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Food Fight: The Impending Agricultural Crisis and a Reasonable Response to Price Volatility

Aaron Sternick

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FOOD FIGHT: THE IMPENDING AGRICULTURAL CRISIS AND A REASONABLE RESPONSE TO PRICE VOLATILITY

I. INTRODUCTION

Like storefront windows during the recent Algerian food riots, surging food prices may soon shatter the global food economy. The hunger-fueled turmoil has spilled into international politics with decades-strong regimes toppling one by one. Meanwhile, in America, third-world food riots appear to be nothing more than the usual struggle between downtrodden populations and their dictators. The Whole Foods economic culture is winning, as Western consumers flock to smaller-scale organic producers; it only takes a trip to the grocery store to distance oneself from the turbulence in Africa and the Middle East.

Beginning in 2007 and peaking in 2008, the world endured a food price spike that sent third-world nations spiraling into unrest. A multitude of factors led to the 2008 crisis, including changing diets in developing nations, natural disaster, speculation on commodities, and escalating biofuel production. In spite of these fac-


5. See Angus, supra note 3 (describing political turmoil surrounding 2008 food crisis).

6. For a discussion of causes of the 2008 food price crisis, see infra notes 18-77 and accompanying text.
tors, international food production spiked and major agribusiness firms saw astronomical profits.\(^7\)

How can the world produce unprecedented amounts of food while simultaneously suffer from unparalleled hunger?\(^8\) Why is the West’s foot so firmly on the accelerator of sustainable energy when most countries barely have sustainable agriculture?\(^9\) The impending global agricultural crisis calls for an examination of the possible burdens of overpopulation and the implementation of more appropriate policies for a scenario in which there is a per capita food shortage.\(^10\) The imminent food price surge, like that of 2008, is both a crisis as well as a crossroad that should invite solutions beyond those addressing overpopulation.\(^11\) The West should begin to question the current global policy that compels weaker nations to serve stronger nations despite their own food-related demands.\(^12\) Furthermore, policy makers should direct their attention to laborers instead of lobbyists, and examine whether agricultural globalization is the answer to the problems of sustainability.\(^13\)

This Comment examines the issues and potential solutions to the impending food crisis. Part II explains the most widely accepted conclusions about the causes of the 2008 crisis.\(^14\) Part III addresses the feasibility and success of proposed remedies to the 2008 price surge.\(^15\) Part IV poses the quandary of world hunger, not as a variety of contributing factors, but as an all-encompassing failure of global policy.\(^16\) Finally, Part V concludes with an explana-

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7. See Lappé & Lappé, supra note 4 (observing rise in Monsanto stock amidst 2008 crisis).
9. See Angus, supra note 3 (observing current accepted global policy of high agrofuel production).
10. See Lappé & Lappé, supra note 4 (noting inconsistency between current 3,000 calorie per person food production and arguments concerning overpopulation).
11. For a discussion of the overpopulation issue, see infra notes 71-77 and accompanying text.
12. See Lappé & Lappé, supra note 4 (framing issue as not lack of food, but “scarcity of democracy”).
13. See generally Holt-Giménez, supra note 8, at 147-48 (advocating pursuit of local food sovereignty over international food globalization).
14. For a discussion of accepted theories behind 2008 crisis, see infra notes 18-77 and accompanying text.
15. For a discussion of attempts to ameliorate food crisis, see infra notes 78-110 and accompanying text.
16. For a discussion of the impact of overall agricultural market structure on food prices, see infra notes 111-166 and accompanying text.
tion of major policy initiatives modeled on sustainability that could ameliorate the pitfalls of the current international agriculture policy.  

II. THE TANGLED ROOTS OF THE 2008 FOOD CRISIS

Currently, the Middle East is erupting into unbelievable chaos. People are hungry and ready to move forward from their despotic histories toward more equitable futures. While some countries have been successful in casting off the burden of autocracy, the majority of the world still struggles under the yoke of agribusiness. Corporate interests, however, do not fully explain the myriad of factors threatening the world food security. Growth of the global middle class, natural disaster, financial speculation, and efforts toward alternative fuel create a new and challenging burden on global food supply.

A. Feeding the Burgeoning Middle Class

A significant part of the 2008 food crisis resulted from large populations in emerging nations entering into the global middle class, and the consequent demand for more expensive food. Wealthier Western countries, such as the United States, have long enjoyed diverse dietary options, including meats, fruits, and vegetables. Poorer countries, however, previously consumed almost no

17. For a discussion of solutions to address inadequacies of agricultural regimes, see infra notes 167-222 and accompanying text.
21. For a discussion of the diverse causes of the 2008 food crisis, see infra notes 18-77 and accompanying text.
22. For a discussion of the factors contributing to the 2008 food crisis, see infra notes 23-77.
23. See Katarina Wahlberg, Are We Approaching a Global Food Crisis?, GLOBAL POLICY FORUM (Mar. 3, 2008), http://globalpolicy.org/component/content/article/217/46194.html (identifying developing nations that have sparked rising demand for high-cost food).
grain through indirect sources like meat.\textsuperscript{25} While the Western dependence on fat, salt, and sugar slowly increased over the last few decades, many developing nations recently incorporated these indulgences into their lifestyles at an alarming rate.\textsuperscript{26} As per capita income increases, people tend to consume more grains indirectly, such as through grain-fed meat.\textsuperscript{27} In some developing countries, per capita meat consumption has doubled.\textsuperscript{28} For example, China's middle class experienced a dramatic shift from grain consumption toward more costly items like milk and meat.\textsuperscript{29} As a result, agriculture markets have now diverted many staple crops, once grown to feed poorer countries, to support the livestock used to feed the growing middle class.\textsuperscript{30} Seemingly overnight, the most heavily populated developing countries echoed the Western command of "supersize it."\textsuperscript{31}

Assuming the food supply remains constant, a dramatic rise in consumption will increasingly strain the stable food supply.\textsuperscript{32} This trend toward over-consumption marks an apparent flaw in the notion that the demand for food will always be limited by the size of

\textsuperscript{25} See Utsa Patnaik, Origins of the Food Crisis in India and Developing Countries, MONTHLY REVIEW (July-Aug. 2009), available at http://www.monthlyreview.org/090727patnaik.php (stating consumption of grain through animal products is close to zero in developing countries).

