIBILITY FOR THE REPERCUSSIONS OF PESTICIDE USAGE IN POST-WAR FRANCOPHONE AFRICA

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The introduction of pesticides to post-war francophone Africa facilitated economic booms, but the chemicals' impacts on people's health and the environment remain obscure. This article presents some of the deleterious effects in southeastern Senegal, but it also reports farmers' alternative uses for the substances. By combining interviews with retired Senegalese farmers and technicians with French agronomists' conference minutes from the 1950s and 1960s, the article proposes the ways the leaders of French agronomy justified the use of potent and perilous chemicals overseas. While some of these actors were concerned about the dangers, others argued that the risks could be reduced, and the economic benefits maximized. A post-colonial rhetoric emerged that charged Africans with responsibility for following French guidelines and thereby blamed them for user-error. This rhetoric suggests why certain pesticides were used in francophone Africa through the early 1980s though banned in France in the 1970s.

In mid-twentieth century West Africa, 'prosperous peasants,' having launched economic booms, helped their countries gain political independence.¹ The farmers succeeded thanks to higher commodity prices following World War II, good rains, sufficient labor, and increased availability of fertilizers, herbicides, and pesticides. Yet whether there was apprehension about the chemical means used to attain the ends remains absent from much of the literature on decolonization and development after independence circa 1960. This article relates the experiences of farmers in Senegal and French agronomists in other former colonies and their concerns about insecticides' risks since the 1950s. Over-looking pesticide usage ignores the sacrifices that were made, and the violence done in the areas involved.² Some villagers were sickened. Some died. Domesticated and wild animals were killed. At the time, however, the damages were rarely recorded and never tallied and those who experienced losses could not demand compensation. Nor would their communities have wanted them to.

In the remote and sparsely populated region of southeastern Senegal, many men and women welcomed the opportunity to make money and were willing to take risks in the fields as long as purchase prices were high. Meanwhile in France, the agronomists who were troubled by the damages and wanted to emphasize precaution argued with those who believed that the risks could be reduced, and the use of the chemicals continued. The ranks

¹ Frederick Cooper, *Africa since 1940: The Past of The Present* (New York: Cambridge University Press, 2002), 20-21.

² Stefania Barca, 'Telling the Right Story: Environmental Violence and Liberation Narratives' *Environment and History* vol. 20, no. 4 (Nov. 2014): 535-46; Rob Nixon, *Slow Violence and the Environmentalism of the Poor* (Cambridge, MA: Harvard University Press, 2011).

of both agronomists and farmers were divided. Scholars of African Studies and Science and Technology Studies (STS) have distinguished knowledge produced either from the top down by 'experts' or from the bottom up by so-called 'lay people.' Historians recognize that the two realms intermingled when European colonial researchers depended on African informants and assistants.³ In francophone Africa, entomologists and agricultural engineers educated first in France then learned from working with African auxiliaries in warmer climates. The disparate actors shared knowledge and concerns while their perspectives differed.

In the 1950s, the French experts worked for historically colonial institutions and some sought to correct older prejudices and urged precaution. By 1960 however a postcolonial rhetoric emerged to deal with African independence, to reinforce pesticide usage, and to assent to economic interests. By investigating French and Senegalese technicians' 'ethical anxiety' while introducing insecticides,⁴ this article identifies the justifications for pesticide usage and how health and environmental concerns were repressed. The leadership of French tropical agronomy framed insecticide as a

³ Soraya Boudia and Nathalie Jas, 'Introduction: The Greatness and Misery of Science in a Toxic World,' in *Powerless Science? Science and Politics in a Toxic World* (New York: Berghahn Books, 2014), 15, 18-19; Lyn Schumaker, *Africanizing Anthropology: Fieldwork, Networks, and the Making of Cultural Knowledge in Central Africa* (Durham, NC: Duke University Press, 2001); Helen Tilley, *Africa as a Living Laboratory: Empire, Development, and the Problem of Scientific Knowledge, 1870-1950* (Chicago: University of Chicago Press, 2011).

⁴ Kim Fortun and Mike Fortun, 'Scientific Imaginaries and Ethical Plateaus in Contemporary U.S. Toxicology,' *American Anthropologist* 107, no. 1 (2005): 43-54; Noémi Tousignant, *Edges of Exposures: Toxicology and the Problem of Capacity in Postcolonial Senegal* (Duke University Press, 2018), 18-19.

'modernizing' tool in a renewed benevolent mission to assist the development of the former colonies. At the same time, lay people used the new tools for their own, non-approved, purposes. French agents and their African partners then charged responsibility for any damages to allegedly unreliable users, not to the Western institutions who introduced the chemicals.

The 'retreat from precaution' has been better documented in the literature on the Global North than on the Global South.⁵ Scholars such as Nancy Langston, Linda Nash, Nathalie Jas, Soraya Boudia, David Kinkela, Frederick Rowe Davis, Noémi Tousignant, Didier Torny, and others have revealed that workers, doctors, scientists, and industrial and government agents knew about deleterious health and environmental effects of various toxicants early on, but that wishes for precaution were superseded by economic motivations. While some individuals considered the substances too perilous to use at all, leaders justified the materials' usage to 'socially acceptable' levels of risk, meaning the absence of protest. They developed 'rules of conduct' that enabled the 'transfer of responsibility' onto people accused of breaking the rules, often individuals with less power. If 'specific protection measures' were followed, leaders argued, the rewards would outweigh the minimized risks.⁶ This article shows a postcolonial variation of this pattern,

⁵ Tousignant, 5-6.

⁶ Nancy Langston, 'The Retreat from Precaution: Regulating Diethylstilbestrol (DES), Endocrine Disruptors, and Environmental Health,' *Environmental History* 13: 1 (2008): 41-65; Linda Nash, 'The Fruits of Ill-Health: Pesticides and Workers' Bodies in Post-World War II California' in G. Mitman, M. Murphy, and C. Sellers (eds.) *Osiris Volume 19: Landscapes of Exposure: Knowledge and Illness in Modern Environments*, pp. 203-19 (University of Chicago Press, 2004); Boudia and Jas, 'Introduction: The Greatness and Misery of Science in a

exposing one of the ways the French finessed their relationship with their former colonies and a key aspect of post-war modernization, that of expecting lay people to follow unrealistic guidelines from above.⁷

The literature on agricultural development in Africa has recognized that farmers adopted agricultural chemicals for their labor- and time-saving features and that there were some negative consequences to people's health and the environment,⁸ but farmers'

Toxic World, ' 11, 18; Sheila Jasanoff, *The Fifth Branch: Science Advisers as Policy Makers* (Harvard University Press, 1990); Hood and Rothstein, 'Risk Regulation Under Pressure: Problem Solving or Blame Shifting?' *Administration and Society* 33 (2001): 21-53; Soraya Boudia and Nathalie Jas, 'Introduction: Science and Politics in a Toxic World,' in *Toxicants, Health and Regulation since 1945* (New York: Routledge Taylor and Francis Group, 2013), 5, 10, 15, 18-19, 24; Nathalie Jas, "Adapting to 'Reality': The Emergence of an International Expertise on Food Additives and Contaminants in the 1950s and early 1960s," in *Toxicants, Health and Regulation since 1945*, 49-51, 55, 65-68; Soraya Boudia, 'From Threshold to Risk: Exposure to Low Doses of Radiation and Its Effects on Toxicants Regulation,' in *Toxicants, Health and Regulation since 1945*; Didier Torny, 'Managing an Everlastingly Polluted World: Food Policies and Community Health Actions in the French West Indies,' in *Toxicants, Health and Regulation since 1945*; David Kinkela, *DDT and the American Century: Global Health, Environmental Politics, and the Pesticide that Changed the World* (Chapel Hill, NC: The University of North Carolina Press, 2011), 13-105, 196fn56; Frederick Davis, *Banned: A History of Pesticides and the Science of Toxicology* (New Haven, CT: Yale University Press, 2014).

⁷ Guillaume Lachenal, 'The Intimate Rules of French Coopération: Morality, Race and the Postcolonial Division of Scientific Work at the Pasteur Institute of Cameroon.' In *Evidence, Ethos and Experiment: The Anthropology and History of Medical Research in Africa*, edited by Geissler and Molyneux, 373-402 (London: Berghahn Books, 2011); Tousignant, 62.

⁸ William Moseley and Leslie Gray (eds.) *Hanging by a Thread: Cotton, Globalization, and Poverty in Africa* (Athens OH: Ohio University Press, 2008); Thomas Bassett, *The Peasant Cotton Revolution in West Africa, Côte d'Ivoire, 1880-1995* (New York: Cambridge University Press, 2001); Sara Berry, *No Condition is Permanent:*

alternative uses of the chemicals have not been elucidated extensively. The literature on the Green Revolution in Asia and Latin America has more critically detailed modernized agriculture's damages, arguing that agricultural development often impoverished peasants, harmed their health, undermined the long-term sustainability of agriculture, and damaged the environment.⁹ This article constitutes a step toward writing more targeted histories of pesticide usage in Africa¹⁰ and how concerns for people's health and the environment were moderated which led to a failure to ensure safety.

My sources include conference minutes by agronomists in France who refer to their experiences in northern, western, and central Africa, Madagascar, and Vietnam, as well as

The Social Dynamics of Agrarian Change in Sub-Saharan Africa (Madison, WI: University of Wisconsin Press, 1993).

⁹ David Arnold, *Toxic Histories: Poison and Pollution in Modern India* (Cambridge University Press, 2016); Clive Ponting, *A New Green History of the World: The Environment and the Collapse of Great Civilizations* (Penguin Books, 2007); Edmund K. Oasa, 'The Political Economy of International Agricultural Research in Glass,' in *The Green Revolution Revisited: Critique and Alternatives*, edited by Bernhard Glaeser (Allen & Unwin, 1987), 13–55; Vandana Shiva, *The Violence of the Green Revolution: Third World Agriculture, Ecology and Politics* (New York: Zed Books, 1992); Vandana Shiva, 'The Green Revolution in the Punjab,' *The Ecologist* 21, no. 2 (Mar.-Apr. 1991); Shiva, *The Violence of the Green Revolution: Ecological Degradation and Political Conflict in Punjab*, Dehra Dun, Research Foundation for Science and Ecology (Natraj Publishers, 1989).

