

Overconsumption of Corn: Structural Violence and Disease in Malawi and the United States

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Introduction

Corn is the main crop grown in the United States and Malawi. While the United States is the largest producer of corn in the world, Malawians are the largest per capita consumers of corn in the world (FAO 2007; Sauer 2006:3).¹ The United States lies at one end of the spectrum, where corn is produced using mechanized and industrialized methods, and corn is consumed indirectly in highly processed forms. On the other end of the spectrum in Malawi, corn production and processing is done mostly by hand, on small-scale family farms, and consumed as a stiff porridge. Both of these forms of production and consumption put people within the United States and Malawi at structural risk for a range of serious diseases.

In this paper, I will first broadly describe the global expansion of corn and its dominance in Malawi and the United States. Next, I will briefly review the consumption of corn in the United States, and the resulting diseases that are suffered. I will then discuss the processing and consumption of corn in Malawi, and will concentrate on the resulting diseases. Due to space constraints, I will focus more on Malawi, and the United States will serve as a point of comparison to show the range of problems that result from the overconsumption of corn, whether that be in an industrialized or low-income country. It is important to recognize the problems with an overreliance and overconsumption of one crop in order to show that the United States should not be used as a model for agricultural development in the global South, and to help devise appropriate solutions to food-related diseases and food insecurity.

I will apply the frameworks of syndemic theory and structural violence used in medical anthropology, in contrast to the assumptions of modern biomedicine which approaches “sickness as a natural phenomenon” (Gordon 1988:24). Rather, the sociophysical environment that someone lives in is a “critical determinant of their health status” (Singer 2009:144). Syndemic

¹ For the purposes of this paper, I will use the word corn rather than maize.

theory, as developed by Singer, focuses on how processes of marginalization and oppression, and conditions of inequality and poverty, interact and produce heightened risk to, and incidence of, disease (2009:151, 153). Disease must be understood as culturally and socially embedded, and the structural determinants of health must be recognized.

Structural violence in the United States and in Malawi puts individuals at risk for disease in general, and for diseases related to the overconsumption of corn specifically. Structural violence refers to social structures that are “characterized by poverty and steep grades of social inequality,” which systematically constrain one’s life choices and chances (Farmer 2004:307), and is embodied in “adverse outcomes... [like] death, injury, [and] illness” (Farmer 2004:308). As Bourgois points out, “structural violence is shaped by identifiable institutions, relationships, force fields, and ideologies,” and “manifests visibly in health disparities” (2009:19). Syndemics and structural violence can therefore be used to analyze the incidence of disease in the United States and Malawi as a product of complex social structures and processes that compound one another and powerfully shape one’s risk of suffering sickness and premature death.

As Scheper-Hughes advocates for, I will look at the power structures and forces that shape incidence of disease and experiences of illness in order to understand the causes of diseases relating to the overconsumption of corn (1990:191). It is only by denaturalizing the occurrence of disease that their causes can be fully understood and then addressed. An investigation of diseases relating to the overconsumption of corn can also be used as a lens for social critique, as suffering from disease is often linked to broader socioeconomic inequality and injustice (Scheper-Hughes 1990:194).

The Global Expansion of Corn

The production and consumption of food is bound within political and economic forces

and has long been “mobilized on global scales” (Phillips 2006:38). As such, it becomes evident that the roots of the global expansion and spread of corn lie in the history of imperialism, forces of oppression and structural violence.

Corn’s spread across the globe began in earnest after contact between the European colonial powers and indigenous peoples of North and South America (Warman 2003:13). Corn’s spread to Africa is “emblematic of the economic, social, and ecological history” of Africa (McCann 2005:198), and began after 1500 as a part of the Columbian exchange (McCann 2005:23). The dissemination of specific types of corn was determined by European “conquests and transatlantic trade” (McCann 2005:27). Corn then became “the principal staple food... for the vast human mobilization brought about by the slave trade” (Warman 2003:60). On the Atlantic coasts of Africa, corn met domestic consumption needs, the consumption needs of European enslavers, and as a commercial crop, it was a source of power for the African middlemen involved in the slave trade (Warman 2003:62). Additionally, European slave traders paid for slaves with corn, and corn was primarily what was fed to enslaved Africans during the transatlantic journey (Warman 2003:63; Pollan 2006:26).