\textsuperscript{26} See SOPHIA MURPHY, INSTITUTE FOR AGRICULTURE AND TRADE POLICY, THE GLOBAL FOOD PRICE CRISIS 2 (Oct. 6, 2008), available at http://www.iatp.org/files/451_2_104147.pdf (noting there are more people eating more calories, and more foods raised, processed, and transported using more water and energy).

\textsuperscript{27} See Patnaik, supra note 25 (explaining ways through which humans consume grain).


\textsuperscript{30} See id. (concluding surge in purchasing power pushes more grain toward livestock production).


\textsuperscript{32} See Wahlberg, supra note 23 (explaining how spike in demand for grains for animal feed and biofuel have nearly exhausted supply).
the stomach to be fed. The recently prosperous middle class in many newly industrialized countries, such as China and India, now place a significant strain on the global agricultural demand for the most nutritious and expensive foods. The food consumed by Western populations often involves heavy processing, which uses more energy and water than required for the cultivation of traditional grain-based commodities food. Moreover, the escalating global demand for grain-fed meat products decreases the land available for farmers to grow staple crops for local communities. Despite the steady supply of grain, farmers cannot satisfy the competing demands for grain-based cereals for the poor and grain-fed livestock for the burgeoning middle class.

B. The Usual Suspects: Drought and Flooding

Though food crises have unique contributing factors, natural disaster is a common thread linking many countries together through the inevitable contribution of volatility to the global market. In recent years, global warming has intensified the extreme weather conditions that typically decimate crops. Climate change already significantly reduced rainfall and altered temperature in dense agricultural regions. Though climate change has been a common contributing factor to past food crises, it “is happening at a time when strong population growth in many parts of the world...”

33. See Patnaik, supra note 25 (posing ameliorating effect on world hunger if less grains went toward livestock support).
34. See Mittal, supra note 24, at 5 (describing various effects of global agricultural commodity prices on world markets and westernization of diet); see Patnaik, supra note 25 (detailing impact of increased prosperity of middle class on demand for grain-fed livestock).
35. See Murphy, supra note 26, at 2 (observing detrimental effect of Western diet on environment and public health).
36. See id. (noting dwindling land supply for “cassava, millet, wheat and local vegetables”).
37. See Patnaik, supra note 25 (describing deprivation of lower class’s direct grain consumption by middle and upper class’s meat consumption).
38. See Mittal, supra note 24, at 2 (observing World Food Program assertion that drought was biggest contributing factor to 2008 crisis).
39. See Bryan Walsh, Why Global Warming Portends a Food Crisis, TIME (Jan. 13, 2009), http://www.time.com/time/health/article/0,8599,1870766,00.html (explaining greenhouse gas emissions’ significant upward effect on average temperatures). Higher average temperatures do not indicate longer growth seasons, but only a higher chance of crop wilting. Id.
40. See Murphy, supra note 26, at 2 (observing smallest change in average temperature can cut harvests in some regions).
continues to contribute to the difficulty of supply keeping up with demand."\(^{41}\)

To make matters worse, governments have maintained the minimal amount of grain reserves allowed by the Food and Agriculture Organization (FAO) in order to maximize exports.\(^{42}\) With reserves so low, countries will experience more difficulty feeding their populations during serious disasters such as drought or flooding.\(^{43}\) Accordingly, when harvests are inadequate, countries with low grain reserves will dramatically increase their grain imports.\(^{44}\) This spike in demand of grain is often drastic and strains the otherwise consistent global supply, consequently driving up prices.\(^{45}\)

C. Speculation on the Global Food Market

If there is one way to disturb the natural ebb and flow of ordinary market trends, it is the inclusion of human intervention.\(^{46}\) Financial regulations governing the trade of agricultural commodities recently expanded to allow for the participation of people who are not in direct need of those commodities.\(^{47}\) Natural disasters, such as floods, often decimate cropland and drive up food prices, but natural disasters do not adequately account for the food

\(^{41}\) von Braun, supra note 29, at 4 (detailing unique threat natural disasters pose in modern era); see also Mittal, supra note 24, at 4 (emphasizing World Food Program estimate that drought was major cause of 2008 food crisis).

\(^{42}\) See About FAO, FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, http://www.fao.org/about/en/ (last updated Oct. 24, 2011) (identifying FAO as independent national body overseeing world hunger policy); see Hendrik J. Bruins, Global Food Insecurity: A Rationale for National Grain Reserves in Disaster Contingency Planning, INTERNATIONAL DISASTER AND RISK CONFERENCE 13 (2008), http://www.idrc.info/userfiles/image/presentations2008/bruins_hendrik_global_food_insecurity_a_rationale_for_national_grain_reserves_in_disaster_contingency_planning.pdf (explaining need for national grain reserves to compensate during grain shortfalls); see Murphy, supra note 26, at 1 (denoting market-based approaches as factor in dwindling food reserves).

\(^{43}\) See Bruins, supra note 42, at 13 (describing flaw in international grain reserve policy).

\(^{44}\) See von Braun, supra note 29, at 4 (describing difficulty in supply catching up with demand as climate change leads to wilder and more unpredictable weather).

\(^{45}\) See Wisdom, supra note 20 (explaining how economic factors coalesce until demand outweighs supply).

\(^{46}\) See Kanaga Raja, Development: Speculation Played Major Role in Food Price Crisis, SOUTH-NORTH DEVELOPMENT MONITOR (Sept. 28, 2010), available at http://www.twnside.org.sg/title2/susagri/2010/susagri131.htm (concluding 2008 food crisis was initially result of ordinary market action).

\(^{47}\) See Murphy, supra note 26, at 3 (explaining change in law, mostly in United States and United Kingdom, allowed more risky speculative activity); see Raja, supra note 46 (observing mass deregulation in international commodity markets in early 2000s).
price crisis because direct human manipulation of the food supply also has significant impacts.48

Traditionally, the agricultural industry maintained stability when farmers contracted with silo operators for the next harvest: a "futures" contract.49 The farmers and silo operators interacted in a relationship modeled on supply and demand fundamentals with little room for unpredictability aside from natural disasters.50 Investors, however, began purchasing these futures at a rapid rate, thus creating considerable volatility in the market to the agriculture industry's detriment.51 When the market for food is flooded with buyers, the price of food inflates without any change in demand.52 Upon the occurrence of an event that reduces supply, such as a major flood, investors who are gambling on the market magnify the resulting demand-driven price surge.53 While typical market influences like natural disasters affect prices, excessive speculation aggravates the problem to a distressing extent.54

D. Biofuel and its Battle for Farmland

At the turn of the millennium, climate change became a driving force in environmental policy.55 Since then, many countries have pushed mandatory objectives and subsidies for renewable fuel production with great fervor, leaving small farmers politically silent and with little choice in the use of their land.56 Biofuel is an important fuel alternative that is both renewable and contributes very few

48. See Raja, supra note 46 (characterizing 2008 crisis as "unique in that it was possibly the first price crisis that occurred in an economic environment characterized by massive amounts of novel forms of speculation in commodity derivative markets").