¹⁰ See Anthony Youdeowei and T. Adejare Fadare, eds., 'Pesticide Usage In Nigeria,' Proceedings of a Symposium held at Ahmadu Bello University, Zaria, Nigeria, 16 Dec. 1974, Entomological Society of Nigeria, No. 17, Dec. 1975; Luise White, 'Poisoned Food, Poisoned Uniforms, and Anthrax: Or, How Guerrillas Die in War,' in *Landscapes of Exposure*; Compare to Michitake Aso, *Rubber and the Making of Vietnam: An Ecological History, 1897–1975* (University of North Carolina Press, 2018).

interviews I conducted in France and Senegal.¹¹ My research focused on cotton production in southeastern Senegal where in the early 2000s Senegalese toxicologists suspected that ‘annual clusters of fatalities [. . . were . . .] caused by pesticide poisoning’ but had to be labeled ‘disease of unknown etiology’ due to lack of confirming lab results.¹² The southeast became Senegal’s ‘cotton basin’ in the 1960s and cotton has been prescribed with more toxic insecticides than food crops.¹³ Though toxicologists and scholars have encountered difficulties asking at-risk individuals about their experiences with toxicants,¹⁴ I found technicians and farmers, though not all, willing to talk about pesticide exposure.

I attribute their willingness to contemporary economic, political, and health issues. Government officials and scholars describe *Haute Casamance* and *Sénégal Oriental* (the southeast) as the most marginalized area of Senegal, lacking transportation and medical

¹¹ I thank the J. William Fulbright-Institute of International Education, the . . . program at . . ., and . . . for funding my research. Some of this information first appeared in the dissertation titled . . .

¹² Tousignant, *Edges of Exposure*, 127.

¹³ Moussa Soumah, ‘L’économie cotonnière ouest africaine, les opérations coton au Sénégal et au Mali’ (thèse, troisième cycle, géographie, Université Cheikh Anta Diop de Dakar, 1972); Amadou Faye, ‘L’encadrement du monde rural dans le département de Tambacounda,’ (Mémoire de stage de fin d’étude, École nationale d’administration et magistrature, Ministère de l’enseignement supérieur, République du Sénégal, 1976); Sérigne Modou Fall, ‘Le Coton et son industrie au Sénégal : étude géographique’ (thèse, troisième cycle, géographie, UCAD, 1990); Moseley and Gray, *Hanging by a Thread*, 15, 100.

¹⁴ Tousignant, 11.

infrastructure.¹⁵ In the 1960s and 1970s residents came to welcome the cotton company because agricultural inputs, including insecticides, were distributed seemingly for free and the company paid competitive prices. But since the 1980s cotton has become less profitable and farmers have become indebted to the cotton company. They have had to sell their livestock and other property to pay what they owe for increasingly expensive agricultural inputs.¹⁶ Farmers and technicians criticized the cotton industry and each other.

Technicians disapproved that farmers used insecticides for their own ends. When the cotton company introduced the new technology in the early 1960s, the repercussions remained to be seen.

A 'MODERNIZING' TOOL

For centuries West Africans cultivated indigenous varieties of cotton for both subsistence needs and regional trade as cotton cloth was a form of currency. Some losses to pests were expected but were not usually devastating because of the practice of interspersing crops. Since at least the early 1800s and through the 1950s, women had interspersed cotton with food crops such as millet, sorghum, okra, and peppers.¹⁷ They either scattered the various

¹⁵ 'Rapport Général sur les Perspectives de développement du Sénégal,' (Dakar: GEHA, par J. et Ch. Bompard S.A., Jul. 1960), 15, 17 ; Mamadou Diouf, *Histoire du Sénégal: le modèle islamo-wolof et ses périphéries* (Paris: Maisonneuve & Larose, 2001), 8.

¹⁶ Interviews, farmers Demba Sow and Mamadou Boye Sow, interpreted by Demba Sow and Souleymane Diallo, Bidiancoto, 13 Mar. 2009; technicians Souleymane Diallo, Tambacounda, 16 Apr. 2009; Mohamadou Habibou Ba, Kolda, 30 May 2009; Written communications, Hady Diallo, Vélingara, 14 Jul. 2009; Pierre Henri Texier, 'La crise actuelle : Quel avenir pour le coton des pays africains de la zone franc?' (Paris : 2008).

¹⁷ Richard Roberts, *Two Worlds of Cotton: Colonialism and the Regional Economy in the French Soudan* (Stanford, CA: Stanford University Press, 1996), 55.

seeds in a circle or sowed them together in mounds. In 1943, the French district officer of Tambacounda in eastern Senegal reported that women grew cotton, indigo, tobacco, and vegetables on small, and often manured, plots inside their villages.¹⁸ In southern Senegal, retired cotton farmer Meta Egge Baldé remembered that when she was young, around 1960, her family used manure from their livestock in the garden adjacent to their home where they sowed their own seeds of maize and indigenous cotton. The two plants were grown together and without chemical products.¹⁹ Pre-existing pest control methods included interspersing crops, using the labor of women and children to tend the plants, and sometimes using smoke to drive away larger insects.²⁰

Even though such means had served West African markets, French industrialists considered them 'primitive' and incapable of producing the quantity and quality of cotton fiber for the cost they wanted to pay.²¹ After WWII, French commercial firms were exasperated by having to import cotton fiber from competitors at rising prices. They renewed their lobbying efforts to develop cotton production in French West and Equatorial

¹⁸ Archives Nationales du Sénégal (ANS), 2G 43-71, Senegal, Tambacounda, annual political report, 1943; Winifred Galloway, 'A History of Wuli from the Thirteenth to the Nineteenth Century,' (Ph.D. diss., Indiana University, 1975), 10; Andrew F. Clark, *From Frontier to Backwater: Economy and Society in the Upper Senegal Valley (West Africa), 1850-1920* (New York: University Press of America, Inc. 1999), 60.

¹⁹ Interviews, Meta Egge Baldé, interpreted by nephew Thiedo Baldé, Bounang Magal, Kolda, 1 Jun. 2009; Ibrahima Samora, interpreted by his son-in-law Sellou Seydi, Saré Bourang, Vélingara, 14 May 2009.

²⁰ Interview, Sambel Baldé, Agricultural Service extension agent, Vélingara, 8 May 2009.

²¹ Monica van Beusekom, *Negotiating Development: African Farmers and Colonial Experts at the Office du Niger, 1920-1960* (Portsmouth, NH: Heinemann, 2002), xxii-xxvi; Richard Roberts, *Two Worlds of Cotton: Colonialism and the Regional Economy in the French Soudan* (Stanford, CA: Stanford University Press, 1996).

Africa to ensure their own lower-cost supply. In 1949 private textile interests and the French government created *La Compagnie des Textiles de l'Union Française* (CTUF) which immediately started to work in *Oubangi-Chari* (Central African Republic) and Chad. In 1950 it changed its name to *La Compagnie française pour le développement des fibres textiles* (CFDT). Financed by taxes on textile firms and by the *Fonds d'Investissement pour le Développement Economique et Social* (FIDES) from the Ministry of Overseas France, CFDT began work in *Soudan français* (Mali) in 1951 and in Côte d'Ivoire in 1952.²² After independence in 1960, Senegal's socialist prime minister, Mamadou Dia, invited CFDT to develop cotton production in his country in order to diversify the nation's revenue away from peanut exports, to support Senegal's textile mills, and to challenge Senegalese elites who dominated peanut production.²³

²² The company used the acronym CFDT in its own publications. Individuals familiar with the African cotton industry frequently use the acronym in conversation today. It should not be confused with the *Confédération française du travail*. CFDT, 'Cinquante ans d'action cotonnière au service du développement,' *Coton et Développement* (Paris: Sept. 1999), 32-33, 109, 114 ; Van Beusekom, *Negotiating Development*, 56; Bassett, *The Peasant Cotton Revolution*, 90-92.

²³ Interview, El Hadj Samba Racky Seye, first Senegalese CFDT encadreur, Tambacounda, 15 Apr. 2009; Mamadou Dia, *Mémoires d'un militant du Tiers Monde: Si mémoire ne ment* (Paris: Publi-sud, 1985), 121, quoted by Mamadou Diouf, 'Senegalese Development: From Mass Mobilization to Technocratic Elitism' in F. Cooper and R. Packard (eds.) *International Development and the Social Sciences: Essays on the History and Politics of Knowledge* (Berkeley: University of California Press, 1997), 301-2, 316fn17-18.

Considering that colonial cotton cultivation was usually done with ‘disciplined’ or forced labor,²⁴ French rhetoric about agricultural production evolved over the twentieth century. Some ideas changed, but some old prejudices lingered. In the 1890s, racist analyses led French agronomists to deem existing cultivation methods in the tropics ‘wasteful.’ They asserted that ‘the native is incapable of properly using his environment’ and ‘the native is an ecological catastrophe.’²⁵ Although misconceptions about extensive cultivation were corrected by later European researchers, the tendency to blame environmental challenges on Africans remained.²⁶ So too did the belief that European intensive farming techniques would ‘make better use of natural resources.’²⁷ Since at least 1902, French officials circulated that their ‘colonial development efforts would uplift Africans while benefitting France.’²⁸ Historian Christophe Bonneuil chronicled that what French imperialists initially called a ‘regime of productive discipline’ and an ‘agronomy of

²⁴ Andrew Zimmerman, *Alabama in Africa: Booker T. Washington, the German Empire, and the Globalization of the New South* (Princeton, NJ: Princeton University Press, 2010); Allen Isaacman and Richard Roberts, eds. *Cotton, Colonialism, and Social History in Sub-Saharan Africa* (Heinemann, 1995).