As a part of the first food regime that contributed to capitalist accumulation and expansion, corn continued to play an important role in colonialism in the United States and sub-Saharan Africa (McMichael 1992:345). American colonists learned how to grow corn from the Native Americans in 1621, after which corn became a crucial staple in the diet of American colonists (Pollan 2006:24-25). Despite the fact that this knowledge transfer enabled the colonists to survive and prosper in the United States, they would later commit genocide against the Native Americans.

Corn also was used as a tool of imperialism in sub-Saharan Africa and had a unique

history in southern Africa. Corn became an important crop grown by white settlers, and the corn trade was structured to favor the white settler farmers (Warman 2003:73; Mandala 2006:523). African farmers were coerced into growing corn through household quota systems as was done in Malawi (Warman 2003:79). Beginning in the early 1900s, corn was transformed from a vegetable, to a grain that could, in the form of flour, cheaply feed the urban proletariat who migrated within the region to work in mines (McCann 2005:114, 94). Along with the control of the corn market to favor urban populations and commercial agricultural estates, the corn market was structured to favor white corn flour, which came to establish corn as white in sub-Saharan Africa (McCann 2005:112, 115). In Malawi, they developed preference for white over yellow corn began during the early 1900s due to the bias for white corn in the British starch market (Smale 2003:10-11, 15).

Today, a stiff porridge called *nsima*, made from refined white corn flour, is the staple food of Malawi and provides 54 percent of their total caloric intake (McCann 2005:9). We will later see the detrimental impact of this overconsumption of refined white corn flour. However, the predominance of white corn in small-scale agricultural production and overall consumption in Malawi has remained due to structural poverty and vulnerability, and being once incorporated and selectively disconnected from the global economy, and has resulted in persistent food insecurity (Ferguson 1999:238, 242).

Unlike in Africa where most of the corn grown is for human consumption, just over 50 percent of corn grown in the United States is used for animal feed (McCann 2005:112; USDA 2006:5). In the 1930s and 1940s, corn production was expanded with the use of hybrid seeds and the development of ammonium nitrate as a chemical fertilizer (Warman 2003:183, 187; Pollan

2006:37).² Beginning in the 1950s, the United States had surplus of cheap corn (Pollan 2006:39). From the 1950s to the 1970s, as a part of the postwar international food order which contributed to a “widening and deepening of capitalist relations within the world economy” (Friedmann S255), America produced surplus grain driving down the price of grain, used food aid policies to dispose of the surplus, and took advantage of other countries need for cheap food to feed urban populations (Friedmann S251).

After the 1970s the global food system restructuring into a third food regime resulted in the “internationalization of American agriculture,” and a new division of labor where the North supplies cheap grain and the South produces nontraditional high-value crops, which has “exacerbat[ed] Southern food dependency” (McMichael 1992:349). In 1973, under Secretary of Agriculture Butz, farm policy changed to direct subsidy payments to farmers which has further encouraged an overproduction of corn which has flooded international markets and depressed world corn prices below the cost of production (Roberts 2008:121;Pollan 2006:62). Today, the United States is the world’s largest producer of corn; corn comprises 95 percent of the United States’ grain production, and it is the United States’ most valuable agricultural commodity (USDA 2010). Corn is now an integral part of the United States’ industrial food system, and several United States based transnational corporations are key players in the global corn market, including Cargill and Monsanto which have both owned controlling shares of the National Seed Company of Malawi (Warman 2003:207).³

The global expansion of corn, and its expansion into Malawi and across the United States, has been a result of historical processes of the slave trade, imperialism, industrialization

² Interestingly, ammonium nitrate and pesticides were developed as a part of the government’s efforts to convert war industries to peacetime industries after World War II (Pollan 2006:41).