50. See id. (observing influx of market participants for agricultural commodities and resulting volatility).

51. See Murphy, supra note 26, at 3 (noting change in commodities policy invited drastic influx of investors).

52. See Brown, supra note 49 (noting demand far exceeds supply in current agricultural market as investments substantially outstrip demand of hungry).

53. See id. (explaining how increased food prices resulted from investors fleeing real estate bubble to commodities bubble).

54. See Murphy, supra note 26, at 3 (observing natural tendency for market to surge and fall to greater extent than real supply and demand would indicate). For a discussion of natural disasters affecting the food crisis, see supra notes 38-45 and accompanying text.

55. See Mittal, supra note 24, at 6 (explaining climate change and rising energy costs have made biofuel high priority for many governments).

hazardous emissions.\textsuperscript{57} Biofuel is primarily produced from ethanol, a type of alcohol derived from plant matter.\textsuperscript{58} Researchers estimated the cultivation of biofuel contributed to as much as one-third of the 2008 rise in all food prices, though these figures were grossly underestimated.\textsuperscript{59} In the United States, corn is the primary source of ethanol.\textsuperscript{60} Domestic energy policy shifted agricultural incentives such that it is more attractive for farmers to harvest corn for the production of fuel rather than for consumption as a food source.\textsuperscript{61} Some developing nations have also diverted grain and vegetable cropland in favor of inedible biodiesel source crops.\textsuperscript{62} The race to convert agriculture from food to fuel has been encouraged by policy makers and market forces, which drives up the cost of food derived from those crops.\textsuperscript{63} The essential problem in referring to biofuel as “renewable,” therefore, is that cropland is funneled away from consumable food production as it is harvested.\textsuperscript{64}

Additionally, as oil prices skyrocket, the energy costs of agriculture are palpably impacting the price of food.\textsuperscript{65} Global agribusiness creates a third of the pollution that contributes to climate change.\textsuperscript{66} At the same time, diverting resources and farmland to biofuel

\textsuperscript{57} See Biofuel: A Short Review, BIOFUEL GUIDE (Feb. 17, 2008), http://biofuelguide.net/ (defining biofuel as renewable alternative to traditional fossil fuel with less hazardous emissions).
\textsuperscript{58} See id. (explaining how biofuel is made).
\textsuperscript{60} See id. at 2 (explaining competing interests in ethanol and grocery industries).
\textsuperscript{61} See id. at 3 (noting increased shift in corn from food to ethanol).
\textsuperscript{62} See id. at 4 (observing Myanmar’s policy diverting use of cropland from harvesting edible food to harvesting inedible fuel source).
\textsuperscript{65} See MITTAL, supra note 24, at 4 (emphasizing oil prices significantly impacted cost of agricultural production, especially in poor countries).
\textsuperscript{66} See Lappé, supra note 64, at 370 (stressing agriculture’s own responsibility for global warming).
growth places an equal burden on the price of grains for human consumption. In fact, one of the primary sources of biofuel, corn-based ethanol, may pose drastic environmental dangers that outstrip its benefit as an energy source. While ethanol may result in cleaner automobile emissions, the factories producing the ethanol emit as many environmental pollutants into the air as traditional energy sources. Thus, modern Western agriculture maintains a burdensome dependence on fossil fuels while the effort to develop alternative fuels exacerbates the costs of producing consumable food.

E. Overpopulation

Crises concerning finite resources inevitably lead to a misguided fear of the consequences of overpopulation. The controversial 200-year-old theory developed by Thomas Malthus suggests some significant part of the world will go hungry as long as the means for exponential population growth are available. Essentially, the population grows exponentially (1, 2, 4, 8, etc.), while resources grow arithmetically (1, 2, 3, 4, etc.).

At its core, the Malthusian argument first presumes demand will invariably outweigh supply; and second, the food production methods available two centuries ago have not advanced significantly.


68. See Wahlberg, supra note 23 (stressing burdensome demands of ethanol production and biofuel farmers’ flagrant disregard for environmental concerns).


It is evident from the 2008 food crisis, however, that the world is producing more than enough food and, as such, demand is not outstripping supply. Furthermore, genetic modification and modern pesticides have propelled food production to its current sufficient state. The flawed Malthusian view of overpopulation facilitates the potentially dangerous illusion that the world can reduce hunger but never entirely eliminate it.

III. Global Response to the 2008 Food Crisis

Together, the short-term and institutional causes of the rise in food prices have devastated the livelihood of the working class in third-world countries. For example, only a few well-subsidized conglomerates now produce maize, the touchstone of the Mexican farming industry. Consequently, droves of Mexican peasants cannot compete in the industry and therefore abandoned their farms. With little money and a dwindling domestic source for the staple crop, Mexico's indigents buy maize and other crops internationally at high and unsubsidized prices.

In order to alleviate the effects of the food crisis, global policy makers should recognize the need to develop responsible solutions. For example, Western countries could limit the push toward biofuel growth, which has diverted so much cropland from consumable food. The actual response to the crisis, however,

74. See Feffer, supra note 71 (explaining flawed presumptions in Malthusian theory).
75. See Lappé & Lappé, supra note 4 (dismissing insufficient production as major contributing factor to 2008 food crisis).
76. See Feffer, supra note 71 (noting scientific achievements spurred food production since advent of Malthusian theory).
80. See id. (explaining local producers do not see benefit from significant rise in global price for maize).
81. See id. (concluding decimation of local food sources has severe impact on structure and safety of communities).
82. See Mital, supra note 24, at 19 (stressing urgent action necessary to provide food security to third-world nations).
83. For a discussion of biofuel's role in 2008 food crisis, see supra notes 55-70 and accompanying text.
demonstrates the generally accepted image that the southern hemisphere is the northern hemisphere’s farm. 84

