ISSN: 2766-6816

JIS

The Journal of International Service

Vol.1, Issue 2

Spring 2021

School *of* International Service

American University
Washington, DC

JOURNAL *of* INTERNATIONAL SERVICE

Circle of Poison: Resolution or Evolution into a Larger and More Complex Issue?

Jennifer Brown

Abstract

The modernization and industrialization of agricultural has led to an increase in the number of monocropping systems throughout the world, causing a rise in the use of pesticides. The following will analyze American exports of pesticides by tracking changes in U.S. pesticide implementation to measure its effects on the global market.

Background

Beginning in the1940s, the Green Revolution[1] [i] propagated the scientific paradigm of high yielding variety crops throughout developing regions across the world, particularly Latin America, and was a driving force in the industrialization of an agriculture industry aimed at ramping up food production across the globe. The Green Revolution accompanied technical diffusion, in which new practices such as increased chemical and mechanical inputs and genetic uniformity were implemented over time. This increased yields and allowed for crops to feed more people. It also allowed for many nations to begin exporting their agricultural goods. Despite their advantages, these applications often failed to honor climatic diversity. They created high expectations for farmers with insufficient resources, requiring them to rely on the assistance of pesticides and other chemical inputs. These technical changes also contributed to development of the export sector in Latin America to the Global North (the wealthier, more technically advanced nations located primarily in the Northern Hemisphere) which continues to diversify with time. Although this aspect benefits the global economic market and transnational chemical corporations, those benefits do not necessarily trickle down to those residing in the Global South

[1] The term "Green Revolution" was a result of U.S. attempts within the Cold War to fight against the global spread of communism; green is on the opposite end of the color spectrum from red, therefore in opposition of the Soviet "Red Revolution."

(the more agrarian, less economically sound or politically stable nations, many of which are located in the Southern Hemisphere) or those performing the manual labor of producing these goods. Global North consumers can enjoy a variety of fruits and vegetables year-round as a result of the high yield, chemical-dependent, industrialized system that developed in another corner of the globe, but this convenience is not without consequences.[ii]

Rachel Carson's 1962 book *Silent Spring* brought significant attention to the harmful effects of pesticide usage in the United States, specifically Dichlorodiphenyltrichloroethane (DDT), an effective pest eliminator that was widely used at the time of publication.[2] [iii] *Silent Spring* sparked a series of debates and increased scrutiny over the use of synthetic pesticides, which continue to date. In the U.S., this scrutiny has been the driving force behind the emergence of large regulatory agencies such as the Environmental Protection Agency (EPA).[iv] Carson's book galvanized public outrage and also met considerable resistance, notably from Norman Borlaug, an early innovator of the Green Revolution who was largely responsible for its success. Borlaug argued that DDT was an essential component for feeding hungry people throughout the world and for controlling the populations of insects that carry malaria and other diseases. Pesticide companies understood how the contents of *Silent Spring* could damage their reputations as well as their profits and pressed hard to stop the book's publication. These efforts failed and Carson's work helped pave the way for modern environmentalism.[3] [v] [vi]

[2] DDT's popularity was due to it being highly effective in killing pests and inexpensive compared to other pesticides available at that time.

[3] *Silent Spring* paved the way for the formation of the Environmental Protection Agency in the U.S., but the agency neglected export regulation, which left opportunity for transnational chemical companies to continue to dump banned chemicals and turn a profit.

Circle of Poison

In 1980, investigative journalists David Weir and Mark Shapiro wrote a book titled *Circle of Poison: Pesticides and People in a Hungry World*, which coined the term "circle of poison" and sparked international attention. The book revealed that the pesticides banned from use in the U.S. due to severe health concerns were still being manufactured domestically and exported to developing nations. Ironically, these pesticides made their way back to U.S. consumers via residue on export crops onto which they were applied.[vii] Among these pesticides were those comprised of organochlorines[4] [5] [viii], which were ultimately banned in industrialized countries as a result of Carson's book and the revelation that they were incredibly dangerous to humans and animals alike. The title of the book, *Silent Spring*, in fact refers to the large number of birds that were killed by the chemicals.[6] [ix] [x]

Circle of Poison also highlighted the lack of legal responsibility of chemical companies that were manufacturing these harmful agricultural inputs. It was revealed that when an importing country's residue tolerances were violated, those located in the Global South producing and exporting these agricultural goods were held responsible and penalized, not the companies that manufactured the chemicals. This is despite the fact that the importing country was not harboring the companies that manufacture these harmful chemicals, nor were their citizens the recipients of the massive profits being made by the sale of these chemicals.[xi]

---

[4] Synthetic organochlorines are created by combining the elements hydrogen, carbon, and chlorine to create completely new compounds. These compounds are considered to be "suspected" endocrine disruptors and carry half-lives of 1 year to 21 billion years depending on the compound combination.

[5] DDT is an organochlorine.

[6] Another example of one of the organochlorines is 1,2-Dibromo-3-chloropropane (DBCP), a chemical banned in the U.S. in 1979 due to carcinogenic and sterilization concerns, that continued to be imported and heavily utilized by the Costa Rican banana industry.

Harmful Effects of Pesticides

Links between pesticide use and negative effects on human and environmental health have caused certain types of pesticides to be banned in most countries. Some can cause immediate human health consequences including headaches, rashes, neurological problems, and death. Long term effects are equally as shocking: miscarriage, infertility, birth defects, damage to the nervous system and cancer.[xii] Environmental consequences are also of concern, chiefly water pollution and soil degradation which can be detrimental for wildlife.[xiii] The effects of pesticides are not limited to consumers. Farmworkers are directly exposed through application in the field. Communities residing in close proximity to agricultural operations are exposed to these chemicals through the dumping of pesticide waste into waterways, drift from aerial application, and the reuse of empty pesticide containers as receptacles for ingestible liquids.[7] [xiv] [xv] Incidences of acute poisoning from toxic pesticide usage in developing countries has been reported to be up to 3.5 million people per year.[xvi] This is exacerbated by poor health conditions of many residing in the developing nations of the Global South, which is the result of socioeconomic factors that have led to issues such as lack of sanitization, adequate medical care, and health education.[xvii] This is in addition to the prevalence of toxic chemicals utilized in agricultural production.[xviii]

Addressing the *Circle of Poison* through National and International Oversight: Resolution?