²⁵ Christophe Bonneuil, ‘Mettre en ordre et discipliner les tropiques : les sciences du végétal dans l’Empire français, 1870-1940’ (Université de Paris 7 doctorat, Histoire des sciences, 1997), 225, 243-254.

²⁶ Paul Pélissier, *Les paysans du Sénégal : Les civilisations agraires du Cayor à la Casamance*, electronic version (Dakar: UCAD, Dept. of History, [1966] 2008), 19-20, accessed 14 Jul. 2012, http://www.histoire-ucad.org/archives/index.php?option=com_remository&Itemid=60&func=select&id=22; James McCann, *Green Land, Brown Land, Black Land: An Environmental History of Africa, 1800-1990* (Heinemann, 1999).

²⁷ van Beusekom, *Negotiating Development*, xxiv, 34, 41.

²⁸ Alice Conklin, *A Mission to Civilize: The Republican Idea of Empire in France and West Africa, 1895-1930* (Stanford: Stanford University Press, 1997), 38-39.

surveillance' not only involved coercing farmers to sow seeds in straight rows and to use plows but also whipping and even killing laborers.²⁹ And by the interwar period 'an agronomic technostructure of *encadrement*' had originated.³⁰

The term *encadrement* [framing/ supervision/ training] litters francophone literature on twentieth-century agricultural development. I consider the term to be a 'mid-level analytical concept' of 'modernization' following Lynn Thomas's suggestion.³¹ Monica van Beusekom argued that *encadrement* was a paradigm produced through struggles between the colonizers and the colonized. Whereas some individuals described the practice as 'authoritarian,' others considered it 'collaborative,' though not between equals.³²

CFDT called its management style 'encadrement.' In 1963 the company started in southeastern Senegal by asking the political authorities in chosen towns and villages to create 'demonstration' fields using animal-drawn equipment to mono-cultivate cotton in rows and to apply chemical fertilizer, herbicide, and pesticide. The leaders required other men and women to work on the fields following CFDT's instructions. Although officially laborers were paid, they were coerced in the early years.³³

²⁹ Bonneuil, 'Mettre en ordre et discipliner les tropiques,' 281-306, 311-312, 366-372.

³⁰ Christophe Bonneuil, *Des savants pour l'empire : la structuration des recherches scientifiques coloniales au temps de 'la mise en valeur des colonies françaises' 1917-1945* (Paris: ORSTOM, 1991), 95.

³¹ Lynn M. Thomas, 'Modernity's Failings, Political Claims, and Intermediate Concepts,' *The American Historical Review* 116, no. 3 (Jun. 2011): 737-738.

³² Mamadou Diouf, *Histoire du Sénégal*, 15; Cooper, *Africa Since 1940*, 169; Van Beusekom, *Negotiating Development*.

³³ CFDT, 'Rapport sur la culture cotonnière au Sénégal, campagne 1963-1964,' (Paris: CFDT, 1964); Bassett, *The Peasant Cotton Revolution*, 108.

The company stressed the importance of its technical expertise and training, but on the ground there was limited training and supervision.³⁴ French men, like Claude Blain, many of whom who had first served in the French military and who had then learned how to grow cotton in Mali, taught Senegalese *encadreurs* [extension agents] how to cultivate intensively (measuring fields into rectangles, applying chemicals following a schedule, etc.) who were to teach these methods to Senegalese farmers.³⁵ Yet the ‘farmers’ the *encadreurs* trained were male household heads who did not do the work themselves. They had their sons, other male dependents, and migrant laborers do most of the work, especially spraying insecticide. Women, who were not trained by *encadreurs*, sometimes did sowing, weeding, and harvesting.³⁶ Interviews with retired French trainers and Senegalese *encadreurs* and farmers revealed the gap between policy and practice.

CFDT claimed that its cotton production was ‘modern’ due to its ‘encadrement,’ training in intensive cultivation methods,³⁷ but its propaganda hid the real modern component of its project, the use of insecticides. Intensive mono-cultivation increases the risk of losses from insects compared to interspersing. Moreover, chemical fertilizers, herbicides, and fungicides had already been introduced to Senegal decades before for

³⁴ CFDT, ‘Rapport sur la culture cotonnière au Sénégal campagne 1963-1964.’

³⁵ Interview, retired trainer, Claude Blain, Saint Médard en Jalles, France, 26 Jun. 2010.

³⁶ Interviews, Mamadou Malal Sidibé, employee since 1980 of the *Société de Développement et des Fibres Textiles* (SODEFITEX), Senegal’s parastatal that replaced CFDT in 1974, Tambacounda, 4 May 2009; Souleymane Badiane, retired veterinarian, Kolda, 30 May 2009.

³⁷ ANS, Chambre de Commerce de Dakar, Serie CCM, 742, ‘Rapport d’activité de CFDT de 1968,’ p. 30; ‘Bilan de la campagne cotonnière 1967-68 dans la zone d’action de la CFDT,’ *Bulletin de l’Afrique noire*, no. 517 (Jun. 24, 1968) : 10420; CFDT, ‘Cinquante ans d’action cotonnière au service du développement,’ 112.

peanut production. And since cotton cultivation in the southeast has been rain-fed and done manually or with animal-drawn equipment up to the present, not with irrigation and only recently and rarely with tractors, applying insecticide was a revolutionary departure from existing agricultural practices in the 1960s according to retired cotton farmers and encadreurs. Spraying pesticide from a tank carried on one's back was a strikingly new, onerous, and dangerous step in agricultural production.³⁸

Such work could not be coerced over the long term. CFDT knew that to get farmers to grow cotton, they would have to pay them sufficiently.³⁹ Furthermore, even though the southeast had exported peanuts since the 1830s, in the 1960s the area suffered from shortages of peanut seed and other inputs and equipment compared to the country's central 'peanut basin.'⁴⁰ CFDT was thus able to make cotton cultivation more remunerative than peanut production in the southeast. French agents earned their reputation among Senegalese male farmers as 'the white men with cash' by paying when the harvest was weighed, compared to the peanut markets where farmers received receipts and payment

³⁸ Interviews, El Hadja Kadiatou Diao, grandmother, former cotton farmer, interpreted by Aminata Kaba, Kandia, 21 May 2009; Bakary Oualy, former CFDT encadreur, chef de village Sinthiou Malème, Sous-prefecture de Koussanar, 19 Mar. 2009.

³⁹ Interview, Pierre Texier, Ancien directeur technique de la CFDT, Paris, 12 Jul. 2010.

⁴⁰ Interview, Oumar Kandé, former farmer, Vélingara, 26 May 2016; Boubacar Barry, *Senegambia and the Atlantic Slave Trade*, Ayi Kwei Armay, trans. (Cambridge University Press, [1988] 1998), 130, 142-4; Philip Curtin, *Economic Change in Precolonial Africa: Senegambia in the Era of the Slave Trade* (University of Wisconsin Press, 1975), 230.

later.⁴¹ In the late 1960s, the purchase price for seed cotton ranged from 15 to 30 francs per kilogram. Men and women willingly began to produce cotton for CFDT. With the cash they earned, men bought bicycles, got married, constructed houses, and sent their sons to cities to pursue other opportunities.⁴² Women purchased extra food, clothes, wedding gifts, and livestock which enlarged their social networks and elevated their social ranking.⁴³

Thanks in part to the injection of cash, there was an ‘unexpectedly rapid expansion’ and ‘remarkable development’ of cotton production in southeastern Senegal in the 1960s.⁴⁴

⁴¹ Interview, farmers Demba Sow and Mamadou Boye Sow, interpreted by Demba Sow and Souleymane Diallo, Bidiancoto, 13 Mar. 2009.

⁴² Interview, farmer Mamadou Goyel Baldé, Bati, Vélingara, 19 May 2009; Abdoulaye Mballo (journalist, broadcaster, Radio Bantaare FM) Vélingara, 11 Dec. 2008; Mamadou Soumboundou, retired encadreur, Vélingara, 19 May 2009; Oumar Kandé; Moussa Soumah, ‘Les Migrations Régionales dans le Sud-Est du Sénégal (Intérieures et Internationales),’ in *Les migrants et l’économie monétaire en Ségambie: rapport final de l’étude sur les migrations en Senegambie*, edited by Lucie Gallistel Colvin of the University of Maryland Baltimore County, for USAID, (Washington, DC: United States Agency for International Development (USAID), 1980), 194.

⁴³ Interviews with female farmers Meta Egge Baldé; El Hadja Kadiatou Diao; grandmother Ndiené Ndiao, interpreted by Moussa Sembène, Saré Coly Sallé, Vélingara, 19 May 2009; Binta Kane, interpreted by Fodé Kane, Maka, 23 Mar. 2009; and retired encadreur El Hadj Samba Racky Seye; Barbara Cooper, *Marriage in Maradi: Gender and Culture in a Hausa Society in Niger, 1900-1989* (Pearson Education, 1997).

⁴⁴ ANS, Documentation Center, Henry-Charles Gallenca, Président de la Chambre de Commerce, d’Agriculture et d’Industrie de Dakar, Allocution, L’Ouverture du Congrès Régional de l’Union de Groupements Économiques du Sénégal à Tambacounda, ‘Le développement économique du Sénégal-Oriental,’ 4 Nov. 1967; ‘Bilan de la campagne cotonnière 1969-1970 dans la zone d’action traditionnelle de CFDT,’ *Bulletin de l’Afrique noire*, no. 609 (22 Jul. 1970) : 12291-5.