A. The Bleak Future of Alternative Fuel Production

In recent years, U.S. environmental policy makers lobbied for heavier subsidies for biofuel production. 85 Subsidies fundamentally provide incentives for the production of a given commodity by attaching tax breaks for its producers. 86 Reduction or elimination of these subsidies is a sensible response to the 2008 food price crisis. 87

In contrast, some governments established production mandates to set target levels of production for certain goods over time. 88 For example, the U.S. Renewable Fuels Standard requires the annual consumption of thirty-six billion gallons of biofuel by 2022. 89 Some U.S. states, including Texas, have aggressively campaigned against the Environmental Protection Agency’s biofuel production mandates, citing skyrocketing food prices as a reason to restrict the push for biofuel. 90 After all, biofuel’s displacement of viable cropland may negate its potential to reduce the cost of production of consumable crops. 91 Instead of changing the current course of action, the United States has granted extended, albeit limited, subsidies to the biofuel industry and increased mandated biofuel production. 92

84. See McMichael, supra note 70 (identifying global policies that transformed third-world countries into Western food sources).
86. See id. (describing tax credits for development of biofuels). Tax credits are used for various reasons, such as: to help finance equipment for the industry, to support the production of different types of biofuels, or to fund the blending of biofuels into fossil fuels. Id.
87. See Wahlberg, supra note 23 (calling for wholesale elimination of policies that encourage high biofuel production).
89. Id. (describing unattractive side effects of ramped-up biofuel production).
90. See Lori A. Burkhart, Biofuel Furor, 146 No. 8 PUB. UTIL. FORT. 52, 55 (Aug. 2008) (detailing Texas’s political response to ramped-up biofuel mandates).
91. For a discussion of alternative fuel’s inability to effectively reduce agriculture production costs, see supra notes 65-70 and accompanying text.
B. Feed Farmers First

On a structural level, the dramatic rise in food prices is a problem of maximized exports and, because of a low domestic supply, overly expensive imports.\(^93\) Shutting off the flow of exports will force domestic producers to trade within the country.\(^94\) In theory, an export ban will result in a greater domestic supply of the commodity and, consequently, allow domestic prices to stabilize and decline.\(^95\) After all, dramatic fluctuations in price from international trading speculation contributed to the crisis in the first place.\(^96\) Many countries instituted export bans in response to the skyrocketing prices and, as a result, suffered violent riots incited by hunger.\(^97\) These export bans, however, tend to inflate the price of the commodities in other countries that depend on the importation of the commodities.\(^98\) The regional political turmoil created by the export bans was not worth a nation’s temporary price respite.\(^99\) Therefore, while export bans may yield some positive effects within the country implementing the ban, they further entrench the world in excessive food prices.\(^100\)

\(^93\). See Steven Mufson, A global effort to keep food prices from soaring higher, WASHINGTON POST (Jan. 14, 2011, 10:21 PM), http://www.washingtonpost.com/wp-dyn/content/article/2011/01/14/AR2011011406262.html (observing international reliance on imports over domestic supplies).


\(^95\). See Mufson, supra note 93 (noting Russia’s rush to ban exports in hopes of influencing domestic food prices).

\(^96\). For a discussion of financial speculation’s role in the food price crisis, see supra notes 46-54 and accompanying text.


\(^99\). See THE STANDARD, supra note 97 (identifying risks associated with export bans).

C. Pay the Hungry

One possible solution to the crippling world hunger ushered in by the food crisis was direct cash payments, exemplified in the United States by the President’s Food Security Response Initiative (PFSRI). Through the PFSRI, Congress gave $770 million to the United States Agency for International Development (USAID) to provide relief to the countries most affected by the 2008 food crisis. Cash payments, however, generally receive less political support as some critics view the payments as mere handouts. In addition, in order for the payments to be effective they must provide direct aid to those affected by the crisis, as well as address the issues of aid distribution and the general resolution of the crisis. While the PFSRI has clear initiatives for improving farmer output, it has no way of ameliorating the structure of the global food system that subjugates smallholder and peasant farmers. An outpouring of food aid to third-world countries will never be fully successful without policy goals fostering the local growth of food markets.

D. If You Can’t Fix Hunger, Fix the Market

In the midst of the crisis, one crop in particular rose to roughly $1,000 per ton: rice. In order to tighten control on the volatile rice prices, the chief exporters of rice—Thailand, Vietnam, Cambodia, Burma, and Laos—proposed a potentially collusive rice coalition.
The countries intended to band together to fix rice prices, which unsurprisingly garnered massive support from rice manufacturers. The countries aborted the plan, however, when it became clear the coalition would only further the interests of major farmers while plunging many parts of the world deeper into starvation.

IV. You Say You Want a Revolution: A Failure of Global Agricultural Policy

To best understand the 2008 food crisis and the impending price surge, the focus should not be on a coalescence of multiple factors, but should be on the general grand failure in international food policy. Food security is the notion that everyone possesses a basic entitlement to a sufficient livelihood, which includes ample sustenance. In a food price crisis, a population’s overall lack of access to necessary food compromises basic food security. Supply often dictates food security, and global aid efforts, such as direct cash payments to affected countries, can provide basic food security.

Food sovereignty, in contrast, is the “people’s right to culturally appropriate food produced through ecologically sound and sustainable methods, and their right to define their own food and agriculture systems.” A population’s food sovereignty is an in-

108. See id. (identifying Thailand’s abiding efforts to join other countries in controlling rice market).
111. See McMichael, supra note 70 (explaining 2008 food crisis as historical problem having roots in long-standing neoliberal policies).
112. See Kerstin Mechlem, Agricultural Biotechnologies, Transgenic Crops and the Poor: Opportunities and Challenges, 10 Hum. RTS. L. REV. 749, 750 (2010) (placing food security as basic human right).
113. See Holt-Giménez, supra note 8, at 143 (noting “angry demonstrations against high food prices in countries that formerly had food surpluses”).
114. For a discussion of direct cash payments to ameliorate crisis, see supra notes 101-106 and accompanying text.
115. Holt-Giménez, supra note 8, at 146 (defining food sovereignty as construed by La Via Campesina).
quality between the farmer and the market and is difficult to address on solely a global level.\footnote{116}