Regulatory measures that date back to the late 1950's address issues of the dangers of chemical inputs and the revelations laid out in *Circle of Poison*. These measures have great significance to this analysis, beginning with the U.S. Delaney Clause (1959), named after New York Congressman James Delaney who advocated for a zero-tolerance stance on cancer-causing

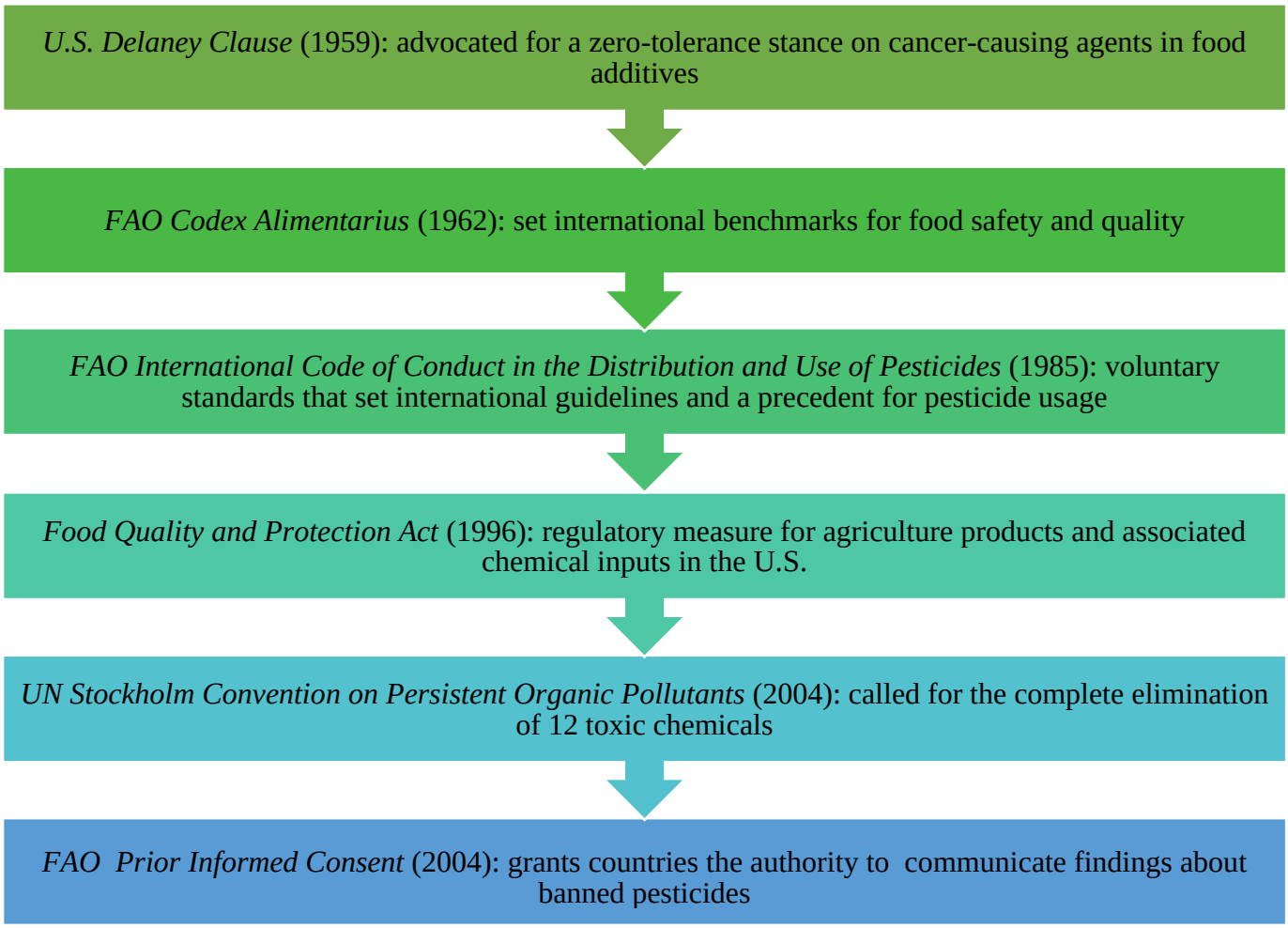
[7] Latin American nations often lack the resources necessary to facilitate education on the proper usage of pesticides, which in turn increases the likelihood of exposure that can potentially lead to detrimental health consequences.

agents in food additives. The Delaney Clause was a crucial component in the larger Food Additives Amendment (1959) that was intended to amend the existing Cosmetic Act (1938).[xix] The zero-tolerance measure of the Delaney Clause was significant and, combined with the increased scrutiny of chemical inputs brought upon by *Silent Spring*, it put safety standards for food and agriculture in the U.S. on a promising track. This clause also indicates there was some recognition and concern regarding harmful food additives within the U.S. government.[xx]

In 1962, the Codex Alimentarius created by the Food and Agriculture Organization (FAO) of the United Nations (based in Rome, Italy) set international benchmarks for food safety and quality. Then, in 1985, the FAO created its first International Code of Conduct in the Distribution and Use of Pesticides, comprised of voluntary standards that set international guidelines and a precedent for pesticide usage.[xxi] The Codex implemented international standards and tolerances for pesticides that are carcinogenic.[xxii]

In 1996, the U.S. implemented the Food Quality and Protection Act, taking the place of The Codex as the predominant regulatory measure for agriculture products and associated chemical inputs in the U.S. on a domestic level.[xxiii] The next significant regulatory measure was the United Nations Stockholm Convention on Persistent Organic Pollutants (POPs), which went into effect in 2004, and called for the complete elimination of 12 toxic chemicals known as the "dirty dozen."[xxiv] Also in 2004, the FAO implemented Prior Informed Consent (PIC), a measure that does not serve as a direct regulation but rather grants countries the authority to communicate findings about banned pesticides to one another.[xxv] Although these varying measures indicate that the dangers behind chemical agricultural inputs have been receiving both national and international attention, there are shortfalls remaining that must be overcome to achieve a meaningful and long-lasting resolution.