From 1964 to 1975 Senegal was promoted as having one of the ‘most modernized’ cotton industries in sub-Saharan Africa and produced the highest yields in francophone West Africa.⁴⁵ In the 1970s, the cotton project successfully reduced the government’s dependency on peanuts as the main earner of foreign exchange.⁴⁶ This achievement was due to the French investment that facilitated CFDT paying high prices to farmers and providing seeds and chemical inputs seemingly for free, and to the availability of land, labor, and good rains.⁴⁷

PRECAUTIONS

To protect workers’ health and prevent wastage, CFDT issued instructions and precautions as had become standard practice in France and in other industrialized countries in the 1950s. Yet the directions were impractical and difficult to follow in the rural region that lacked sanitary infrastructure. The existence of official precautions set up any accidents to be the fault of workers, not the company’s encadrement or the chemicals’ inherent dangers. Such unrealistic expectations are common in technical and dangerous industries. Instead of

⁴⁵ ANS, ‘Bilan de la campagne cotonnière 1967-68 dans la zone d’action de la CFDT,’ *Bulletin de l’Afrique noire*, no. 517 (24 Jun. 1968) : 10420; ‘Le coton: moteur du développement rural,’ *Africa*, no. 39, 15th year, (Mar. 1977) : 59; Compagnie Française pour le Développement des Fibres Textiles (CFDT), ‘Vingt ans d’action cotonnière 1949-1969,’ (Paris: 1969), 25; CFDT, ‘Cinquante ans d’action cotonnière au service du développement,’ *Coton et Développement* (Paris: Sept. 1999), 112.

⁴⁶ Catherine Boone, *Merchant Capital and the Roots of State Power in Senegal, 1930-1985* (Cambridge University Press, 1992), 112.

⁴⁷ Interview, Pierre Texier.

working to decrease the use of dangerous products, regulations leave workers vulnerable to blame for user-error.⁴⁸

Encadreurs and male and female farmers recalled that CFDT warned them that the chemicals were lethal. Encadreur Mohamadou Habibou Ba learned at the agricultural center in Kerewane in southern Senegal that the '*produit* [product/pesticide] was toxic, dangerous. It kills; it was fatal.'⁴⁹ Encadreur Charles Diatta remembered that in the early 1970s the French CFDT trainer, Claude Blain, warned encadreurs that the pesticides could 'reduce the number of years a person might expect to live' and that 'he wanted us to tell this to the peasants so that they would take care.'⁵⁰ The message was passed on. Grandmother El Hadja Kadiatou Diao recalled that Diatta 'warned people about the products.'⁵¹

Yet encadreurs and farmers were given limited advice and insufficient equipment to manage such danger. At the Kerewane center, Ba received no gloves or uniform, but was one of the rare trainees to receive a face mask. The French trainers did not usually wear masks, goggles, gloves, or long pants when they handled the chemicals, despite the regulation that they do so. Given no protective equipment, encadreurs like Ba complained that 'the only advice they gave us was not to smoke and to wash our hands and clothes with

⁴⁸ Charles Perrow, *Normal Accidents: Living with High-Risk Technologies* (Princeton, NJ: Princeton University Press, 1984).

⁴⁹ Interview, Mohamadou Habibou Ba, former CFDT and SODEFITEX encadreur, Kolda, 30 May 2009.

⁵⁰ Interview, Charles Diatta, former CFDT encadreur, Vélingara, 25 May 2009.

⁵¹ Interviews, El Hadja Kadiatou Diao; Mamadou Malal Sidibé.

soap.⁵² Encadreur Diatta passed this message along to farmers. 'We told people to wash themselves and their clothes with soap.'⁵³ Yet what one was to do with the contaminated wash water afterwards was not discussed.

AGRARIAN REALITIES

The realities of agrarian life in southeastern Senegal made it difficult to prevent all accidents even while following the recommended precautions. Despite CFDT's instructions that the men who sprayed the pesticides wash their own clothes before returning home, the men tended to give the laundry to women in their households. One day in the 1970s in Koumpentoum, a woman washed her husband's clothes after he had treated his cotton field and she then rinsed a spoon in the same soapy water before serving him lunch. When he ate with the spoon, he was poisoned and died.⁵⁴ The recommended precautions were not as thorough as they needed to be.

⁵² Interviews, Mohamadou Habibou Ba; Mamadou Malal Sidibé; Sekou Kaba, former SODEFITEX employee, président régional de la Croix Rouge de Tambacounda, Tambacounda, 19 Apr. 2009; Abdou Ndiaye, former CFDT encadreur, Kolda, 29 May 2009; Pierre Texier; Claude Blain; Sambel Baldé; M.R. Souverain-Inspecteur Divisionnaire du Service de la Repression des Frauds, 'Regional and International Problems: Current Aspects of the French Regulation of Phytosanitary Products,' L'Institut Français d'Outre-Mer (IFOM), *Congrès de la Protection des Végétaux et de leurs Produits sous les Climats Chaud* (Marseille: Institut Français d'Outre-mer, 1954).

⁵³ Interview, Charles Diatta.

⁵⁴ Interview, Bakary Oualy.

One brand-name insecticide, *péprothion*, which was 25% DDT, 12.5% endosulfan, and 6.25% méthyl-parathion, became infamous in southeastern Senegal.⁵⁵ Many interviewees, even a man who had been a child in the 1970s and had since lived in France for twenty years, still remembered and used the name 'Péprothion' (independently of any prompting by myself) when discussing the most common but the most toxic pesticide.⁵⁶ It was used in southeastern Senegal from 1963, along with hexachlorocyclohexane (HCH) and endrin, to at least through 1982⁵⁷ and it caused '*beaucoup de dégâts*' [a lot of damages] and at least a few deaths.⁵⁸ Retired encadreurs openly answered questions about the product's dangers because they asserted that their status was due not only to their hard work, but also to the precautions they had taken as younger men.⁵⁹

⁵⁵ Labouche, Denis, and Calvet, 'Rapport d'enquête effectuée dans le département de Kolda à propos [sic] de plusieurs cas de morts brutales survenues sur le bétail,' (May 1975) in response to letter no. 634 of Apr. 8, 1975 from Senegal's director of livestock [directeur de l'élevage du Sénégal], obtained at the Centre de coopération internationale en recherche agronomique pour le développement (CIRAD), Nogent-sur-Marne, Paris, France; CFDT, 'Rapport sur la culture cotonnière au Sénégal campagne 1963-1964.'

⁵⁶ 'Péprothion smelled sweet.' Former resident of Vélingara, Moussa Kaba, Paris, France, 14 Jul. 2010.

⁵⁷ CFDT, 'Rapport sur la culture cotonnière au Sénégal, campagne 1963-1964'; SODEFITEX, 'Rapport d'activités (coton, céréales, arachide), Campagne 1982/83,' Ministère du Développement Rural, République du Sénégal (SODEFITEX, 1983).

⁵⁸ 'Péprothion killed people and animals from 1969 to 1985.' Interview, Anonymous, Tambacounda, 25 Nov. 2008.

⁵⁹ 'The Péprothion was so toxic that we only needed to spray the cotton one or two times, not five or eight times like today.' Abdou Ndiaye; 'Péprothion was the most effective pesticide against all kinds of parasitic attacks. It even killed mosquitos who were flying past' while the plants were being sprayed. Bakary Oualy; 'Peprothion was the best product, but it killed.' El Hadj Samba Racky Seye.

Spraying pesticides was perilous work. Several interviewees who had sprayed pesticides in the 1960s and 1970s reported experiencing some form of intoxication at least once, from being light-headed and dizzy to suffering more extreme vertigo, nausea, or passing out. El Hadji Thierno Beydu Baldé, the son of the canton chief at Kerewane, explained that when he was a young man, ‘after I treated the cotton plants, my eyes would hurt, I’d have a headache, and my head would spin.’⁶⁰ Mrs. Meta Egge Baldé recalled that the ‘*navétanes* [seasonal migrant laborers] who sprayed the cotton plants sometimes fell sick.’⁶¹ Such intoxication happened when the wind changed direction.⁶² Victims of pesticide poisoning felt ill for an hour or for weeks.⁶³ These individuals discussed their symptoms in part to complain that the current cotton company, *La Société de Développement et des Fibres Textiles* (SODEFITEX), Senegal’s parastatal that replaced CFDT in 1974, did not appreciate the risks they had taken and had since failed to reward them for their continued hard work. One farmer lamented, “*Mi tampi!*” [“I’m tired!”].⁶⁴

Insecticide exposure was occasionally fatal. Encadreur Abdou Ndiaye in Kolda recounted a story of another encadreur who had had his own cotton field sometime in the

⁶⁰ Interview, El Hadj Thierno Beydu Baldé, Kerewane, Vélingara, 21 May 2009.

⁶¹ Interview, Meta Egge Baldé.

⁶² Interview, Ndiéné Ndiao.

⁶³ Kaly Cisse, after treating his field once with a ‘twenty-liter canister, became ill and was bed-ridden for twenty days.’ Interview, Kaly Cissé, interpreted by Souleymane Diallo, N’Doungoussine, 24 Mar. 2009.

⁶⁴ Interview, Hamadou Abderrahmane, president, and other representatives and members of the local *Groupement des Producteurs de Coton* (GPC), interpreted by Moussa Sembène, transcribed by Keba Mané, Médina Gounass, 18 May 2009; Scholars argue that the impoverishment of small-holding cotton farmers derives from their position in the global economy. Moseley and Gray, *Hanging by a Thread*.

1970s. After treating it himself one day, he went home but had difficulty breathing and did not know why. He went to see a doctor in town who smelled the pesticides on him, told him he had been poisoned, but could not prevent him from dying that evening.⁶⁵ Others were unfortunate as well. In two separate incidents in the late 1960s and early 1970s in Médina Gounass, two young men died, one when he tripped and fell over a furrow in the cotton field, spilling the diluted pesticide in the cannister on his back onto his body. He died within a day, the other within a week from an unknown means of exposure.⁶⁶ Such terrible accidents reveal the inadequacy of CFDT's encadrement. The pesticides were too toxic to be safely handled by people without safety equipment or access to antidotes or other medical care.