By the end of World War II, the last vestiges of colonialism broke down and the Cold War incited the most powerful countries to reach out to the weakest for global influence.\footnote{117} This phenomenon, termed the Green Revolution, brought an enormous influx of food aid to the poorest countries, which nourished the people of the third-world nations more than ever before.\footnote{118} More importantly, Western nations shared the unprecedented agricultural technology that promised to eliminate hunger.\footnote{119} In order to utilize these benefits, however, third-world farmers bargained away their collective right to dictate how they grew their food.\footnote{120} As a result, many agricultural regions lost food sovereignty; the fundamental lack of global initiatives to foster agricultural growth on a local level significantly contributed to future world hunger.\footnote{121}

A. The Blight of Monoculturalism

A monoculture is a type of agricultural economic structure in which a country or region devotes its entire productive capacity to one crop.\footnote{122} In exchange for new technologies to enhance crop production, smallholder farmers collectively gave up their right to determine what crops they grew.\footnote{123} As the Green Revolution expanded after World War II, northern agribusiness corporations and governments placed immense pressure on the global South, in the form of investment loans, to engage solely in monoculture farm-
Pressuring the global South to industrialize its agriculture and compete on a global level, however, undermined any attempt at perpetuating sustainable local farming. Accordingly, when a country’s farming industry revolves around a single crop traded on a global scale, it must import all other crops needed for consumption.

Unlike the global North, however, the new monocultures in the global South lacked the necessary infrastructure to make the importation of all other consumption crops from various nations sufficiently cost-effective to justify such mass exportation. To make matters worse, large agribusiness firms placed immense pressure on the smallholder farmers to hold minimal grain reserves. Reserves, after all, withhold grains from the global marketplace. Thus, these smallholder farmers exported so much of their surplus crops that there was nothing remaining for subsistence. Under this structure, for example, a third-world farmer grows wheat in the spring, exports it north in the summer, and, in order to survive, must buy back the surplus from a northern corporation in the fall. The result is a nation’s complete loss of control over its commodities and, consequently, an alarming rise in hunger.

124. See id. at 947 (citing Carmen G. Gonzalez, Genetically Modified Organisms and Justice: The International Environmental Justice Implications of Biotechnology, 19 GEO. INT’L ENVTL. L. REV. 583, 600-01 (2007)) (explaining process by which northern governments provided loans to southern countries and encouraged industrialized agriculture to provide more exports to pay off debt); see also Mechlem, supra note 112, at 761 (observing crippling debt cycle stemming from foreign loans that traps farmers).

125. See McMichael, supra note 70 (emphasizing food crisis’ roots in substituting staple crops for export crops for global trade).

126. See Mandell, supra note 123, at 948 (noting paradoxical result as southern populations had to purchase food they grew back from north).


128. See Murphy, supra note 26, at 1 (observing grain stocks were at all-time low prior to 2008 food crisis).

129. See McMichael, supra note 70 (noting that high third-world debt accelerated stripping of grain reserves to pay loans).

130. See Mandell, supra note 123, at 941 (describing transition into export-oriented “feeder/fed dichotomy” as usurping smallholder farmers’ sovereignty over food).

131. See id. at 947 (noting replacement of developing countries’ local food supplies with cheaply-produced northern imports).

132. See Thurow & Kilman, supra note 77, at 10 (observing that north invested enough in southern agriculture to create high-yield exports, but not enough to sustain local food supplies).
B. Will the Invisible Hand of the Market Feed Everyone?

The Green Revolution essentially represented a massive movement to provide the global South with enough technology for high-yield production, without affording them equality in trade, which would have allowed the farmers to consume what they produced. Modern agriculture's trade inequities stem from subsidies and a distinct lack of market control; while northern governments subsidize domestic producers and implement policies to ensure market stability, southern agriculture suffers at the whim of such subsidies and policies.

Farmers in the global North receive a great deal of comfort through the price stability that hefty subsidies secure. Governments direct these subsidies so strongly toward core commodity crops, such as corn, that the global North must still rely on other nations for fruits and vegetables. Poorer countries, in contrast, often bargain away the ability to subsidize their farmers and institute import tariffs in exchange for valuable loans and technology. Moreover, in spite of the blessings associated with loans and technology, the frequently unstable governments of third-world nations struggle to provide reliable subsidies that allow farmers to survive the inevitable declines in prices.

For example, in 2005, the Haitian government agreed to cut its rice import tariff from 35% to 3% to secure a loan it needed from the United States. Heavily dependent upon the tariff for market access, Haitian rice farmers now had to compete with profoundly

133. See Mandell, supra note 123, at 946 (defining basic shortcoming of Green Revolution).
134. See Thurow & Kilman, supra note 77, at 10 (noting farmers' fundamental lack of control of agricultural economy in poorer countries).
137. See Thurow & Kilman, supra note 77, at 24 (identifying northern prohibition on southern subsidies as precondition for loan).
138. See id. at 10 (noting regardless of conditions to loans from north, southern governments frequently lack stability for subsidization and explaining benefits of private agricultural loans, which include rural infrastructure and better access to farming inputs).
139. Angus, supra note 3 (pointing out immense effect of northern pressure on southern policies promoting agriculture).
subsidized American rice. As Western countries place $280 billion toward subsidies each year, they secure a significant advantage over poorer countries without the ability to adequately protect their farmers.

In addition to subsidies, poorer countries are more vulnerable due to the unpredictable nature of the global food market. With greater economic power comes the global North's greater ability to protect its farmers with subsidies, import tariffs, and global leverage. During the Green Revolution, the northern governments urged the third-world countries, under the banner of free trade, to lower tariffs and trade barriers in favor of higher exports. As a result, third-world smallholder farmers placed all of their cultivation efforts into one crop; accordingly, their economic success rested on the rise and fall in the price of that one crop on the global market.