Figure 1: Timeline of regulatory measures



While each of the regulatory measures introduced signaled a step forward, their results are mixed. This begins with the U.S. FPQA implemented in 1996, which was in direct contrast to the previously dominant regulation, essentially defying the stringent prohibition of cancer-causing food additives provided by the 1959 Delaney Clause. Advocates for the FPQA stated that scientific and technological advances negate the need for the Delaney Clause. These arguments were based on the belief that the negligible risk standards under the FQPA more

appropriately addressed the issue as it existed in 1996. Supporters of the FQPA also claimed that the absolute zero-tolerance policy of 1959 was enacted by a Congress that was insufficiently equipped with the scientific capability to enforce standards that demanded this level of stringency, due to lack of informed knowledge.[8] [xxvi]

Furthermore, the FQPA grants tolerances for residues of banned pesticides on the exterior surfaces of imported agricultural products, therefore allowing some of these harmful chemicals to make their way back to consumers in the U.S. in the form of these residues despite being banned in the U.S. This is completely at odds with the zero-tolerance stance of the Delaney Clause, since the exterior of agricultural products is often consumed, hence leading to exposure of the consumer.[xxvii] Though the act does call for the review of pesticide registrations, these reviews are only required once every 15 years. When taking into consideration the speed in which industries grow and technologies advance, a gap of 15 years between reviews calls into question the efficacy and vigilance of these safety standards.[xxviii]

In 1962, the Codex Alimentarius provided some promising guidelines at the international level regarding carcinogenic pesticides, but these measures fell short in their effectiveness in the fact that they were, and remain, non-binding. Furthermore, under the FQPA, it is required that the EPA considers this Codex which has established an *acceptable daily intake* (ADI) which is measured via the *maximum residue level* (MLR) of a particular pesticide on food products. Having these guidelines in place are, in theory, a helpful measure in controlling the amount of potentially harmful chemicals that can make their way back to consumers via residue. However, MLRs are then set by each individual country and are regulated at the point of entry. Therefore,

[8] One supporter is Dr. Fred Shank, former Director of the Center for Food Safety and Applied Nutrition of the Food and Drug Administration, who testified before the Subcommittee on Health and the Environment of the United States House of Representatives in support of FPQA in 1996.

since there is no consistent international standard in place, what truly is an ADI or MLR for potentially dangerous chemicals is a gray area.[9] [xxix]

The 2004 PIC (2004) reform is a direct result of the revelations of *Circle of Poison*, and was initially a procedure initiated by the FAO and UN Environmental Programme (UNEP) in 1989. It was later adopted as a voluntary measure at the Rotterdam Convention (1998).[10] [xxx] PIC provides a list, detailing pesticides banned by two or more countries, ensuring that banned pesticides are documented and there is transparency between nations. Environmentalists and academics have argued that the system is extremely inefficient and incompatible with the high-speed industry of agriculture, which is designed to keep commodities flowing quickly to avoid spoilage and shortages. Furthermore, inaccurate and incomplete labeling, such as not listing all the ingredients contained within the chemical compound, is a persistent problem with pesticides that are shipped from the U.S., making the hazard level difficult to assess.[xxxi]

The Rotterdam Convention entered into force in 2004 for the countries that chose to ratify it, such as Brazil, France, and Germany to name a few. The U.S., however, did not ratify due to claims that the nation did not possess the authority to implement all the provisions. Today, the U.S. still remains an observer with voluntary obligation to the PIC.[xxxii] Furthermore, the pesticide market continues to grow rapidly in industrialized nations due to its profitability, and this growth necessitates the need for the Rotterdam Convention to augment the list of chemicals that fall under its provisions to keep up with the industry's expansion. This measure has serious potential to prove inefficient and incompatible with the speed in which the industry operates,[xxxiii] and the guidelines and factors affecting the ban of a chemical vary from country to country.[xxxiv]

[9] In the U.S., MLRs are overseen by the EPA

[10] The Rotterdam Convention is a multilateral treaty that promotes shared responsibilities pertaining to importation of hazardous chemicals which was signed September 1998 and entered into force in February 2004

[xxxv] So, it is possible that a chemical can be banned in one country but not another, due to differing conditions of the country's climate, political environment, and the practices associated with the chemical. This creates confusion and inconsistency in keeping an accurate and up-to-date list.[xxxvi] In light of these facts, the implementation of the PIC list is a step in the right direction, but it is still a feeble system.[xxxvii]

There are also other examples of the flaws in pesticide regulatory measures, including the environmental group Pesticide Action Network (PAN). PAN is composed of groups and individuals from over 90 different countries and much like PIC, it was largely formed as a reaction to *Circle of Poison*. Although this group is a powerful and effective player in pesticide information and regulations, it fails to comprehensively address all the issues persistent in pesticide usage around the globe. In both the U.S. and China, the pesticide databases are outdated and incomplete. They also do not distinguish between voluntary and non-voluntary cancellations of pesticides and lack notation for the pesticide's intended use.[xxxviii]

The 1985 FAO International Code of Conduct in the Distribution and Use of Pesticides presents another example of international reform that falls short of being entirely effective. While this code has shed light on the continued international sale and use of chemicals such as DDT, despite decades of research documenting severe environmental and health consequences, the voluntary nature of the code sparked moral outrage because it lacked any substantial accountability or consequence. It also lacked enforcement to ensure that the measure actually made a true impact. This motivated PAN to push hard for the implementation of PIC, and in 1987 the FAO decided to implement PIC into its Code, which was adopted by the Rotterdam Convention. The FAO Code proved a step in the right direction for transparency in global pesticide usage but suffered from vague and ill-defined language that left it open to

interpretation. For example, Article 5.2.4 of the FAO Code calls upon the pesticide industry to cease the sale of dangerous chemicals when "no manner of safe use is possible," yet the term "safe use" is in no way defined.[xxxix]

The United Nations Stockholm Convention on POP's calls out the 12 particularly harmful chemicals, the "dirty dozen", that can remain in the environment for extended periods and accumulate in the body fat of humans and animals.[xl] [xli] Unfortunately, this regulation falls short because it does not apply to pesticide residues on imported food. Therefore, a regulatory gap remains that prevents the core issue from being completely addressed; this loophole continues to allow these dangerous and harmful chemicals to make their way into the environment and human bodies. Considering the detrimental effects caused by this "dirty dozen," this is a huge oversight with potentially dangerous consequences.[xlii]

Circle of Poison: **Evolution?**

Although international strides have been made to address the *Circle of Poison*, major problems still remain. Academics, journalists and activists argue that the issue has morphed into a global pesticide complex that continues to evolve. Dr. Ryan Galt, a professor of human ecology at the University of California, Davis states:

> The global pesticide complex, defined as encompassing all aspects of pesticides' lifecycles from conception to environmental fate, is extraordinarily complicated... All of these geographically rooted economic and ecological processes occur within international, national, and subnational pesticide and food regulation frameworks that have varying

characteristics and strengths, exerted within their territorial homes and sometimes beyond them as an increasingly globalized food system.[xliii]