The insecticides were also too toxic to be sprayed in an area where livestock roamed. Sometimes livestock ate treated plants and died.⁶⁷ In 1975 in Medina Yorofoulah, a town north of Kolda in Upper Casamance where cotton production was booming, a herd of cattle was accidentally let loose before the end of the rainy season and the whole herd died from eating cotton plants recently sprayed with Péprothion. This incident prompted the national Livestock Service to request a laboratory to investigate. The lab's report complained that the cotton company was still using Péprothion when France had banned one of its main ingredients, DDT, three years before.⁶⁸

⁶⁵ Interview, Abdou Ndiaye.

⁶⁶ Interview, GPC representatives.

⁶⁷ Interviews, El Hadj Samba Racky Seye; Souleymane Badiane; Meta Egge Baldé; Ndiéné Ndiario; Madou Kane, Chef du Village, Maka, 23 Mar. 2009.

⁶⁸ Labouche, Denis, and Calvet, 'Rapport d'enquête [...] morts brutales survenues sur le bétail,' (May 1975).

Yet in the 1960s and 1970s, CFDT and SODEFITEX claimed that such accidents could be prevented by closely monitoring the pesticides. Encadreurs kept the chemicals in locked storage sheds in their host villages. The company required farmers to make appointments with encadreurs to receive the chemicals. In turn, the encadreurs were required to record the exact hour when they handed pesticides and sprayers to farmers and when farmers returned the equipment and any unused pesticide.⁶⁹ The policy of keeping the pesticides under lock and key was designed to control the use of pesticides, to manage the company's expenses, and to enforce some safety precautions. The company gave farmers only prescribed quantities of the chemicals and kept track of how much, the company believed, they used. The policy kept farmers dependent on the company for the chemicals while it theoretically impeded overuse and misuse of pesticides. According to one encadreur, 'at the end of the season, the sector manager would come in his truck with a can of gasoline and we would drive out to a remote area and burn the remaining containers of pesticides.'⁷⁰ Burning the canisters were memorable events because 'the smoke and smell would travel for five kilometers.'⁷¹ Such a powerful substance was tempting to some.

ALTERNATIVE USES

Farmers and encadreurs quickly realized the power of Péprothion to kill anything from a tiny insect to a large predatory animal.⁷² Encadreur Ba, perhaps channeling Rachel Carson's *Silent Spring*, recalled that a bird could die from eating a worm in the cotton field, even a

⁶⁹ Interview, Sekou Kaba.

⁷⁰ Interview, El Hadji Samba Racky Seye.

⁷¹ Interview, Mamadou Malal Sidibé.

⁷² Interview, Bakary Oualy; Mamadou Malal Sidibé.

week after treatment. Observing such deaths, farmers sought to take advantage of the poison to protect their assets. Despite CFDT and SODEFITEX's policy through the 1970s of keeping the pesticides under lock and key and distributing only the amount required for a single day's treatment, some farmers, according to encadreurs, clandestinely kept a little of the product for their own needs. Ba complained that even though he and other encadreurs told farmers to be careful with the pesticides, 'some farmers were hard-headed.'⁷³ Sidi Diallo, an *animateur rural* [state rural education agent] in 1961, remarked that 'people would leave out the product [pesticide] to kill birds which ate their crops.'⁷⁴ Meta Egge Baldé noticed that snakes died in the cotton fields, a beneficial side effect since venomous snakes had occasionally killed her chickens and goats.⁷⁵ Previously villagers had used local odorous plants to repel reptiles.⁷⁶ Now household heads poured pesticides in a circle around their compounds to keep out venomous snakes and rodents that ate their stored grains.⁷⁷ In rural southeastern Senegal in the 1960s and 1970s, peasants grew most of their own food and did not have access to biomedical facilities that could treat snakebites. Hence, farmers were motivated to handle toxic chemicals to protect their food supplies and to prevent snakebites. They were not simply 'hard-headed peasants,' as the frustrated encadreurs criticized. They were people who worked to take care of themselves. Today the

⁷³ Interview, Mohamadou Habibou Ba; Rachel Carson, *Silent Spring* (Boston: Mariner, 2002 [1962]), 93.

⁷⁴ Interview, Sidi Diallo, Tambacounda, 14 Apr. 2009.

⁷⁵ Interview, Meta Egge Baldé.

⁷⁶ Interviews, Habibou Diambang, President de la association de guerrisseur traditionnel, Nianao, Wassadou, 31 May 2016.

⁷⁷ Interview, Mohamadou Habibou Ba.

southeast remains a region with a high prevalence of snakebites and lacks ambulances and biomedical facilities.

Peasants and encadreurs observed that Péprothion killed large animals. According to this favorite tale among encadreurs, 'Péprothion was so toxic that one time a hyena happened to pass through a field right after it had been treated and the hyena died instantly.'⁷⁸ In the 1960s, southeastern Senegal had more large wild animals than did other regions in the country. Warthogs and monkeys ate peasants' crops and hyenas and lions attacked their livestock. Peasants, according to a retired state veterinarian, therefore mixed pesticide with bait to kill these predators.⁷⁹ As encadreur Ba explained,

people used Péprothion to kill hyenas that killed their cows. After the hyenas killed a cow, you could chase them off, but they wouldn't go far away, so then you poured some Péprothion on the carcass, and when they came back to take a piece off the carcass with them, they'd be poisoned and die.⁸⁰

Most villagers in southeastern Senegal owned livestock and were keen to use new methods to protect their animals. In the 1950s the colonial veterinarian had distributed poison to kill hyenas.⁸¹ Since the 1930s, farmers in central Senegal had used milder agricultural chemicals from peanut production—NPK fertilizer, urea, and fungicide (which are much

⁷⁸ Interview, El Hadj Samba Racky Seye; Mamadou Malal Sidibé. If this did indeed happen, one wonders how the young man survived spraying the field. If it did not happen, the story suggests at least that the pesticide was very powerful.

⁷⁹ Interview, Souleymane Badiane.

⁸⁰ Interviewees did not mention whether hyenas and other animals would have smelled the pesticides and thus may have been dissuaded from the area. Interview, Mohamadou Habibou Ba.

⁸¹ ANS, 11 D1/0255, *Affaires politiques et administratives* (APA), Vélingara, *Affaires économiques*, 1940-60.

less toxic than insecticides)—to poison bait around their cereal fields.⁸² In southeastern Senegal, according to the veterinarian, urea was put in bait around rice paddies.⁸³ Cotton company and state agents reported that farmers misused agricultural chemicals. Farmers themselves did not claim to apply the products in these ways. They only recalled that there were pests larger than insects that plagued their lives. Given the history of poisoning hyenas, it is plausible that peasants would take advantage of an even more potent poison to protect their assets. Though the insecticides were lethal, people chose to use these powerful new tools to improve their lives. Their silent agency, however, opened them up to critiques of misusing that power.

SUSPICIONS OF INTENTIONAL POISONING

For both Senegalese and French agents, handling pesticide for unapproved usages was akin to using poison intentionally. Across the African continent, as in Europe in some respect, poison and medicine were conceived of as the same. A powerful substance could be used to harm or to heal, as the founder of toxicology remarked.⁸⁴ Encadreurs, when training farmers, were expected to translate the cotton company's instructions from French into the local vernacular. In southeastern Senegal, most cotton farmers spoke Pulaar in which the

⁸² Cheikh Kaling, 'Les politiques de modernisation d'agriculture au Siin-Saalum, 1940-1960' (mémoire de maîtrise, dépt. d'histoire, Université Cheikh Anta Diop de Dajar, 2006).

⁸³ Interview, Souleymane Badiane.

⁸⁴ 'The right dose differentiates a poison and a remedy,' as Davis attributed to Paracelsus, the sixteenth-century Swiss founder of toxicology. *Banned*, xiii.

word for 'poison,' *tooke*, meant both 'snake venom' and the 'antidote.'⁸⁵ West Africans also had a well-known tradition of making poison arrows and their antidotes for hunting and warfare.⁸⁶

Yet the tradition for which they were most infamous was sorcery. When people got sick and herbal remedies failed to cure them, the illness was then attributed to spiritual or social forces. Ancestors, relatives, or neighbors could be expressing their dissatisfaction with the afflicted person. A sorcerer could have been hired to curse the patient or could be asked to cure him or her. Though most witchcraft was performed through supernatural means, it was also implemented through physical medicines or poisons. Sorcery was the application of special powers to help or to harm.⁸⁷ Insecticide may have been incorporated into this paradigm.

Malevolent witchcraft was associated with envy. Some owners of livestock who were comparatively wealthy and powerful claimed that someone, probably a neighbor, was

⁸⁵ 'Tooke = venom, poison.' Mamadou Niang, *Pulaar-English/English-Pulaar Standard Dictionary* (New York: Hippocrene Books, 1997), 83, 99, 222, 266; Personal Communication, Samba Camara, interpreter, May 2011; SODEFITEX employees sometimes referred to the 'active ingredients' in pesticides as 'tooke.' See recording of a radio broadcast of a 'toxico-vigilance' [poison awareness] seminar in Koussanar on 21 Sept. 2007, Radio Bantaare FM.

⁸⁶ Abena Dove Osseo-Asare, *Bitter Roots: The Search for Healing Plants in Africa* (University of Chicago Press, 2014).

⁸⁷ James Sweet, *Domingos Alvares, African Healing, and the Intellectual History of the Atlantic World* (The University of North Carolina Press, 2011); David Owusu-Ansah, 'Prayer, Amulets, and Healing,' in Nehemia Levtzion and Randall L. Pouwels (eds.) *The History of Islam in Africa*, pp. 477-484 (Ohio University Press, 2000).