Furthermore, the volatility of the global food market incentivizes poorer countries to dismantle their grain reserves in favor of exports. An evolving economic perspective notes stocking grain is not only costly but also inefficient. In recent years, touting free market principals, agribusiness corporations and northern governments pressured smallholder and peasant farmers to stop holding crops for surplus and export their excess crops. When the food

140. Id. (describing drastic effect on southern farmers when northern subsidized agriculture butts up against southern unsubsidized agriculture).
141. Id. (identifying amount of subsidies United States provides for domestic agriculture each year).
143. For a discussion of the inequities of global subsidies, see supra notes 135-141 and accompanying text. See also Thurow & Kilman, supra note 77, at 24 (noting how subsidies are tied in with agricultural bargaining power such that poorer nations are never able to achieve success).
144. See Patnaik, supra note 25 (explaining inflationary impact of free trade policies on global grain prices).
146. See McMichael, supra note 70 (noting pattern of dismantling of grain reserves as condition of debt repayment).
147. See Mittal, supra note 24, at 4 (observing Green Revolution notion of inefficiency of grain stocking).
148. See Patnaik, supra note 25 (explaining southern countries were told they would have "comparative advantage" switching to exports and buying cheap northern imports).
crisis erupted in 2008, therefore, global grain stocks were at an unprecedented low.149

Finally, by raising the prices of input products, such as Monsanto’s seeds and Du Pont’s chemical sprays, agribusiness passed the costs onto farmers, and directly contributed to the price surges and resulting hunger.150 The global South essentially bargained away its trade barriers and the North flooded the South with cheap subsidized imports, the price of which large agribusiness firms could control.151 Thus, the highly monopolistic nature of the food system allows traders, processors, and retailers to influence food prices while producers’ revenue remains constantly low.152

C. Biotechnology: Blessing or Bane?

As many feared the consequences of a burgeoning world population on the finite available resources, the Green Revolution brought advanced farming technology to combat the hunger tragedy.153 After the initial introduction of sophisticated pesticides and fertilizers, agribusinesses were eventually able to modify plant DNA in order to create more efficient crop yields.154 Nearly all farming in the global North is now executed through massive agribusiness firms with mechanized farmhands and advanced chemical pesticides and fertilizers.155 The turn of the twenty-first century experienced greater use of genetic modification in agriculture as well as further incentives for the global South to adopt the technologies of the North.156

International agribusiness firms, such as Monsanto, sell smallholder farmers a package that includes fertilizer, pesticide, and

149. See Mittal, supra note 24, at 4 (identifying drastic dip in global grain reserves as contributing cause of food crisis).
150. See McMichael, supra note 70 (pointing to spread of genetic modification as placing greater power and, thus, greater price control in agribusiness’s hands).
151. See id. (describing how north forced southern agriculture market open and induced dependence on northern commodities).
152. See id. (noting farmers have seen no benefit to rising food prices while agribusiness stock soared during food crisis).
153. See Mechlem, supra note 112, at 752-53 (identifying Green Revolution notion that high productivity will stave off hunger by overpopulation).
154. See Mandell, supra note 123, at 948 (expressing agribusiness reliance on genetic modification to raise crop yields and prevent hunger).
155. See Peters, supra note 135, at 207 (describing highly industrialized nature of modern agriculture.).
156. See Mandell, supra note 123, at 950-51 (drawing comparison between first and second Green Revolution showing how each subjugated southern farmers with advanced technology).
seeds. But the chemical fertilizer and pesticide impose health risks on farmers' crops, and the seeds are genetically altered in such a way that they are not salvageable for a subsequent harvest. When hunger strikes, third-world governments must difficultly choose between curing the dangerous reliance on genetically modified agriculture or exacerbating widespread starvation. If the third-world government chooses the former, farmers will undoubtedly continue to toil at the whims of agribusiness's influence on prices.

D. Inadequate Infrastructure

Perhaps the most crucial flaw of the Green Revolution was pushing such sophisticated technology and demands on countries not internally capable of high-yield production. First, many third-world countries lack the resources to facilitate the movement of bountiful crops to other parts of the surrounding region where the year's harvest had failed. For example, if Kenya faces a weak harvest, it may be more costly or difficult for Ethiopian farmers to sell their successful harvests to their Kenyan neighbors than selling the crop on the global market. Second, when third-world farmers struggle through their most unproductive seasons, no local lenders come to their aid. Finally, the third-world smallholder farmers have no access to crop insurance against inclement weather. Accordingly, domestic farming in the global South will

157. See id. at 948 (describing process by which agribusiness firms pull farmers into industrialized production).
158. See id. at 948-49 (identifying dangers of genetically modified food and how intellectual property protection benefits suppliers).
159. See id. at 950 (pointing to media uproar when Africa turned down genetically modified crops as exemplifying this difficult choice).
160. See McMichael, supra note 70 (explaining monopolistic nature of agriculture market allows firms to influence food prices through manipulation of farming input prices).
161. See Thurow & Kilman, supra note 77, at 10 (observing northern governments never invested money in rural southern infrastructure).
162. See id. (noting, as Green Revolution brought high yields, farmers endured burdensome expenses in transporting crops).
163. See Mandell, supra note 123, at 947-48 (describing how Green revolution market liberalization undermines local and regional agriculture).
164. See Thurow & Kilman, supra note 77, at 10 (giving farmer financing as example of infrastructure investment that could curb hunger).
165. See id. (observing crop insurance could prevent breakdown of local agriculture when disaster strikes).
never be self-sufficient without crucial improvements to the surrounding infrastructure.\textsuperscript{166}

V. \textit{Viva La Via Campesina!: Restoring Food Sovereignty}

The world had already sunk into another food price crisis by 2011.\textsuperscript{167} While some experts tout the factors that gave rise to the 2008 crisis as the causes for the oncoming price surge, the catastrophic failure of the Green Revolution is increasingly more difficult to ignore as a major cause.\textsuperscript{168} In both 2008 and 2011, specific phenomena such as overzealous biofuel production and financial speculation aggravated the sustainability issues facing local and regional agriculture in third-world nations.\textsuperscript{169} If the commonly proffered Green Revolution solution, reduction of trade barriers, were implemented, it would only undermine the global South’s food sovereignty and exacerbate its dependency on wealthier nations.\textsuperscript{170}

The pattern of tariff reductions and subsidies over the last decade resulted in poorer countries increasingly dependent on imports from richer countries and decreasingly dependent on domestic production.\textsuperscript{171} In the best of times, the poorer countries prospered from an abundant food supply at heavily subsidized and, therefore, affordable Western prices.\textsuperscript{172} In the worst of times, however, such as in 2008 and now 2011, the poorer countries were slaves to Western food imports, and thus excessively vulnerable to price fluctuations.\textsuperscript{173} An effective solution, therefore, must prima-

\textsuperscript{166.} See McMichael, supra note 70 (identifying infrastructure as key point of improvement for developing countries).


\textsuperscript{169.} For a discussion of the effects of biofuel and speculation on food prices, see supra notes 46-70 and accompanying text.

\textsuperscript{170.} See \textit{Food Price Crisis: A Wake Up Call for Food Sovereignty}, \textit{The Oakland Institute}, 5 (May 2008), http://www.oaklandinstitute.org/sites/oaklandinstitute.org/files/Food_Prices_Brief.pdf (noting free market ideology’s entrenchment in food price crisis). For a discussion of how trade liberalization has aggravated the food price crisis, see supra notes 133-152 and accompanying text.

