

# Agrochemical Toxicity in Latin America

by **Oscar A. Pérez** | Skidmore College | operezhe@skidmore.edu

According to data from the Food and Agriculture Organization of the United Nations, more than 863,000 tonnes of pesticides were used in Latin America in 2019 (FAO 2022). This number lumps together information on a wide variety of chemicals employed in agricultural production, including insecticides, herbicides, fungicides, bactericides, rodenticides, and plant growth regulators. A rough comparison shows an increase in the overall amount of pesticides used of approximately 23 percent compared to 2009, and 124 percent with respect to 1999. The region includes two of the five countries in the world that use the largest amount of pesticides in absolute terms: Brazil and Argentina. It also includes two of the top five countries for pesticide use per area of cropland: Ecuador and Costa Rica (FAO 2021).

Many factors drive the increasing presence of pesticides in Latin American fields, but perhaps no other single one has had a more significant effect than the exponential growth of soybean production in South America, particularly Brazil, Argentina, and Paraguay. Vast areas of forests, wetlands, and grasslands have been replaced with monocrops sustained by a myriad of agricultural technologies. From fertilizers and plant-growth hormones to pesticides, chemical products represent a considerable fraction of such technologies and have become a staple of contemporary industrial agriculture. The agrarian transformation taking place in various South American countries frequently triggers strong reactions among those who consider it a vehicle for economic prosperity and those who watch the environmental and health effects of the rapid changes with worried eyes.

Indeed, large-scale monoculture farming has generated economic wealth at the expense of ecosystems, affecting humans and nonhumans

in ways we struggle to understand fully. The mesmerizing sea of green leaves that characterizes industrial soybean production overshadows its less visible aspects, whether quantifiable or not. Satellites, aerial images, and ground surveys help us track the deforestation resulting from the expansion of the so-called agricultural frontier. However, other environmental and health effects can be less evident. Beyond the destruction of habitats and lack of biodiversity of these “green deserts,” the technologies used in industrial agriculture can have unintended consequences that are difficult to identify, measure, or even conceive. Agricultural chemicals pose exceptionally complicated challenges in this respect.

Practices and technologies associated with large-scale agriculture after World War II and in the context of what is commonly known as the Green Revolution have “introduced new forms of slow and invisible violence against the bodies of farmworkers and consumers due to the spread of millions of tonnes of the new agrochemicals” (Bertomeu-Sánchez 2019, 2). The assiduous use of chemicals in agricultural production is also one of the main contributors to the ecological crisis posed by the so-called persistent organic pollutants (POPs), highly toxic substances resistant to environmental degradation that can accumulate in living organisms. POPs travel long distances and are now present almost everywhere on the planet.

The use of large amounts of agrochemicals in soybean production has caused the emergence of local, national, and transnational groups and organizations centered on this issue. Their demands vary from a stricter control of the substances and more accountability for those responsible for their creation, use, and misuse to the complete overhaul of industrial agriculture

and the adoption of more sustainable practices that do not depend on these technologies. In Argentina, for example, campesino movements and Indigenous communities were among the first to raise concerns about pesticide use in soybean production. Now multiple organizations have come together under the banner of *pueblos fumigados* (fumigated towns) and regularly hold regional and national meetings. The activism of the scientist Andrés Carrasco in the 2010s also triggered a meaningful mobilization among concerned professionals in the country, like those who participate in the Red de Médicos de Pueblos Fumigados. The movement against *agrotóxicos*—as toxic agricultural chemicals are commonly referred to in Spanish and Portuguese—continues to grow and has an active presence in the public sphere. Nonetheless, it is a movement that regularly finds strong resistance among certain sectors in society. A look at the social media responses to the recent awareness-raising campaign Basta de Venenos (#BastaDeVenenos) shows how polarizing the issue continues to be.