'jealous' and 'malicious,' coded terms for witches, and therefore poisoned their livestock.⁸⁸ The animals' owners thereby made charges akin to witchcraft accusations. What the men did not admit, however, was whether their animals were responsible for destroying other peoples' crops. Farmers had to protect their crops and their families' subsistence from wandering livestock and therefore used agricultural products in a kind of chemical warfare with elites. In the colonial period, chiefs were well-known for using fungicide to publicly humiliate people who did not pay their taxes or debts. The same may have been done with insecticide as well.⁸⁹

Women were also likely to be accused of using poison, which may be one reason they were not trained to handle pesticide. An encadreur from southern Senegal asserted that in central Senegal 'Serer women especially use urea to poison their husbands because it has no odor, unlike pesticides which smell so you can tell if the food is contaminated.'⁹⁰ The idea that women might poison men was held not only by the Senegalese, but also by the French. In 1953 an inheritance dispute between a young man and his older aunt turned ugly in Linkering (a southern town which became the largest producer of cotton in Senegal in the 1980s). When the young man won the court case, his aunt, a 'reputed witch,'

⁸⁸ Interviews, Souleymane Badiane; Mohamadou Habibou Ba; Bakary Oualy; Thiedo Baldé, radio manager, Kolda, Jun. 1, 2009.

⁸⁹ Interviews, Sara Oualy, former deputy to the National Assembly, Tambacounda, Mar. 10, 2009; Kaling, 'Les politiques de modernisation d'agriculture au Siin-Saalum, 1940-1960'; 'Farmers in Senegal who did not repay their loans were at one time flogged and sprayed with fertiliser and insecticide.' Jean-François Bayart, *The State in Africa: The Politics of the Belly*, trans. Chris Harrison (New York: Longman Publishing Group, 1993), 62. (Thanks to . . . for showing me this quotation.)

⁹⁰ Interview, El Hadji Amadou Ndila Sow, former CFDT encadreur, Vélingara, May 16, 2009.

threatened him. A few days later he died, prompting the French district officer and doctor to send the man's guts and stomach fluid to a lab for analysis. The canton chief later held a trial in which the aunt was accused of witchcraft.⁹¹ Inheritance disputes were common and could conceivably, though rarely, be dealt with by surreptitious means. Encadreur Diatta had 'heard rumors that people would keep some of the product [pesticide] to poison others' but could not confirm such stories.⁹²

CONCERNS ABOUT INSECTICIDE'S REPERCUSSIONS

Though it was imaginable that one could be poisoned by one's relatives or neighbors, in the 2000s several deaths and illnesses reminded people of the authorities' neglect and seeming malice towards their region. They blamed the cotton company, to which many were indebted, not each other. According to many interviewees in 2008, the villages that grew a lot of cotton over the preceding decades have 'no elders' today because people died before their time, presumably from long-term pesticide exposure.⁹³ The hearsay motivated one young man who grew up in the area to research agricultural chemical pollution for his master's thesis.⁹⁴ A town medical assistant explained that 'all the big producers of cotton

⁹¹ ANS, 11 D1 248, Vélingara, Casamance, Letter to Justice of the Peace [Juge de la paix] of AOF/ACE in Kolda from A. Ducray, Jun. 28, 1953; Letter to the Vélingara police chief [Chef de poste de gendarmerie de Vélingara] from Jean Desanti, head of subdivision of Vélingara, 24 Dec. 1953.

⁹² Interview, Charles Diatta.

⁹³ Interviews, Ndiené Ndiao; Evelina Nava, Peace Corps volunteer, Kolda, Dec. 14 2008; Sambel Baldé; Abdou Ndiaye; Ousmane Diao, Dakar, Jun. 2009.

⁹⁴ Ousmane Diao, 'Gestion des produits chimiques agricoles dangereux dans les milieux irrigués: le cas du bassin de l'Anambé,' (mémoire de diplôme d'études approfondies (DEA), département de géographie, Université Cheikh Anta Diop de Dakar, 2008).

are dead now. The pesticides killed them.⁹⁵ Encadreurs complained that their colleagues had been blinded, developed lung problems, or died too young from repeated pesticide exposure.⁹⁶ Retired agricultural service agent Sidi Diallo asserted, 'since industrial cotton cultivation began, all the small animals in the area have disappeared, particularly birds and rabbits.'⁹⁷ When asked if cotton cultivation had been good for people, great-grandmother Jeynabou Mballo responded, 'no, it killed.' She condemned the French CFDT trainers. 'Blain and Bordeaux,' she criticized, 'brought the poison that killed lots of people.'⁹⁸ For her, the white men who had promoted cotton production had brought destruction. Grandmother Ndiené Ndiao concluded that 'cotton brought money, but it killed our animals, so we stopped doing it.'⁹⁹

These concerns were raised more in the 2000s than they had been in the 1960s and 1970s. During the cotton boom, people were glad to earn cash. By 1989, however, prices for seed cotton fell, costs for inputs increased, and farmers went on strike.¹⁰⁰ Even though there had been numerous damages and fatalities in the early decades, no protests had been made loudly and no actions taken as long as money flowed. CFDT's encadrement and prompt payment had made pesticide-usage 'socially acceptable.' When cotton production was no longer enticing, male farmers took collective action against it. Elderly women and

⁹⁵ Interview, Seydi Sibaly, medical assistant, Vélingara, 16 May 2009.

⁹⁶ Interviews, Mamadou Soumboundou; Mohamadou Habibou Ba; Mamadou Malal Sidibé.

⁹⁷ Interview, Sidi Diallo.

⁹⁸ Interview, Jeynabou Mballo (great-grandmother, farmer), interpreted by her relative and Sambel Baldé, Saré Thialy, Vélingara, 12 May 2009.

⁹⁹ Interview, Ndiené Ndiao.

¹⁰⁰ SODEFTEIX, 'De fil en aiguille' [Stitches in time], *Renaissance Cotonnière* no 6, (Jul. 2005) : 20.

retired encadreurs were left to gripe that their losses had never been addressed. They were stirred in part by others who criticized pesticides.

In the 1990s at least one man presented an alternative, organic cultivation, to southern Senegal. Hady Diallo, while in Germany in the mid-1980s, met Green Peace activists who introduced him to the International Federation of Organic Agriculture Movements (IFOAM) that had been founded in 1972 by the president of a French farmers' organization, *Nature et Progrès*, and that was later headquartered in Bonn. IFOAM trained Diallo in organic agriculture. By 1993, Diallo arranged with HessNatur, a clothing retailer, to purchase organically grown cotton from farmers around his hometown, Vélingara. HessNatur paid the farmers 220 francs CFA per kilo of seed cotton, 70 francs more than SODEFITEX was paying, which by no longer compensated farmers for the rising costs of inputs conventional cultivation required. Diallo instructed farmers to space out the sowings, thin the saplings, weed the plants that attracted pests, maintain plants that served as distractions and traps for pests, and make natural pesticides from plants that were known to be inherently noxious to insects, particularly the neem tree (*Azadirachta indica*). He hired women to collect and pound neem seeds. Women and men favored Diallo's organic program. Mamadou Coulibaly remarked how 'the whole family helped to make the natural pesticides. [. . .] I preferred it because the price was better than SODEFITEX's price and plus it wasn't toxic.' Though the project did not survive challenges a few years later, it showed people in the region that there could be an alternative.¹⁰¹

¹⁰¹ Written communication, Hady Diallo, 14 Jul. 2009; Interviews, Hady Diallo, Vélingara, 24 May 2009; Mama Baldé, La présidente de le groupement des producteurs feminine (GPF) de département de Vélingara, 9 May 2009; Mamadou Coulibaly, Kandia, 21 May 2009.

Campaigns against pesticides and the rising demand for organic production from outside Senegal helped spark criticism against insecticides inside Senegal.¹⁰² In recent years the international Pesticide Action Network (PAN) has established a headquarters in Dakar and put up posters in the southeast warning people of dangers.¹⁰³ In the 2000s ENDA-PRONAT, the 'Natural Protection' [*Protection Naturelle*] division of the organization for Environment Development Action in the Third World (ENDA Tiers Monde) originally created in 1972 by the African Institute for Economic Development and Planning (IDEP) and financed by the United Nations Environmental Program (UNEP) and the Swedish International Development Cooperation Agency (SIDA/ASDI), started another organic cotton project in Koussanar in eastern Senegal.¹⁰⁴ Meanwhile the French government promoted organic agriculture as a new industry.¹⁰⁵ Though the interviews I conducted may have been influenced by these recent developments, written documents from the 1950s to 1970s confirm that French agronomists were troubled by insecticides' risks early on as well.

In 1954, the French Overseas Institute [*L'Institut français d'outre-mer* (IFOM)] (of the 'French Union' which had replaced the 'French Empire' when the Fourth Republic established a new constitution ending the separate and oppressive 'native law' [*Code de*

¹⁰² Tousignant, *Edges of Exposure*, 144.

¹⁰³ See <http://www.pan-afrique.org/depart.php>

¹⁰⁴ Interview, Aissatou Diallo (Vice-Présidente de Fédération de Producteurs de Yakaar Niani Wulli; Présidente de *Bamtaare* [développement], le groupement de promotion féminine (GPF) de Paniat; matrone de case de santé), interpreted by Souleymane Diallo, Koussanar, 27 Mar. 2009.