Given the complexity of this issue and the lack of transparency surrounding pesticide exports, these arguments are not without merit. The pesticide industry includes a complex network of over 600 active pesticide ingredients that are traded, sold, and transported to various locations throughout the world. All of these locations have varying levels of regulatory frameworks, and these frameworks must endure an increasingly globalized food system.[xliv] Adding to this complexity, the FAO has estimated that there are approximately half a million metric tons of improperly stored and debunked pesticides residing in the Global South, the majority of which were already phased out by the U.S.[xlv]

There are numerous examples to indicate that misconduct in the pesticide industry is rampant, and that the industry is putting profitability above the health and safety of humans, animals, and the environment. One example is that trade investigations revealed that between 1995 and 1996, 21 million pounds of unregistered and banned pesticides were produced and exported by the U.S. Alarmingly, the chemical pesticide compound monocrotophos, which is known to be fatal to humans in doses as small as 120 milligrams, had a 600% increase in exports to Mexico under its trade name, Azodrin.[xlvi] Another example is the extensive examination of U.S. customs records in the early 2000s. The Foundation for the Advancement in Science and Education discovered that of the 1.7 billion pounds of pesticides exported from the U.S. between 2001 and 2003, 28 million pounds were banned, severely restricted, or simply unregistered.[11] [xlvii]

[11] There are a staggering 70,000 different chemicals on the market, with 1500 new ones being introduced each year according to the FAO, further exacerbating the difficultly in keeping accurate records for dangerous chemicals in any industry, pesticides included.

[xlviii]A final example is that between 1989 and 2000, pesticide sales in Latin America increased more rapidly than any other region in the Global South. Internationally, sales continue to increase annually. Pesticides in developing countries have an annual market value of approximately 900 million USD. It is also estimated that 30% of these do not meet accepted international safety criteria for residues via application.[xlix]

U.S. Standards on Pesticides: An Example to be Followed?

While the U.S. continues to export pesticides that are banned from use within the country, U.S. pesticide standards remain troubling. They also may not serve as a reliable export market for safe pesticides, even if they are not classified as banned. The major point of contention is the EPA standards that establish thresholds for which carcinogenic pesticide use is considered to be "safe." Many academics and health professionals vigorously debate that there are no clear thresholds for carcinogens, making the argument that anything with carcinogenic properties carries a true risk of causing cancer no matter what the dosage or length of exposure may be.[l] The accuracy of residue tests on imported products conducted by the Food and Drug Administration of the United States (FDA) is also questionable. Tests utilized by the FDA often cannot detect all of the chemical residues, adding uncertainty to their claim that levels of pesticide residue on imported commodities is "well below established safety standards" and unsurety in their declaration that the U.S. has the highest food safety standards in the world.[li]

The process of banning chemical products in the U.S. further adds to the complexity of this issue. U.S. government agencies do not always enforce bans on pesticides that are deemed harmful by the EPA.[12] What is commonplace is that a pesticide will fail to be approved and

[12] The European Union has been much more forthcoming with withdrawing pesticides from use than the United States. In 2009 the EU adopted a set of measures that determined that pesticides must be scientifically proven to not

therefore is not deemed permissible for use in the U.S. However, those reasons could be a failure to submit necessary studies or other economic reasons, such as the chemical not proving to be as profitable as it was intended to be. Either way, the revoking is a *voluntary,* industry-initiated cancellation facilitated through the EPA and is the primary method in which a pesticide is pulled from use.[13] [lii] This creates confusion around which chemicals are revoked for harmful effects versus other "less damaging" reasons. This process also sheds light on the fact that there is no agency that is truly holding the industry accountable and forcing their hand to pull harmful chemicals out of circulation.[liii]

Drawing comparisons between the U.S. and other nations in the Global North sheds increasing light on why the U.S. does not serve as a gleaming example of vigilance on chemical input safety standards. U.S. non-voluntary banning guidelines (when they do actually occur) are far less stringent when compared to other industrialized nations. In 2016, out of the 1.2 billion pounds of pesticides utilized globally, 322 million pounds were banned through regulator initiation in the European Union (EU) and 40 million pounds were banned in China, indicating that China and the EU are taking drastic measures in the banning of harmful chemicals. There are also 45 million pounds of pesticides that are banned or in the process of being phased out in other industrialized nations other than the U.S. Paraquat, which is being phased out internationally, is still in use in the U.S. to a certain degree. Paraquat is an incredibly lethal chemical, and the EPA data indicates that exposure resulted in 27 deaths in the U.S. between 1990 and 2016.[liv]

---

have negative health effects, which resulted in a staggering 60% of active ingredients being subject for withdrawal from use. [i]

[13] This is where confusion with PAN databases can come into play**,** as mentioned in previously within this paper.

Although voluntary cancellation in the U.S. can put many dangerous pesticides out of use, most pesticides cancelled using this practice are cancelled due to poor sales and the loss of their economic appeal.[lv] Voluntary cancellation also results in a longer phase-out period. Take for example Aldicarb, a pesticide that, in 2010, was found to be incredibly dangerous for infants and young children. Instead of imposing a forced regulatory ban, the EPA entered into voluntary cancellation negotiations with the manufacturer.[lvi] The agreement ultimately led to the continued manufacturing of the pesticide for another four years, and a phaseout period of an additional four years after that. A regulatory cancellation would have completely phased out the product within one year. But, despite having a quicker timeline and the potential to bring harmful chemicals out of circulation at a more rapid pace, forced EPA-initiated bans tend to be far more complicated and administratively time consuming than voluntary ones. This is due to the fact that they require more agency resources and many additional steps, such as officially informing other agencies such as the U.S. Department of Agriculture. These additional steps and resources are implemented with the intent of limiting the hardship on the agriculture sector. It is also possible for bans to be reversed by presidential decree. Essentially, the more a chemical is used and the more profitable it is, the harder it will be for the EPA to impose an outright ban. This calls attention to the fact that even pesticides that are approved for use and exported by the U.S., such as Paraquat, are not necessarily safe. Therefore, U.S. safety standards should not serve as a model for developing nations due to their lack of stringency and oversight.[lvii] Pesticides used in industrialized countries and developing countries are not as distinctly different as they were during the 1980s when *Circle of Poison* was first released, but this does not mean that the usage of unsafe pesticides has ceased to occur.[lviii]

Lack of Clarity: U.S. Pesticide Exports

The way in which pesticides are classified in the U.S. also requires closer analysis. For a pesticide to be used within the U.S., it must be registered with the EPA; therefore, selling unregistered pesticides is illegal. It is possible for manufacturers to forego the registration process and export the product as "unregistered."[lix] When examining data from the early'90s through the early 2000s, there is a significant reduction in the number of banned or severely restricted pesticides exported from the U.S. Correlating with these reductions is a significant rise in the number of pesticides that were never registered before being exported. This indicates that banned and severely restricted pesticides may simply leave the U.S. without ever being registered, excluding them from any formal database and making them impossible to track.