A common argument that emerges in debates on the use of agrochemicals, particularly pesticides, is the perceived lack of conclusive evidence of their adverse effects on human health. Those who support pesticide use tend to portray pesticides as a technological marvel or, in the worst-case scenario, a necessary evil to increase food production and economic prosperity. They blame unmistakable cases of agrochemical poisoning on human errors and mismanagement. The old adage that the dose makes the poison prevails in these circles. On the opposing side, individuals point to the incongruity of creating and using highly toxic products to grow food. Many challenge the alleged lack of evidence with firsthand experiences and even with their own bodies, which act as living testimony of the health effects of these substances. Multiple issues hinder our understanding of agrochemicals' ecological and health effects. For instance, determining the toxicity of pesticides for humans and other living beings is a complex matter. There are several practical challenges in the field. A series of assumptions are made, and constraints must be defined to simplify dynamic systems

and processes. Nevertheless, the intensive use of agrochemicals defies our understanding in ways that surpass the realm of the scientific and technological.

Various scholars have described the planetary ecological crisis as a crisis of representation; that is, the scales and temporalities of environmental degradation are often inconceivable to most humans. This is no small matter; after all, “pragmatic solutions seem impossible when the dimensions of crisis exceed our abilities to conceive them” (Anderson 2016, xix). Understanding the adverse effects of toxic agricultural chemicals, like other ecological crises, is closely related to issues of representation. Toxic chemicals can threaten human and nonhuman life in ways that are frequently invisible to us due to their material properties but also, and perhaps more significantly, to matters of physical scale and temporality that we humans have difficulty grasping. The slow violence perpetrated by these substances often means that many of their health effects express as progressing imperceptible changes to living bodies, changes that could easily go unnoticed in our daily lives. Furthermore, such changes could take generations to become visible. How can we make sense of the complexity of agrochemical systems and processes in ways that speak to human and nonhuman experiences? As it turns out, artists, writers, filmmakers, historians, literary and cultural critics, and others working in what we call the environmental humanities have been actively trying to answer this and other related questions. For instance, what tools do these fields offer us to understand better the scope, scales, and temporalities of agrochemical systems and processes and deal with notions often perceived as unfathomable? What responsibilities do those who create such representations have? How do representational practices and spaces influence the attention different voices receive? What is the role of representation when it comes to social and environmental justice?

The recognition of pesticides as a category for historical analysis has brought together historians of science, technology, agriculture, occupational health, and the environment, among others,

to provide a much-needed perspective on the intricate role that chemicals have had in agricultural production throughout time. Historians and other science and technology studies (STS) scholars have emphasized the sociotechnological nature of pesticides. That is, they are technologies that arise from and participate in particular social, political, and environmental contexts rather than a collection of substances that exists independently of human action. Thinking of pesticides in these terms has brought attention to lives touched by these chemicals, from scientists, policymakers, and manufacturers to activists and community members. Furthermore, in recent years, there has been a push to study the forces and mechanisms that invisibilize toxic risks and contribute to public ignorance (Guillem-Llobat and Nieto-Galan 2020). Historians have also been crucial in highlighting the differential impact toxic agrochemicals have had on communities, pointing to unequal power dynamics and environmental injustice (Bohme 2015; Porter and Rivera 2020).

Bringing visibility to the health and environmental risks of toxic agrochemicals has been a recurrent concern of artists in Latin America. Projects in the visual and performing arts have created spaces for discussions about agricultural toxicity in the public sphere while reflecting on the processes shaping our perceptions of the matter. In *El costo humano de los agrotóxicos (The Human Cost of Agrochemicals)*, Pablo Ernesto Piovano depicts the pain and suffering of individuals whose lives and bodies have been transformed by these substances (see fig. 1). His project comprises a series of black and white photographs that form the basis of an exhibit, a video essay, and a printed book. Aware of the ethical implications of his work, Piovano strived to portray his subjects with dignity, emphasizing the connection between ethics and aesthetics (Piovano 2021). Similarly, Jordi Ruiz Cirera's series *The United Soya Republic* reflects on the connections