¹⁰⁵ Alexis Aulagnier et Frédéric Goulet, « Des technologies controversées et de leurs alternatives. Le cas des pesticides agricoles en France », *Sociologie du travail* [En ligne], Vol. 59 - n° 3 (2017).

l'indigénat] for colonial subjects in 1946-47) held a convention in Marseille on the 'protection of plants and plant-products in hot climates.' Jean Risbec, the Honorary Inspector General of Scientific Services Overseas and the Director of the Service of Agricultural Entomology at the Teaching and Tropical Research Institute at Bondy, a suburb of Paris, reminded the audience that when pesticides were used in great quantities they had serious harmful effects, including sickening people, killing off useful insects, and accumulating in the soil.¹⁰⁶ He warned that ignoring these effects could be 'disastrous.' He argued that they must find new ways to protect plants other than chemical insecticides and that, until alternative methods were found, they must continue to study pesticides' consequences.¹⁰⁷

Director Risbec did not like the pesticide industry. After Pierre Desaymard, an agricultural engineer from the Rhône-Poulenc Company read his report on 'Parathion, Oléoparathion and Toxaphènes: Characteristics and Conditions of Usage in Hot Countries,' Risbec chastised him as he concluded the session.

Evidently, for him [Desaymard] Parathion is not that dangerous. The producers [such as Desaymard] should not say that their products are not 'not very dangerous,' but on the contrary, they should emphasize the danger. Even in countries like

¹⁰⁶ Risbec was probably affiliated with the Office of Overseas Scientific and Technical Research (ORSTOM) that the French government founded in the 1950s to promote economic growth. Manning, 123-24; {{Thanks to . . . for her work as my research assistant.}} IFOM, *Congrès de la Protection des Végétaux et de leurs Produits sous les Climats Chaud* (1954), 8, 31.

¹⁰⁷ Jean Risbec, IFOM, *Congrès de la Protection des Végétaux et de leurs Produits sous les Climats Chaud* (1954), 8, 31, 542.

France we see people using these products without any precautions. For example, I have seen in Provence in a small hotel, in the café, a cultivator who had been spraying all day. Since the wind was strong and he was walking in it, despite all the advice he had been given, this man was covered in toxic substances. One should not tell people, 'it's not toxic,' but rather, 'pay attention!'¹⁰⁸

Even though Risbec described the farmer as a hard-headed provincial peasant who disregarded information, Risbec did not blame him and instead argued that it was the company's responsibility to better warn such users. Parathion was an organic phosphate which was developed in World War II as a nerve gas.¹⁰⁹

Nevertheless, into the late 50s insecticides were applied around the francophone world on a large scale in the name of the 'human economy.'¹¹⁰ They were being used though, according to some agronomists, 'before sufficient experimentation had been performed.'¹¹¹ In 1959 in Côte d'Ivoire, pesticide had killed large numbers of goats, dogs, ducks, fish, and other animals.¹¹² In part in response to these incidents, the (French) National Federation of Crop Protection Associations (FNGPC) and the Institute for Tropical Agricultural Research (IRAT) (which was related to ORSTOM, the Office of Overseas Scientific and Technical Research, recently created by the French government to promote

¹⁰⁸ IFOM, *Congrès de la Protection des Végétaux et de leurs Produits sous les Climats Chaud* (1954), 33-34.

¹⁰⁹ Davis, *Banned*, 159.

¹¹⁰ IFOM, *Congrès de la Protection des Végétaux et de leurs Produits sous les Climats Chaud* (1954), 542.

¹¹¹ L'Institut de Recherches Agronomiques Tropicales (IRAT) et la Fédération Nationale des Groupements de Protection des Cultures (FNGPC), *Les Problèmes Insecticides Outre-Mer* (Paris: le Service de la Défense des Cultures de l'Institut de Recherches Agronomiques Tropicales, 1960), 6-7.

¹¹² 'Colloque sur la défense des cultures cotonnières,' (Paris: 1959), 76.

economic growth) held a conference in Paris in 1960 on pesticide usage in the member countries of the 'French Community' (that replaced the 'French Union' following the 1958 constitution) titled '*Les Problèmes Insecticides Outre-Mer*' [Insecticide Issues Overseas]. Mr. Bouriquet, the Inspector General of Research and the head of the Crop Defense Service at IRAT, reported that pesticide treatments were often 'expensive, inefficient or ineffective, or even dangerous and damaging.' At times the chemicals had destroyed the plants and harvests they had been trying to save. People had died and there had been 'massive destruction of livestock and wild game following badly applied treatments.' Moreover, new pests had shown up. Bouriquet suggested that pesticide application had not been cost effective. He sounded the alarm that there was a 'pressing need to control pesticide use in tropical agriculture.'¹¹³ Yet rather than urge precaution as had other experts, he implied that there was a need to control Africans.

POSTCOLONIAL JUSTIFICATIONS FOR USE

In 1960 banning insecticides was still inconceivable and so the use of problematic pesticides had to be justified.¹¹⁴ Older colonial concepts evolved into a new postcolonial rhetoric. One of the reasons for the lack of control, suggested Bouriquet, was not the chemicals' persistence in the environment but the political agitation for independence in the countries in question. Changes that had 'created new countries delayed the institute's projects' which had included better labeling insecticides with appropriate dosages.¹¹⁵

Without the precise instruction labels, he claimed, pesticides had sometimes been applied

¹¹³ IRAT, *Les Problèmes Insecticides Outre-Mer* (1960), 6-7.

¹¹⁴ Boudia and Jas, 'Introduction: Science and Politics in a Toxic World,' 18; Jas, "Adapting to 'Reality,'" 59.

¹¹⁵ IRAT, *Les Problèmes Insecticides Outre-Mer* (1960), 7.

in expensive and grossly dangerous quantities. Prescribed dosages and instruction labels were *de rigueur* at the time, considered essential to precaution (despite that later research would prove that some toxicants were unsafe in any quantity).¹¹⁶ In the French Community, Bouriquet asserted that political change, not the drive for profit nor the chemicals themselves, had caused economic waste and ecological damage. More control over agriculture, and presumably over Africans as well, Bouriquet suggested, would return the sector to profitability and reduce its harmful effects.

Decolonization thus affected agronomists' rhetoric and the 1960 conference differed significantly from the 1954 convention, though the trend in Europe and the USA over the 1950s was also for experts to cut back on their recommended testing.¹¹⁷ Unlike Risbec's earlier criticism of pesticide producers, Bouriquet spoke well of the pesticide industry. He summarized his introduction to the conference by claiming that 'both the private and public sectors were involved in the generous vocation of France, that of technical assistance to the developing countries.' Pesticides were the tools of this renewed

¹¹⁶ Boudia and Jas, 'Introduction: Science and Politics in a Toxic World,' 5-6, 10, 19; Jas, "Adapting to 'Reality,'" 49-51, 67; Soraya Boudia, 'From Threshold to Risk: Exposure to Low Doses of Radiation and Its Effects on Toxicants Regulation,' in *Toxicants, Health and Regulation since 1945* (New York: Routledge Taylor and Francis Group, 2013), 71; Christopher Sellers, 'The Cold War Over the Workers' Body: Cross-National Clashes Over Maximum Allowable Concentrations in the Post-World War II Era,' in *Toxicants, Health and Regulation since 1945* (New York: Routledge Taylor and Francis Group, 2013).

¹¹⁷ Jas, "Adapting to 'Reality,'" 64.

benevolent mission. On the job were some of 'France's best entomologists, plant pathologists, and plant pharmacists' who read their reports at the conference.¹¹⁸

This time there were more voices implying that ordinary Africans were to blame for accidents, not the industry. The first paper given was by Mr. Flocken from the Plant Protection Service in Central African Republic (CAR) on the use of insecticides in coffee and cotton cultivation. The challenges he encountered would be familiar to CFDT agents already working in CAR and soon in Senegal as well. First, it was difficult to treat the plants 'efficiently' because the fields were spread out away from one another and each field was irregularly shaped, as was common in shifting agriculture across Equatorial and West Africa.¹¹⁹ Moreover, Flocken found it 'impossible' to trust the 'planters' to use motorized sprayers. The planters frequently refused to carry to the fields the chemicals or the water needed to dilute them, or to do the treatment themselves. He argued that research was needed to determine which treatment was the least expensive in terms of 'equipment, labor, and surveillance.'¹²⁰

The fact that 'planters,' presumably elder male village chiefs and household heads, refused to do the work frustrated development agents for decades throughout sub-Saharan Africa. Flocken did not mention the planters' possible motivations. In Oubangi-Chari,

¹¹⁸ Americans made similar claims about their own benevolent mission. See Kinkela, *DDT and the American Century*; IRAT, *Les Problèmes Insecticides Outre-Mer* (1960), 1, 7; While I conducted numerous interviews in Senegal, more research is required to do a prosopography of the French experts published in the conference minutes. It is 'difficult to research them in parallel.' Tousignant, 145.

¹¹⁹ Gregory Maddox, *Sub-Saharan Africa: An Environmental History* (Denver: ABC-CLIO, 2006), 292.

¹²⁰ IRAT, *Les Problèmes Insecticides Outre-Mer* (1960), 14.

French colonial rule had forced peasants to ‘work jointly on chief’s [cotton] fields’ through ‘repression and terror’ (versus the ‘disguised coercion’ of colonial cotton production in Soudan français, Côte d’Ivoire, and Senegal where peasants decided to sell their harvests at export or domestic markets). In Oubangi-Chari, the French paid the chiefs 0.5 francs per kilo of cotton that peasants brought to the export market, but not the peasants themselves.¹²¹ Labor in cotton fields was thus akin to slave labor and beneath the status of planters.

Agricultural labor in Sub-Saharan Africa historically consisted of ‘family labor,’ loosely defined. Male elders were responsible for ensuring their dependents’ food security and oversaw their dependents’ cultivation of food crops. Fields were dispersed due to soil fertility and land tenure. Colonial cash-cropping was often pushed onto younger male dependents, women, and children whom already had urgent and arduous tasks during the growing season.¹²² Yet French agents like Flocken were more concerned with dosage and surveilling labor than with paying for labor. CFDT encountered similar challenges in Senegal and found that they had to pay labor more.¹²³

Flocken’s presentation sparked a discussion during the question and answer session about pesticides’ dangers which revealed both a concern for people’s lives and the logic of

¹²¹ Isaacman and Roberts, *Cotton, Colonialism, and Social History in Sub-Saharan Africa*, 20, 22, 27, 31, 33.