TNCs and WTO: Wielding Influence and Creating Barriers

Transnational corporations (TNCs) have tremendous influence in the global domain of pesticides and the power they hold could be the largest threat to the implementation of more sustainable models and the curbing of bad practices.[lx] In 1998, nearly twenty years after the release of *Circle of Poison,* the Center for Public Integrity released an extensive report exemplifying ways in which the U.S. Congress has prioritized the financial interests of the pesticide industry over the health and safety of the public.[lxi] CropLife America, a trade association serving the interests of pesticide manufacturers, spends an average of $2.6 million a year on lobbying efforts to sway policy in favor of the industry.[lxii] [lxiii] In 2017, annual sales for U.S.-based pesticide manufactures were among the most profitable in the world: DowDuPont earned $6.1 billion in agrochemical sales, Monsanto (now Bayer) earned $3.7 billion in agrochemical sales, and Adama earned $3.3 billion in agrochemical sales.[lxiv] In 2018, the U.S.

was the third-largest pesticide exporter with sales of $4.2 billion.[lxv] Additionally, the U.S. has a persistent “revolving door” between the public and private sectors, in which individuals go from positions within regulatory government agencies into positions within the private sector of the industry. This revolving door phenomenon is likely allowing the pesticide industry to infiltrate regulatory agencies, creating the potential for conflicts of interest. This phenomenon is by no means exclusive to the chemical industry, and in some cases, it allows for a regulator to have a deeper understanding of the industry. However, when it comes to regulatory agencies determining if dangerous chemicals are being put into the market and causing severe harm, these potential conflicts of interest are of grave concern.[lxvi]

Policies that promote exportation and the liberalization of trade under what was formerly known as the North American Free Trade Agreement (NAFTA) (now the United States-Mexico-Canada Agreement, USMCA) and the World Trade Organization (WTO) incentivize and put pressure upon the continuation of conventional production patterns in place in order to keep pace with the demand that has been further bolstered by these policies. Large chemical TNCs also place tremendous amounts of pressure on policymakers at both national and international levels to loosen or withdraw regulations geared at limiting the use of pesticides.[lxvii] WTO agreements aim to eliminate discriminatory barriers to trade. Although this is a positive goal, it also means that countries that attempt to eliminate the importation of certain pesticides could actually violate WTO provisions. Therefore, many countries in the Global South that wish to prioritize the health and safety of their people and environments face severe limitations and could violate these provisions if they refuse to import dangerous chemicals that are known to cause serious harm.[lxviii]

Conclusion

Progress has been made to address the rampant use of harmful pesticides revealed in *Silent Spring* and the globalized lifecycle of dangerous chemicals that was brought to light with the release of *Circle of Poison.* However, the issue of dangerous agricultural inputs coming from the Global North, being exported to the Global South, and ultimately making their way back to the Global North is an issue that not only remains unresolved but has evolved into something more complex and difficult to unravel. The reliance on pesticides has permeated agricultural systems all over the globe and breaking free from this dependence will prove difficult, but there are measures that can be taken to resolve the issues recently analyzed. To begin, uniform, legally binding international guidelines need to be put into place. The current, varying guidelines and loose obligations that possess the potential for exploitation do not provide the necessary precautions to protect against exposure to dangerous chemicals. Further, strictly enforced global-level phase-outs and drastically more stringent regulations imposed by FAO are also other important ways to ensure that the most toxic variations of pesticides exit production and export markets.

Furthermore, the WTO and USMCA must implement provisions into their trade policies that specifically address issues raised in regard to the usage and exportation of pesticides. One provision that these agencies should look to and follow is the EU decision at the Committee on Sanitary and Phytosanitary Measures in July 2019, in which WTO members discussed specific trade concerns regarding food safety. In this meeting, the EU made a commitment to limiting MRLs for the chemical Imazalil (a fungicide used in banana production) after Colombia, Costa Rica, the Dominican Republic and Ecuador voiced concerns over its usage and related MRLs. This type of open dialogue, consideration for concern, and the utilization of the knowledge

available through measures such as PIC, should be used as a benchmark for more effective trade policies that take into account the concerns of nations in both the Global North *and* the Global South.[lxix]

Additionally, there is a need for international guidelines to curb the lobbying power of TNCs that manufacture pesticides and limit the industry's influence over regulatory measures. These companies need to feel the burden of responsibility for keeping harmful pesticides out of circulation. Additionally, the U.S. has a unique opportunity to pave the way for better practices and set higher standards, being such a large manufacturer of pesticides, and should be doing so.

Ultimate reduction and elimination of pesticide usage is a vital action that should be taken. Integrated pest management (IPM) could provide for a safe alternative for reducing or eliminating the usage of pesticides, but the effort would have to be tailored to each individual operation. IPM is a system that is focused on managing individual ecosystems, such as biological control and the manipulation of habitat, in order to focus on the long-term prevention of pests. The U.S. actually started an IPM program in 1971, but it is severely underutilized.[lxx] A useful example of a successful IPM program can be gleaned from cotton production in the Cañete Valley of Peru, which in the past suffered from overuse of toxic pesticides that led to pests developing a resistance to these chemicals and massive crop die-offs. In order to resolve this crisis pesticide usage was eliminated, beneficial predatory insects were reintroduced, and crop diversification schemes were implemented. These actions allowed for the continuation of cultivation and avoided an agricultural catastrophe. This serves as a very specific example, but it sheds light on the fact that there *are* alternative methods to heavy pesticide usage and a way forward for agricultural systems to step off of the pesticide treadmill.[lxxi]

Essentially, protecting the health and well-being of people and environments all over the globe must be prioritized above the interests of TNCs that manufacture and export these chemicals, as well as the agricultural imports and export industries that are relying on these chemical inputs. The system as it stands now is not driven by sheer necessity, but profitability. That can and needs to change.