between genetic research, industrial agriculture, and activism (Ruiz Cirera, n.d.). Making visible the negative effects of pesticides was also one of the goals of the installation *Serán ceniza, mas tendrá sentido (ligeramente tóxico)*, part of the group exhibition titled *Sin origen / Sin semilla* by Colectivo BIOS Ex machinA. For this project, members of the Colectivo grew traditional varieties of maize to later expose them to the herbicide glyphosate in a controlled experiment before audiences. The idea was to show in real time the toxic effects that the herbicide has on plants that have not been genetically modified (González Valerio 2015). The installation drew attention to the role of biotechnology in food production and the relationship between art and science. It also raised unintended questions about risk perception and showed how pesticides are hard to contain, as visitors kept touching the contaminated plants even when they were explicitly labeled as toxic, much like insects, birds, and other living and nonliving beings do in agricultural fields. Moreover, as the creators of the project were unable to reproduce the results of previous trials when the installation was shown in the context of the museum, it exposed "science to the messiness of life beyond the laboratory" and revealed the possibilities that art opens for "a different kind of knowledge" (Page 2021, 134).

**Figure 1. Photograph from Pablo E. Piovano's project *El costo humano de los agrotóxicos (The Human Cost of Agrochemicals)*, which examines the effects of toxic agrochemicals in rural Argentina. Reproduced with permission.**



When it comes to literature, scholars have shown us how canonical works like Juan Rulfo's *Pedro Páramo* can be read as cautionary tales on the environmental effects of the Green Revolution and the technologies that supported it, pesticides among them. Moreover, they encourage us to think about how literary and discursive spaces, like the novel and the Green Revolution, can be both complementary and antithetical fictionalizing projects of the countryside (Saramago 2021, 118–121). Critics have paid close attention to the relatively recent emergence of a wave of works concerned with the environmental, health, affective, social, and individual effects of agro-industrial practices.<sup>1</sup> Many of these novels and short stories focus on the consequences of large-scale soybean production and the agrochemicals it requires (De Leone 2017, 65). The literature of agROTOXICITY takes many different forms, from Gothic and detective novels to science fiction, and it is precisely its variety that pushes us to reflect on agrochemicals beyond an anthropocentric perspective. These works reveal how no bodies are exempt from the transformations and deterioration triggered by toxic chemicals (Heffes 2020). In doing so, they help us make sense of the human-nonhuman continuities in the natural world.

As in literature, issues related to the use of agrochemicals are present in numerous films. Although the theme has appeared in a growing number of fictional productions, filmmakers have turned to the documentary genre with more frequency to center such issues, so much so that we could now talk about an agROTOXICITY subgenre.<sup>2</sup> The militant tradition and goals associated with Latin American activist cinema,

like *Tercer Cine* and *Cinema Novo*, laid the foundation for contemporary networks of *cine comunitario ambientalista*, or environmentalist community cinema (Fernández Bouzo and Bruno Besana 2019). *Cine comunitario*—which is behind many of the agROTOXICITY films—is a tool for political intervention and environmental justice. In this sense, critics have considered “how filmmaking can operate as a generative posthumanist or environmentalist practice that imagines alternative ways of sensing the world” (Fornoff and Heffes 2021, 17).

Artistic, literary, and cinematographic works allow us to follow the invisible paths of toxic agrochemicals, teaching us that such substances are material agents that spread beyond the fields where they are used, attached to the crops they help grow as well as to other living and nonliving beings. These works transport us across spaces, times, and dimensions, from the molecular changes caused by chemical reactions, to the global scale of agribusiness and its role in the climate crisis. They inspire us to reject humans and their time frames “as the measure of all things,” and envision deep, unstable temporalities (Fornoff, Kim, and Wiggin 2020, xiii). Moreover, they encourage reflections on environmental responsibilities, accountability, and rights. Artists and scholars have urged us to interrogate how we engage with representations of agrochemical toxicity, in particular, and the climate crisis, in general. Their perspectives have not only complemented the work of scientists, social scientists, policymakers, and activists, but they also have made evident that environmental crises and the crisis of their representations are tied

<sup>1</sup> Among them are Lina Meruane, *Fruta podrida* (2007); Julián Joven (Cristian Molina), *Un pequeño mundo enfermo* (2010); Selva Almada, *El viento que arrasa* (2012); Samanta Schweblin, *Distancia de rescate* (2014); Gabriela Massuh, *Desmonte* (2015); María Inés Krimer, *Noxa* (2016); Pablo Plotkin, *Un futuro radiante* (2016); Cristian Romero, *Después de la ira* (2018); Daniel Baldi, *Los visitantes* (2019); Manuel Crespo, *Fosfato* (2019); and *Corpos secos* (2019), a collaborative project by Luisa Geisler, Marcelo Ferroni, Natalia Borges Polesso, and Samir Machado de Machado.