¹²² Sara Berry, *No Condition is Permanent: The Social Dynamics of Agrarian Change in Sub-Saharan Africa* (The University of Wisconsin Press, 1993), 135; Henrietta Moore and Megan Vauhan, *Cutting Down Trees: Gender, Nutrition, and Agricultural Change in the Northern Province of Zambia, 1890-1990* (Heinemann, 1994); Richard Schroeder, *Shady Practices: Agroforestry and Gender Politics in The Gambia* (University of California Press, 1999).

¹²³ CFDT, ‘Rapport sur la culture cotonnière au Senegal campagne 1963-1964.’

blaming Africans more than the chemicals. The first comment and eventual question came from a Mr. Thenard who compared pesticide doses in CAR and France, showing the obsession with the (irrelevant) issue of dosage, though noting the remarkably low population of CAR (which parallels the low population density of southeastern Senegal).¹²⁴

Thenard: 'I was very surprised by the concentration of the insecticides you talked about. Such concentrations are not used in France. I don't know if there is any particular legislation in Central African Republic, but when you spoke of 300 to 400 grams of Phosdrine or Endrine in 40 liters of water, I had the impression that you had dynamite at the end of your gun. I am not, to tell the truth, really worried since the population of Central African Republic does not have the density that Paris does, but when someone is in a field, a planter or a user who is just a little curious, with a dose of 300 to 400 grams of active ingredients, which is around 10 times the amount authorized in France, doesn't that person risk causing accidents?'

Flocken responded by defending his paper with the technical requirements of the equipment. 'With the pneumatic sprayer, it's necessary to use such a dose.' Nonetheless, the panel's chairman followed up on the question. 'Have you had any accidents?' Flocken admitted that: 'Once there was a European agent who did not take the necessary precautions while using Eldrine and he felt ill after spraying the plants two or three times.' Even European authorities could fail to follow instructions. The idea that a European could be as negligent as an African, however, did not go unchallenged.

¹²⁴ Patrick Manning, *Francophone Sub-Saharan Africa 1880-1995* (Cambridge University Press, 1998), 113.

A Mr. Perret came to Flocken's defense by asserting that pesticides' dangers in the former colonies were different from those in France, and that they were peculiar to the social cultures there.

Perret: 'It is remarkable that in the Overseas countries larger doses of pesticides are always used and that there is little or no legislation there. Pesticides at the doses that surprised you are used, but what is more remarkable, is that no one is worse off.'

Thenard: 'For the moment.'

Perret: 'No, statistically, according to the doctors who verify illnesses, violent deaths are not recorded as caused by pesticide applications, but rather by the surreptitious use of these toxins to settle some family matters.'

Chairman: 'We are going to listen to Mr. Gry on the organization of the insecticide campaign for cacao cultivation in Côte d'Ivoire.'¹²⁵

In the chairman's desire to keep the conference on schedule, he cut off any responses to Perret's suggestions that pesticide poisoning overseas was not that bad and that poisonings were intentional and motivated by personal issues. Perret implied that Africans were more likely to die from intentional mishandling than from the work of spraying crops. Perret could have meant that medical examiners were covering up accidents, but he did not get the chance to clarify. While his comment can also be read as racist, portraying Africans as sly, my research found, surprisingly, that it also supports some statements made by Senegalese extension agents and farmers who worked in cotton fields in the 60s and 70s.

¹²⁵ IRAT, *Les Problèmes Insecticides Outre-Mer* (1960), 15.

For some French and Senegalese individuals, it was conceivable that pesticides were just as, if not more, dangerous in their potential to be misused surreptitiously for personal matters than in their potential to cause harm under normal working conditions. How Perret heard of such ‘statistics’ is unknown, but his comment indicates that Africans’ experiences with pesticides and their complex ideas about their uses had bubbled up to Paris. Yet there was not enough time at the session for a nuanced discussion. As the minutes stand, Perret denied pesticides’ responsibility for human deaths, which had been one of the reasons the conference had been convened in the first place.

After the 1960 conference, people continued to die from exposure to insecticides, but the ultimate cause of that exposure had been obscured. Whereas leading agronomists had once been concerned about the danger of the chemicals, their concerns shifted to the dangers of misuse. In 1960 they did not call for different agricultural methods as loudly as they had before, but rather emphasized the need to apply and control insecticides through encadrement’s ‘training and supervision.’ Obstinate peasants, uppity political usurpers, and witches were blamed for mishandling the chemicals.

CONCLUSION

The conference minutes document that French technicians wrestled with ‘ethical anxiety.’ Yet since many accepted that the chemicals would serve a greater good, but some doubted they could trust African peasants with insecticides, the leadership followed a common rhetorical strategy. Rather than acknowledge their own complicity, they blamed Africans for the problems and suggested that their encadrement was the solution.¹²⁶ Villagers’

¹²⁶ ‘The scapegoat is taken to possess intrinsically the qualities we assign to it.’ Kenneth Burke, *The Philosophy of Literary Form: Studies in Symbolic Action* 3rd ed. (Berkeley: University of California Press, 1941), 46; Other

alternative uses may have provided an excuse that made it easier for French technicians to believe their own rhetoric after they had ‘sweated alongside’ hard-working Africans in the fields.¹²⁷ The failure to document acute and accidental cases of human fatalities at the time and the imperceptible consequences of long-term, non-acute, exposure also helped support the reliance on ‘instructions’ rather than efforts to stop usage.¹²⁸

In the late 1970s, the justifications for continued use changed when cotton’s profits fell.¹²⁹ The greater good this time was fighting disease vectors.¹³⁰ Both times leaders

strategies include denial, shifting blame, evading responsibility, diminishing offensiveness of the problematic act, and offering to take corrective action. William Benoit and Shirley Drew, ‘Appropriateness and Effectiveness of Image Repair Strategies’ *Communication Reports* 10, no. 2 (1997): 153-163.

¹²⁷ Interviews, Abdou Ndiaye, Charles Diatta.

¹²⁸ Tousignant, 104; Julie Livingston, *Improvising Medicine: An African Oncology Ward in an Emerging Cancer Epidemic* (Duke University Press, 2012), 29-51; Boudia and Jas, ‘Introduction: Science and Politics in a Toxic World,’ 20; Michele Murphy, ‘Chemical Infrastructures of the St Clair River,’ in *Toxicants, Health and Regulation since 1945*.

¹²⁹ République du Sénégal, Direction de l’Aménagement du Territoire, Société des Terres Neuves, J.P. Dubois et P. Milleville, ‘Opération Terres Neuves, Projet Pilote Koumpentoum-Maka, Étude d’Accompagnement Rapport de Fin de Campagne, 1974-75,’ vol. 1 (Dakar : Office de la Recherche Scientifique et Technique Outre-Mer (ORSTOM), Juillet, 1975), 104; ANS, 2G 76-26, Ministère du Développement Rural et de L’Hydraulique, Projet F.E.D., Devis Intérimaire, Convention de financement no. 1025/SE, ‘Rapport sur la culture cotonnière au Sénégal, campagne 1975/76,’ (Dakar : Société de Développement des Fibres Textiles (SODEFITEX), 1976), 20; ANS, 2G 78-22, Ministère du Développement Rural, ‘Rapport sur la culture cotonnière au Sénégal, campagne 1977/1978,’ Project F.E.D., (Dakar : SODEFITEX, 1978), 17.

¹³⁰ Thanks to my research assistant Advertisement for the « Congrès sur la Lutte Contre les Insectes en Milieu Tropical » which will take place in Marseille from March 13-16, 1979, *Coton et Fibres Tropicales* vol

considered Africa different from Europe. It was a place where higher doses and more toxic and sometimes banned chemicals should be used as long as European instructions were followed. First the continent needed to be modernized like Europe. Secondly it was home to endemic tropical diseases spread by insects. Both times European experts, rather than African farmers, supposedly knew what was needed and what was best, even though by the 1970s European publics protested exposure to low doses of toxicants.¹³¹ In 1991, a World Bank memo described Africa as 'under-polluted' and assumed that Africans would not protest contamination.¹³²

In 2008, however, the residents of southeastern Senegal criticized the cotton industry and the negative consequences of pesticides. In 2010, Senegalese toxicologists wanted to study pesticides' risks in the southern region over the long term but lacked the capacity to do so.¹³³ While the Pesticide Action Network and ENDA-PRONAT have worked to empower the residents, the tendency of other foreign aid has been to reinforce the authority of outside 'experts' over internal voices. Recognizing the residents' desires and

XXXIII (1978) ; 'Congrès sur la lutte contre les insectes en milieu tropical: Première Partie, Cultures Tropicales' (Chambre de Commerce et d'Industrie de Marseille 13-16 Mars, 1979), 37, 49 ; C. Dejoux, 'Emploi des Pesticides et Pollution des Eaux Continentales Tropicales,' Laboratoire d'Hydrobiologie de l'O.R.S.T.O.M. BP 1434, Bouaké, Côte d'Ivoire, 'Congrès sur la lutte contre les insectes en milieu tropical' (1979), 861-872; James Webb, *Humanity's Burden: A Global History of Malaria* (Cambridge University Press, 2008).

¹³¹ Boudia, 'From Threshold to Risk,' 71.

¹³² 'Whistle Blower's Corner/Lawrence Summer's 1991 World Bank Memo,' Basel Action Network, <http://ban.org/whistle/summers.html>, accessed 2 Aug. 2018; Tousignant, 7.

¹³³ Tousignant, *Edges of Exposure*, 132.

ability to take care of themselves without foreign guidance would be a step towards improving people's health and their environment.¹³⁴

¹³⁴ See Dennis Galvan, *The State Must Be Our Master of Fire: How Peasants Craft Culturally Sustainable Development in Senegal* (University of California Press, 2004).