Works Cited

"Agrow Top 20 2018." 2018. Agrow Agribusiness Intelligence. https://agrow.agribusinessintelligence.informa.com/-/media/agri/agrow/ag-market-reviews-pdfs/supplements/agrow_top20_2018_online.com.

Altieri, Miguel A.; Nicholls, Clara Ines. 1997. "Conventional Agricultural Development Models and the Persistence of the Pesticide Treadmill in Latin America." *International Journal of Sustainable Development & World Ecology* 4 (2): 93–111. https://doi.org/10.1080/13504509709469946

Diaz, Dr. Leticia M.; Dubner, Dr. Barry Hart. 2005. "On the Importance of Regulating the International Trade of Pesticides: A Look at the Current Status of Conventional Wisdom (or Lack Thereof) on the Subject." *Southeastern Environmental Law Journal* 14 (1): 40.

Donley, Nathan. 2019. "The USA Lags behind Other Agricultural Nations in Banning Harmful Pesticides." *Environmental Health* 18 (1): 44. https://doi.org/10.1186/s12940-019-0488-0.

Galt, Ryan E. 2008. "Beyond the Circle of Poison: Significant Shifts in the Global Pesticide Complex, 1976–2008." *Global Environmental Change* 18 (4): 786–99. https://doi.org/10.1016/j.gloenvcha.2008.07.003.

Galt, Ryan E. 2009. "Overlap of US FDA Residue Tests and Pesticides Used on Imported Vegetables: Empirical Findings and Policy Recommendations." *Food Policy* 34 (5): 468–76. https://doi.org/10.1016/j.foodpol.2009.05.005.

"Health Equity: Challenges in Low Income Countries." 2009. *African Health Sciences* 9 (Suppl 2): S49–51.

Langman, Jimmy. 2008. "The Global Pesticide Pushers in Latin America." *NACLA Report on the Americas* 41 (1): 5–10. https://doi.org/10.1080/10714839.2008.11722281.

McCouley, Lauren. 2016. "Exposed: Pesticide Industry Deployed Aggressive Lobby Effort to Quash Bee Protections." Common Dreams. https://www.commondreams.org/news/2016/06/15/exposed-pesticide-industry-deployed-aggressive-lobby-effort-quash-bee-protections.

Patel, Raj. "The Long Green Revolution." *Journal of Peasant Studies* 40, no. 1 (January 2013): 1–63. https://doi.org/10.1080/03066150.2012.719224.

Redmond, Derek. 2002. "Importing Death as a Part of Free Trade: An Argument for a Prohibition on the Importation of Foods Containing the Residue of Banned Pesticides." *William & Mary Environmental Law and Policy Review* 27 (1): 34.

Robinson, David. 2016. “Golf Courses and Chemical Companies Target Environmental Laws.” News Story. Lohud. https://www.lohud.com/story/news/investigations/2016/07/27/golf-courses-and-chemical-companies-target-environmental-laws/87400716/.

“Top Pesticides Exporters.” 2019. World’s Top Exports. http://www.worldstopexports.com/top-pesticides-exporters/.

“United Nations Treaty Collection., The Rotterdam Convention Treaty” 2019. https://treaties.un.org/pages/ParticipationStatus.aspx.

US EPA, OECA. 2013. “Importing and Exporting Pesticides and Devices.” Overviews and Factsheets. US EPA. https://www.epa.gov/compliance/importing-and-exporting-pesticides-and-devices.

US EPA, OA. 2015. “Summary of the Food Quality Protection Act.” Overviews and Factsheets. US EPA. https://www.epa.gov/laws-regulations/summary-food-quality-protection-act.

Wilson, John S., and Tsunehiro Otsuki. 2004. “To Spray or Not to Spray: Pesticides, Banana Exports, and Food Safety.” *Food Policy* 29 (2): 131–46. https://doi.org/10.1016/j.foodpol.2004.02.003.

World Trade Organization News. “WTO | 2019 News Items -Members Address Trade Concerns, Promote Transparency in SPS Committee,” July 19, 2019. https://www.wto.org/english/news_e/news19_e/sps_22jul19_e.htm.

---

[i] Patel, Raj. “The Long Green Revolution.” *Journal of Peasant Studies* 40, no. 1 (January 2013): 1–63. https://doi.org/10.1080/03066150.2012.719224.

[ii] Altieri, Miguel A.; Nicholls, Clara Ines. 1997. “Conventional Agricultural Development Models and the Persistence of the Pesticide Treadmill in Latin America.” *International Journal of Sustainable Development & World Ecology* 4 (2): 93–111. https://doi.org/10.1080/13504509709469946

[iii] Patel, Raj. “The Long Green Revolution.” *Journal of Peasant Studies* 40, no. 1 (January 2013): 1–63. https://doi.org/10.1080/03066150.2012.719224.

[iv] Galt, Ryan E. 2008. “Beyond the Circle of Poison: Significant Shifts in the Global Pesticide Complex, 1976–2008.” *Global Environmental Change* 18 (4): 786–99. https://doi.org/10.1016/j.gloenvcha.2008.07.003.

[v] Patel, Raj. “The Long Green Revolution.” *Journal of Peasant Studies* 40, no. 1 (January 2013): 1–63. https://doi.org/10.1080/03066150.2012.719224.

[vi] Galt, Ryan E. 2008. “Beyond the Circle of Poison: Significant Shifts in the Global Pesticide Complex, 1976–2008.” *Global Environmental Change* 18 (4): 786–99. https://doi.org/10.1016/j.gloenvcha.2008.07.003.

[vii] Redmond, Derek. 2002. “Importing Death as a Part of Free Trade: An Argument for a Prohibition on the Importation of Foods Containing the Residue of Banned Pesticides.” *William & Mary Environmental Law and Policy Review* 27 (1): 34.

[viii] Galt, Ryan E. 2008. “Beyond the Circle of Poison: Significant Shifts in the Global Pesticide Complex, 1976–2008.” *Global Environmental Change* 18 (4): 786–99. https://doi.org/10.1016/j.gloenvcha.2008.07.003.

[ix] Redmond, Derek. 2002. “Importing Death as a Part of Free Trade: An Argument for a Prohibition on the Importation of Foods Containing the Residue of Banned Pesticides.” *William & Mary Environmental Law and Policy Review* 27 (1): 34.