\textsuperscript{171.} See \textit{The Oakland Institute}, supra note 170, at 5 (describing process of agricultural enslavement through trade liberalization).

\textsuperscript{172.} See id. (explaining dependency on cheap imports displaces domestic production).

\textsuperscript{173.} For a discussion of price volatility and its effects on poorer countries, see supra notes 142-149 and accompanying text.
rily address the pitfalls of international agricultural trade liberalization by fostering domestic food sovereignty.\(^{174}\)

A. Nurturing Food Sovereignty

The food price crisis of 2008 illuminated the devastating effects of excessive dependence on food aid, city-dweller importation, and diminished domestic agriculture production.\(^{175}\) Food sovereignty can help reverse the effects of the Green Revolution by ensuring an abundance of food and establishing "democratic control over the food system—from production and processing, to distribution, marketing, and consumption."\(^{176}\) An international farmers’ advocacy initiative, La Via Campesina (Campesina), emerged in 1993 to champion food sovereignty and democratic control over agriculture.\(^{177}\) Worldwide encouragement and adoption of the policies espoused by Campesina may be the key to ending world hunger.\(^{178}\)

The most significant initiative Campesina supports is localized control of agricultural production.\(^{179}\) In other words, poorer nations should shift their farming away from industrial monocultures toward a system more beneficial for smallholder farmers.\(^{180}\) The new system would rely on "local expertise, local germplasm, and farmer-managed, local seed systems."\(^{181}\)

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\(^{174}\) See The Oakland Institute, supra note 170, at 5-6 (stressing need for alternatives to free market approaches).


\(^{176}\) Holt-Giménez, supra note 8, at 146 (identifying concrete benefits of food sovereignty).

\(^{177}\) See id. at 148 (defining La Via Campesina movement’s core objective as: “to halt neoliberalism and construct alternative food systems based on food sovereignty”).

\(^{178}\) For a discussion of La Via Campesina policies, see infra notes 179-196, and accompanying text.

\(^{179}\) See Lappé & Lappé, supra note 4 (quoting Annette Aurelie Desmarais, La Via Campesina: Globalization and the Power of Peasants (2007)) (concluding La Via Campesina policies grant "producer real access to the wealth s/he generates day in and day out”).


\(^{181}\) Holt-Giménez, supra note 8, at 148 (stressing need for enhanced local farming).
In addition to curbing world hunger, localized initiatives offer several additional benefits. First, small-scale farming is inherently less demanding of resources than industrialized agribusiness, and thus it will use less oil. Second, small-scale farming’s push away from genetically engineered seeds and fertilizers might reverse the negative health effects associated with industrial agriculture. As a corollary, the health benefits posed by organic farming may also include providing enough food to combat the spread of human immunodeficiency virus (HIV). Third, contrary to popular belief, small-scale farming uses organic methods that can potentially increase crop yields. Finally, local agriculture contributes less to climate change due to its reliance on organic farming.

In concurrence with the proliferation of small-scale farming, the solution to the global food crises lies in the poorer countries’ independence from the entities perpetuating the cycle of hunger. For example, the World Bank and similar global institutions pressure third-world governments to distribute land to encourage industrialized monoculture farming. In the early 1980s, however, the Campesina movement successfully amended the Brazilian constitution to enforce the social utility of land and redistribute.

182. See Bryceson, supra note 175 (detailing benefits of small-scale agriculture).
183. See id. (noting major agribusiness depends on excessive oil use for farming and long-distance transportation).
184. See id. (recognizing growing concern over diseases from large-scale farming).
185. See Scott Drimie et al., The Right to Food: HIV and Food Price Increases, 37 Hum. RTS. 22, 22 (Winter, 2010) (observing exacerbating effect of food scarcity on HIV prevalence); Julia Wright, Organic Agriculture and HIV/AIDS in Sub-Saharan Africa, IFOAM 5-6 (Jan. 2008), http://www.ifoam.org/pdfs/OA_HIV_WEB.pdf (highlighting higher nutrient level in organic produce boosts immune system when, as in context of HIV, it needs it most).
186. See Lappé & Lappé, supra note 4 (debunking popular myth of organic farming’s inefficiency). “A large overview study of farmers transitioning to sustainable practices in 57 countries, involving almost 13 million small farmers on roughly 90 million acres, found that after four years, average yields were up 79 percent.” Id.
187. See Bryceson, supra note 175 (explaining small-scale farming’s crop diversity and its lower impact on climate change); see also Holt-Giménez, supra note 8, at 149 (identifying reduced ecological impact through “green manures, crop diversification, integrated pest management, biological weed control, reforestation, and agrobiodiversity management at farm and watershed scales”).
188. See Holt-Giménez, supra note 8, at 152-54 (observing neoliberal attack on smallholder farmers’ hopes of reform, and La Via Campesina attempt to break free from Green Revolution policies).
189. For a discussion of the negative impact of monoculture farming, see supra notes 123-132, and accompanying text.
4,600 acres to peasant farmers.\footnote{190} This type of agrarian reform furthers the Campesina policy favoring localized farmer control over land.\footnote{191}

Smallholder farmers in poor countries must be free from the more powerful governments and independent from the global agribusiness monopolies.\footnote{192} Often, smallholder farmers receive a package deal from a multinational corporation, which pulls the farmers into the corporation's horizontally and vertically integrated distribution chain.\footnote{193} The farmers in these situations almost always have a limited choice in the company from whom the farmer purchases supplies and, at times, in the decision to transact with a particular company at all.\footnote{194} Therefore, the Campesina goal of independence must include freedom from corporate control.\footnote{195} Such overwhelmingly beneficial efforts to achieve independence, however, require smallholder farmer movements and third-world governments hold much greater political power.\footnote{196}

B. Cultivating Sustainable Agriculture

An underlying current in food crises is the globalized industrialization of farming, as agribusiness monopolies advocate.\footnote{197} The scientifically advanced nature of industrialized agriculture presents the illusion of progress, but disguises its inevitably stagnant character.\footnote{198} Any hope to extinguish world hunger lies not in expanding the resource-intensive mega farms but in revising the current agricultural paradigm.\footnote{199} For example, legislation that places greater

\footnote{190. Holt-Giménez, \textit{supra} note 8, at 152-53 (stressing revolutionary impact of amendment on Brazilian agricultural reform).