<sup>2</sup> A comprehensive list is long and includes fiction films such as *La tierra roja* (dir. Diego Martínez Vignatti, Belgium, Argentina, Brazil, 2015), *El rocío* (dir. Emiliano Grieco, Argentina, 2018), *Respira: Transgénesis* (dir. Gabriel Grieco, Argentina, 2019), and *Distancia de rescate* (dir. Claudia Llosa, Peru, Chile, Spain, United States, 2021). When it comes to documentary films we could mention many more, including *O veneno está na mesa* (dir. Silvio Tendler, Brazil, 2011), *Raising Resistance* (dir. David Bernet and Bettina Borgfeld, Germany, Switzerland, 2011), *Desierto verde* (dir. Ulises de la Orden, Argentina, 2013), *Pueblo verde* (dir. Sebastián Rodrigo Jauris, Argentina, 2015), *Viaje a los pueblos fumigados* (dir. Fernando “Pino” Solanas, Argentina, 2018), *Andrés Carrasco: Ciencia disruptiva* (dir. Valeria Tucci, Argentina, 2019), and Colectivo Documental Semillas’s web series *El agronegocio letal*, directed by Juan Pablo Lepore, which includes *La jugada del peón* (Argentina, 2015), *Dique Chico: Fumigación impune* (2018), and *Arroyo Leyes: La frutilla del postre* (2019).

to anthropocentric worldviews and paradoxical notions of modernity (e.g., Guerra Villalobos and Fazolli 2017; Polanco Rodríguez and Beilin 2019).

As Kata Beilin reminds us in the introduction to this issue of *LASA Forum*, the rise of environmental humanities in the twenty-first century acknowledges that disciplinary boundaries have limited our ability to respond to environmental crises—particularly when it comes to how we learn about, reflect on, portray, and engage with them. The environmental humanities platform has fostered multidisciplinary, interdisciplinary, and transdisciplinary work. In the case of agrochemical toxicity, such work has given us some much-needed tools to begin to understand the complexity of ecological scales and temporalities, to examine how globalized agribusiness practices are changing our world, and to reveal the links between representational, environmental, and technoscientific challenges. Scholars have pushed us to learn “from below,” using our senses beyond sight, and they have made us realize that, in resisting agrochemical toxicity, human activism is entangled with weeds acquiring resistance to pesticides (Beilin and Suryanarayanan 2017). Enlightening connections between the humanities, the arts, social sciences, and natural sciences have been developed and now offer paths for future examination of the so-called Chemical Anthropocene, including chemo-ethnography, affective ecocriticism, eco-crip theory, queer ecologies, and more. Nevertheless, the environmental humanities have also made evident that more voices are needed in these debates, particularly those historically marginalized, like Indigenous activists who have been at the forefront of fights against agrochemical toxicity in Latin America. Hence, the impact of environmental humanities and the new approaches emerging from them will depend on our ability to create spaces for deeper, more inclusive conversations.