[x] Galt, Ryan E. 2008. "Beyond the Circle of Poison: Significant Shifts in the Global Pesticide Complex, 1976–2008." *Global Environmental Change* 18 (4): 786–99. https://doi.org/10.1016/j.gloenvcha.2008.07.003.
[xi] Wilson, John S., and Tsunehiro Otsuki. 2004. "To Spray or Not to Spray: Pesticides, Banana Exports, and Food Safety." *Food Policy* 29 (2): 131–46. https://doi.org/10.1016/j.foodpol.2004.02.003.
[xii] *Id.*
[xiii] Redmond, Derek. 2002. "Importing Death as a Part of Free Trade: An Argument for a Prohibition on the Importation of Foods Containing the Residue of Banned Pesticides." *William & Mary Environmental Law and Policy Review* 27 (1): 34.
[xiv] "Health Equity: Challenges in Low Income Countries." 2009. *African Health Sciences* 9 (Suppl 2): S49–51.
[xv] Patel, Raj. "The Long Green Revolution." *Journal of Peasant Studies* 40, no. 1 (January 2013): 1–63. https://doi.org/10.1080/03066150.2012.719224.
[xvi] Diaz, Dr. Leticia M.; Dubner, Dr. Barry Hart. 2005. "On the Importance of Regulating the International Trade of Pesticides: A Look at the Current Status of Conventional Wisdom (or Lack Thereof) on the Subject." *Southeastern Environmental Law Journal* 14 (1): 40.
[xvii] "Health Equity: Challenges in Low Income Countries." 2009. *African Health Sciences* 9 (Suppl 2): S49–51.
[xviii] Diaz, Dr. Leticia M.; Dubner, Dr. Barry Hart. 2005. "On the Importance of Regulating the International Trade of Pesticides: A Look at the Current Status of Conventional Wisdom (or Lack Thereof) on the Subject." *Southeastern Environmental Law Journal* 14 (1): 40.
[xix] Redmond, Derek. 2002. "Importing Death as a Part of Free Trade: An Argument for a Prohibition on the Importation of Foods Containing the Residue of Banned Pesticides." *William & Mary Environmental Law and Policy Review* 27 (1): 34.
[xx] *Id.*
[xxi] Diaz, Dr. Leticia M.; Dubner, Dr. Barry Hart. 2005. "On the Importance of Regulating the International Trade of Pesticides: A Look at the Current Status of Conventional Wisdom (or Lack Thereof) on the Subject." *Southeastern Environmental Law Journal* 14 (1): 40.
[xxii] "Health Equity: Challenges in Low Income Countries." 2009. *African Health Sciences* 9 (Suppl 2): S49–51.
[xxiii] Redmond, Derek. 2002. "Importing Death as a Part of Free Trade: An Argument for a Prohibition on the Importation of Foods Containing the Residue of Banned Pesticides." *William & Mary Environmental Law and Policy Review* 27 (1): 34.
[xxiv] Patel, Raj. "The Long Green Revolution." *Journal of Peasant Studies* 40, no. 1 (January 2013): 1–63. https://doi.org/10.1080/03066150.2012.719224.
[xxv] "United Nations Treaty Collection., The Rotterdam Convention Treaty" 2019. https://treaties.un.org/pages/ParticipationStatus.aspx.
[xxvi] Redmond, Derek. 2002. "Importing Death as a Part of Free Trade: An Argument for a Prohibition on the Importation of Foods Containing the Residue of Banned Pesticides." *William & Mary Environmental Law and Policy Review* 27 (1): 34.
[xxvii] *Id.*
[xxviii] US EPA, OA. 2015. "Summary of the Food Quality Protection Act." Overviews and Factsheets. US EPA. https://www.epa.gov/laws-regulations/summary-food-quality-protection-act.
[xxix] "Health Equity: Challenges in Low Income Countries." 2009. *African Health Sciences* 9 (Suppl 2): S49–51.
[xxx] Galt, Ryan E. 2008. "Beyond the Circle of Poison: Significant Shifts in the Global Pesticide Complex, 1976–2008." *Global Environmental Change* 18 (4): 786–99. https://doi.org/10.1016/j.gloenvcha.2008.07.003.
[xxxi] Redmond, Derek. 2002. "Importing Death as a Part of Free Trade: An Argument for a Prohibition on the Importation of Foods Containing the Residue of Banned Pesticides." *William & Mary Environmental Law and Policy Review* 27 (1): 34.
[xxxii] "United Nations Treaty Collection., The Rotterdam Convention Treaty" 2019. https://treaties.un.org/pages/ParticipationStatus.aspx.
[xxxiii] Diaz, Dr. Leticia M.; Dubner, Dr. Barry Hart. 2005. "On the Importance of Regulating the International Trade of Pesticides: A Look at the Current Status of Conventional Wisdom (or Lack Thereof) on the Subject." *Southeastern Environmental Law Journal* 14 (1): 40.
[xxxiv] *Id.*
[xxxv] Galt, Ryan E. 2008. "Beyond the Circle of Poison: Significant Shifts in the Global Pesticide Complex, 1976–2008." *Global Environmental Change* 18 (4): 786–99. https://doi.org/10.1016/j.gloenvcha.2008.07.003.
[xxxvi] *Id.*