191. \textit{See id.} (noting \textit{La Via Campesina} success in raising awareness of benefits of local, democratically controlled agriculture).


193. \textit{See id.} (explaining farmers also receive credit in package, which they cannot otherwise obtain in poorer countries).

194. \textit{See id.} (describing how agribusiness generates dependency by purchasing smallholder farmers' harvests).


196. For a discussion of poorer countries' dependence on Western agribusiness, see \textit{supra} notes 111-166, and accompanying text.

197. \textit{See Peters, \textit{supra} note 135, at 210 (detailing environmental burdens of large-scale farming, including groundwater and soil pollution, pesticide contamination, and soil depletion).

198. \textit{See Lappé, \textit{supra} note 64, at 377 (identifying illusion of sustainability in overdependence on fossil fuels and chemicals).

199. \textit{See Robinson, \textit{supra} note 180 (advocating reassessment of trade policy to preserve sustainable farming in United States and global south).}
consequences for environmental damage on agribusiness corporations would substantially position small-scale sustainable farming on equal footing with the agribusiness corporations.\textsuperscript{200} Moreover, Western governments must encourage sustainable agriculture efforts in poor nations rather than preserve conformity with industrial farming.\textsuperscript{201} In essence, until the agricultural policymakers enforce the beneficial use of available resources, such as soil, the current system will perpetuate ecological distress and world hunger.\textsuperscript{202}

C. Advancing Regional Food Aid

Direct cash payments are currently one of the most effective ways to ameliorate hunger in poor countries.\textsuperscript{203} While the United States is the largest provider of food aid, its policies revolve around producing food domestically, which creates inefficiencies and added costs in delivery to the poor countries.\textsuperscript{204} Farmers in famine-stricken regions are often weakened by poor infrastructure and agricultural economies; therefore, channeling payments into the development of local markets can mitigate these problems.\textsuperscript{205}

When calamities like flooding and drought cause the failure of local farming, wealthy nations should address the food shortages by purchasing food from the target nation’s neighbors rather than providing food directly to the target country.\textsuperscript{206} For example, when a natural disaster destroys crop harvests in Ethiopia, the United States should procure food from Sudan or Kenya rather than exporting American crops to Ethiopia.\textsuperscript{207} The cost of transporting the food from Ethiopia’s neighbor is significantly less than export-
ing the food from the United States. Furthermore, this policy has the corresponding benefit of invigorating the agricultural economy of the neighboring countries of Sudan or Kenya. Finally, the donor nation could outsource the actual delivery of the goods, which drives business to the shipping companies based in the global South. If Western nations shifted to direct cash payments under this scheme, it would eliminate the food delivery problem and encourage purchases from local markets, thereby stimulating agricultural and economic growth in the region.

D. Enhancing Intellectual Property

One of the most crucial problems facing smallholder farmers in poor countries is the lack of an enforceable intellectual property regime to corral the support of agribusiness corporations abroad. Currently, adequate access to farming inputs to feed a population trumps whether those inputs produce organic food. In fact, a dearth of innovation and research into new agricultural technologies influenced the latest food crises. Major corporations, however, have been reluctant to produce the best inputs for smallholder farmers because the poorer countries are less capable of enforcing the patent rights over those inputs.

A number of court decisions and international treaties grant intellectual property rights to the developers of new varieties of plants. The World Intellectual Property Organization extends

208. See id. (observing, despite poor infrastructure, regional transportation is more efficient than global transportation).
209. See id. (arguing domestic food aid procurement is threshold to gaining support for genuine agricultural reform).
210. See Boudreaux & Aft, supra note 204, at 180 (arguing benefits of direct cash payments).
212. See id. at 166 (identifying poor intellectual property regimes in Sub-Saharan Africa).
213. See id. at 168 (quoting The Use of Genetically Modified Crops in Developing Countries, a Follow-Up Discussion Paper, NUFFIELD COUNCIL ON BIOETHICS (2003), http://www.nuffieldbioethics.org/sites/default/files/GM%20Crops%20short%20version%20FINAL.pdf) (observing organic-only policy in poor nations places Western world’s needs ahead of hunger).
214. See MITTAL, supra note 24, at 3 (identifying decline in research and development by governmental and international institutions as cause for food crises).
215. See Boudreaux & Aft, supra note 204, at 166-67 (noting weak intellectual property laws discourage new technology in region).
216. See LAURENCE HELFER, FOOD AND AGRIC. ORG. OF THE UNITED NATIONS, International Property Rights in Plant Varieties: International Legal Regimes and Policy
the United States' broad permissive stance on plant patenting to other countries, which compels the other countries to recognize the protected status of a holder's patent. 217 Many parts of the global South, such as Sub-Saharan Africa, have faulty or non-existent intellectual property regimes, essentially discouraging agribusiness firms from pursuing innovation. 218 Thus, rather than create innovative new agricultural technologies suited for farmers in a particular country, agribusiness firms provide the country with the existing technology that may be better suited for conditions in another part of the world. 219

The implementation of robust intellectual property regimes in third-world countries, primarily those in Sub-Saharan Africa, would encourage foreign agribusiness investment, which could yield better inputs, higher crop yields, and less hunger. 220 In exchange, major corporations could relax their constrictive enforcement of the intellectual property laws against farmers. 221 While not conducive to the goal of safe, organic crop growth, intellectual property reform could at least provide some hope for relieving hunger in the global South. 222

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217. See Boudreaux & Aft, supra note 204, at 160-61 (detailing international intellectual property treaty's requirement of basic level of enforcement).

218. See id. at 163 (noting only way to enforce patent rights is on owner's initiative).

219. See id. at 166 (observing weak intellectual property structure results in constant reliance on food donations).

220. See id. at 167 (arguing for intellectual property reform as challenging but rewarding method of reinvigorating poor regions).

221. See id. at 161 (quoting THE WORLD BANK, WORLD DEVELOPMENT REPORT 2008: AGRICULTURE FOR DEVELOPMENT, 167 (2008)) (asserting farmers' entitlement to fair use of purchased seeds).

222. See Boudreaux & Aft, supra note 204, at 143-44 (quoting Interview with Mamati Tembe, in Johannesburg, S. Afr. (Sept. 26, 2005)) (observing genetically modified products hold prospect of empowerment for smallholder farmers).

*J.D. Candidate, 2012, Villanova University School of Law; B.A. 2009, Southern Methodist University