## References

- Anderson, Mark. 2016. “Introduction: The Dimensions of Crisis.” In *Ecological Crisis and Cultural Representation in Latin America*, edited by Mark Anderson and Zélia M. Bora, ix–xxxii. Lanham, MD: Lexington Books.
- Beilin, Katarzyna O., and Sainath Suryanarayanan. 2017. “The War between Amaranth and Soy: Interspecies Resistance to Transgenic Soy Agriculture in Argentina.” *Environmental Humanities* 9 (2): 204–229. <https://doi.org/10.1215/22011919-4215211>.
- Bertomeu-Sánchez, José Ramón. 2019. “Introduction. Pesticides: Past and Present.” *HoST: Journal of History of Science and Technology* 13 (1): 1–27. <https://doi.org/10.2478/host-2019-0001>.
- Bohme, Susanna Rankin. 2015. *Toxic Injustice: A Transnational History of Exposure and Struggle*. Oakland: University of California Press.
- De Leone, Lucía. 2017. “Campos que matan: Espacios, tiempos y narración en *Distancia de rescate* de Samanta Schweblin.” *452ºF: Revista de Teoría de la Literatura y Literatura Comparada*, no. 16: 62–76.
- FAO. 2021. *Pesticides Use: Global, Regional and Country Trends, 1990–2018*. FAOSTAT Analytical Brief Series, no. 16. Rome: FAO. <https://www.fao.org/3/cb3411en/cb3411en.pdf>.
- FAO. 2022. “FAOSTAT: Pesticides Use.” *FAO.org*. <http://www.fao.org/faostat/en/#data/RP> (accessed February 10, 2022).
- Fernández Bouzo, Soledad, and Patricio Bruno Besana. 2019. “El papel del cine comunitario en las redes de movilización ambientalistas de Argentina.” *Ecología Política* 57: 86–91.
- Fornoff, Carolyn, and Gisela Heffes. 2021. “Introduction: Latin American Cinema Beyond the Human.” In *Pushing Past the Human in Latin American Cinema*, edited by Carolyn Fornoff and Gisela Heffes, 1–22. Albany: State University of New York Press.
- Fornoff, Carolyn, Patricia Eunji Kim, and Bethany Wiggin. 2020. “Environmental Humanities across Times, Disciplines, and Research Practices.” In *Timescales: Thinking across Ecological Temporalities*, edited by Bethany Wiggin, Carolyn Fornoff, and Patricia Eunji Kim, vii–xxviii. Minneapolis: University of Minnesota Press.
- González Valerio, María Antonia. 2015. “Historia a destiempo que narra la creación de hibridaciones (o coordinar BIOS Ex machina dejándose llevar por las fuerzas).” In *Sin origen / Sin semilla: Without Origin / Seedless*, coordinated by María Antonia González Valerio. Mexico City: Bonilla Artigas Editores/UNAM.
- Guerra Villalobos, Jorge Ulises, and Silvio Alexandre Fazolli. 2017. *Agrotóxicos: Um enfoque multidisciplinar*. Maringá: Editora da Universidade Estadual de Maringá.
- Guillem-Llobat, Ximo, and Agustí Nieto-Galan. 2020. *Tóxicos invisibles: La construcción de la ignorancia ambiental*. Barcelona: Icaria.
- Heffes, Gisela. 2020. “Toxic Nature in Contemporary Argentine Narratives: Contaminated Bodies and Ecomutations.” In *Ecofictions, Ecorealities, and Slow Violence in Latin America and the Latinx World*, edited by Ilka Kressner, Ana María Mutis, and Elizabeth M. Pettinaroli, 55–73. New York: Routledge.
- Page, Joanna. 2021. *Decolonizing Science in Latin American Art*. London: UCL Press.

Piovano, Pablo. 2021. "El costo humano de los agrotóxicos." *VIST*, April 9, 2021. <https://vistprojects.com/el-costo-humano-de-los-agrotoxicos>.

Polanco Rodríguez, Angel G., and Kata Beilin. 2019. "Toxic Bodies: Water and Women in Yucatan." In *Environmental Cultural Studies through Time: The Luso-Hispanic World*, edited by Kata Beilin, Kathleen Connolly, and Micah McKay, *Hispanic Issues On Line*, no. 24: 168–193.

Porter, Jayson M. (guest), and Michael B. C. Rivera (host). 2020. "How Does the History of Pesticide Use Reveal Relationships between Ecological, Political and Social Violence in Mexico?" *The Arch and Anth Podcast*, no. 137. <https://archandanth.com/episode-137-interview-with-jayson-maurice-porter/>.

Ruiz Cirera, Jordi. n.d. "The United Soya Republic." *Jordi Ruiz Cirera*. <http://jordiruizphotography.com/work/the-united-soya-republic-ongoing/> (accessed March 4, 2022).

Saramago, Victoria. 2021. *Fictional Environments: Mimesis, Deforestation, and Development in Latin America*. Evanston, IL: Northwestern University Press. //