[xxxvii] Redmond, Derek. 2002. "Importing Death as a Part of Free Trade: An Argument for a Prohibition on the Importation of Foods Containing the Residue of Banned Pesticides." *William & Mary Environmental Law and Policy Review* 27 (1): 34.
[xxxviii] Donley, Nathan. 2019. "The USA Lags behind Other Agricultural Nations in Banning Harmful Pesticides." *Environmental Health* 18 (1): 44. https://doi.org/10.1186/s12940-019-0488-0.
[xxxix] "United Nations Treaty Collection., The Rotterdam Convention Treaty" 2019. https://treaties.un.org/pages/ParticipationStatus.aspx.
[xl] Patel, Raj. "The Long Green Revolution." *Journal of Peasant Studies* 40, no. 1 (January 2013): 1–63. https://doi.org/10.1080/03066150.2012.719224.
[xli] Diaz, Dr. Leticia M.; Dubner, Dr. Barry Hart. 2005. "On the Importance of Regulating the International Trade of Pesticides: A Look at the Current Status of Conventional Wisdom (or Lack Thereof) on the Subject." *Southeastern Environmental Law Journal* 14 (1): 40.
[xlii] Redmond, Derek. 2002. "Importing Death as a Part of Free Trade: An Argument for a Prohibition on the Importation of Foods Containing the Residue of Banned Pesticides." *William & Mary Environmental Law and Policy Review* 27 (1): 34.
[xliii] Galt, Ryan E. 2008. "Beyond the Circle of Poison: Significant Shifts in the Global Pesticide Complex, 1976–2008." *Global Environmental Change* 18 (4): 786–99. https://doi.org/10.1016/j.gloenvcha.2008.07.003.
[xliv] *Id.*
[xlv] Patel, Raj. "The Long Green Revolution." *Journal of Peasant Studies* 40, no. 1 (January 2013): 1–63. https://doi.org/10.1080/03066150.2012.719224.
[xlvi] "United Nations Treaty Collection., The Rotterdam Convention Treaty" 2019. https://treaties.un.org/pages/ParticipationStatus.aspx.
[xlvii] Langman, Jimmy. 2008. "The Global Pesticide Pushers in Latin America." *NACLA Report on the Americas* 41 (1): 5–10. https://doi.org/10.1080/10714839.2008.11722281.
[xlviii] Diaz, Dr. Leticia M.; Dubner, Dr. Barry Hart. 2005. "On the Importance of Regulating the International Trade of Pesticides: A Look at the Current Status of Conventional Wisdom (or Lack Thereof) on the Subject." *Southeastern Environmental Law Journal* 14 (1): 40.
[xlix] Patel, Raj. "The Long Green Revolution." *Journal of Peasant Studies* 40, no. 1 (January 2013): 1–63. https://doi.org/10.1080/03066150.2012.719224.
[l] Redmond, Derek. 2002. "Importing Death as a Part of Free Trade: An Argument for a Prohibition on the Importation of Foods Containing the Residue of Banned Pesticides." *William & Mary Environmental Law and Policy Review* 27 (1): 34.
[li] Galt, Ryan E. 2009. "Overlap of US FDA Residue Tests and Pesticides Used on Imported Vegetables: Empirical Findings and Policy Recommendations." *Food Policy* 34 (5): 468–76. https://doi.org/10.1016/j.foodpol.2009.05.005.
[lii] Diaz, Dr. Leticia M.; Dubner, Dr. Barry Hart. 2005. "On the Importance of Regulating the International Trade of Pesticides: A Look at the Current Status of Conventional Wisdom (or Lack Thereof) on the Subject." *Southeastern Environmental Law Journal* 14 (1): 40.
[liii] *Id.*
[liv] *Id.*
[lv] *Id.*
[lvi] Aldicarb is manufactured by Bayer CropScience ("What Is Aldicarb? Chemservice News" 2014)
[lvii] Diaz, Dr. Leticia M.; Dubner, Dr. Barry Hart. 2005. "On the Importance of Regulating the International Trade of Pesticides: A Look at the Current Status of Conventional Wisdom (or Lack Thereof) on the Subject." *Southeastern Environmental Law Journal* 14 (1): 40.
[lviii] Galt, Ryan E. 2008. "Beyond the Circle of Poison: Significant Shifts in the Global Pesticide Complex, 1976–2008." *Global Environmental Change* 18 (4): 786–99. https://doi.org/10.1016/j.gloenvcha.2008.07.003.
[lix] US EPA, OECA. 2013. "Importing and Exporting Pesticides and Devices." Overviews and Factsheets. US EPA. https://www.epa.gov/compliance/importing-and-exporting-pesticides-and-devices.
[lx] Altieri, Miguel A.; Nicholls, Clara Ines. 1997. "Conventional Agricultural Development Models and the Persistence of the Pesticide Treadmill in Latin America." *International Journal of Sustainable Development & World Ecology* 4 (2): 93–111. https://doi.org/10.1080/13504509709469946
[lxi] Redmond, Derek. 2002. "Importing Death as a Part of Free Trade: An Argument for a Prohibition on the Importation of Foods Containing the Residue of Banned Pesticides." *William & Mary Environmental Law and Policy Review* 27 (1): 34.

[lxii] Robinson, David. 2016. "Golf Courses and Chemical Companies Target Environmental Laws." News Story. Lohud. https://www.lohud.com/story/news/investigations/2016/07/27/golf-courses-and-chemical-companies-target-environmental-laws/87400716/.
[lxiii] Patel, Raj. "The Long Green Revolution." *Journal of Peasant Studies* 40, no. 1 (January 2013): 1–63. https://doi.org/10.1080/03066150.2012.719224.
[lxiv] "Agrow Top 20 2018." 2018. Agrow Agribusiness Intelligence. https://agrow.agribusinessintelligence.informa.com/-/media/agri/agrow/ag-market-reviews-pdfs/supplements/agrow_top20_2018_online.com.
[lxv] "Top Pesticides Exporters." 2019. World's Top Exports. http://www.worldstopexports.com/top-pesticides-exporters/.
[lxvi] McCouley, Lauren. 2016. "Exposed: Pesticide Industry Deployed Aggressive Lobby Effort to Quash Bee Protections." Common Dreams. https://www.commondreams.org/news/2016/06/15/exposed-pesticide-industry-deployed-aggressive-lobby-effort-quash-bee-protections.
[lxvii] Altieri, Miguel A.; Nicholls, Clara Ines. 1997. "Conventional Agricultural Development Models and the Persistence of the Pesticide Treadmill in Latin America." *International Journal of Sustainable Development & World Ecology* 4 (2): 93–111. https://doi.org/10.1080/13504509709469946
[lxviii] Redmond, Derek. 2002. "Importing Death as a Part of Free Trade: An Argument for a Prohibition on the Importation of Foods Containing the Residue of Banned Pesticides." *William & Mary Environmental Law and Policy Review* 27 (1): 34.
[lxix] World Trade Organization News. "WTO | 2019 News Items -Members Address Trade Concerns, Promote Transparency in SPS Committee," July 19, 2019. https://www.wto.org/english/news_e/news19_e/sps_22jul19_e.htm.
[lxx] Patel, Raj. "The Long Green Revolution." *Journal of Peasant Studies* 40, no. 1 (January 2013): 1–63. https://doi.org/10.1080/03066150.2012.719224.
[lxxi] Altieri, Miguel A.; Nicholls, Clara Ines. 1997. "Conventional Agricultural Development Models and the Persistence of the Pesticide Treadmill in Latin America." *International Journal of Sustainable Development & World Ecology* 4 (2): 93–111. https://doi.org/10.1080/13504509709469946