³ Cargill took control of the National Seed Company of Malawi in 1988, and sold it to Monsanto in 1998, who still owns the company (Bonanno 1994:44; Smale 2003:41).

and capitalist expansions, and globalization. Supported by institutions of global governance and rich industrialized nations like the United States, global inequality has increased as power and wealth has been increasingly concentrated in the hands of transnational corporations whose global reach continues to expand and marginalize those in the South, like Malawi's national economy and population which is overwhelming dependent on agriculture.⁴ Malawi is one of the poorest countries in the world with 52 percent of the population living below the poverty line which is set at "32 US cents a day" (United Nations 2006). These political and economic forces constitute structures that perpetrate and perpetuate violence in the form of continued poverty, food insecurity, and increased risk to disease which will now be explored.

Overconsumption of Corn and Disease in the United States

Corn is used to produce high-fructose corn syrup which is the cheapest sweetener available,⁵ among a range of other industrial food additives, and is the predominate feed for cattle, pork, and poultry (Fields 2004:A821; Schoonover 2006:2). Overconsumption of corn mostly occurs through indirect consumption of these goods. Indeed, Americans are each responsible for directly and indirectly consuming a ton of corn each year (Pollan 2006:85). This can be seen through isotopic hair analysis which traces the isotope through the food chain and has shown that "North Americans look like corn" (Pollan 2006:23). United States agriculture policy and international trade policies have incentivized an overproduction of corn at the expense of fruits, vegetables and other grains, and significantly lowered the price of corn (Fields 2004:A821). The end result of our food policies has been the creation of an industrial food system in which the unhealthiest foods are the cheapest, which fosters obesity and diabetes,

⁴ The economy relies on agriculture for over 90 percent of its export revenue, and overall, agriculture supports 90 percent of the population. The population is predominately rural, and about nine million people out of a population of 13 million are classified as subsistence farmers (GOM 2005:95).

⁵ The lower comparative cost of corn sweeteners is also due to trade barriers on sugar imports (Fields 2004:A823).

among other health problems (Schoonover 2006:1; Morrill 2004:361).⁶ I will focus on obesity and diabetes.

Although health disparities are individualized and naturalized in the United States, socioeconomic structures are highly determinative of one's risk to disease and one's access to health care (Jenks 2010:211, 221). In the United States, "the obesity epidemic... follows a sharp socioeconomic gradient," and the "absence of wealth, minority status, and living in impoverished neighborhoods appear to be the major predictors of both obesity and type 2 diabetes" (Drewnowski 2007:1). Groups with higher incomes and education levels tend to have higher-quality diets due to access to fresh produce and higher quality meats and prepared foods (Drewnowski 2007:6-7). Whereas groups with lower socioeconomic status buy less expensive foods that are of lower quality and are more processed high-energy-dense foods (Drewnowski 2007:2).

Obesity is the result of "complex interactions between genetic, metabolic, cultural, environmental, socioeconomic and behavioral factors" (Morrill 2004:357). I cannot explore all the factors that contribute to obesity, however I will explore high-fructose corn syrup consumption due to its direct relationship to corn. Overall sugar consumption has increased as sugar, in the form of high-fructose corn syrup, has been added to more processed foods. Annual per capital corn sweeter consumption increased 387 percent between 1970 and 2005, and 76 percent of all corn sweeteners are high-fructose corn syrup (USDA 2008:17). High-fructose corn syrup has slightly higher levels of fructose than glucose (the levels are equal in sugar) (Johnson 2009:97). Fructose is metabolized differently than glucose, including that glucose does not signal insulin release (Johnson 2009:99; Bray 2004:538). Further, fructose and high-fat diet interact to

⁶ In the past 20 years in the United States, "the real cost of fresh fruits and vegetables has risen nearly 40 percent" while the "real costs of soda pop, sweets, and fats and oils, on the other hand, have declined" (Schoonover 2006:1).

contribute to obesity (Johnson 2009:99). High-fructose corn syrup also does not trigger satiety, contributing to an overconsumption of soft drinks and food (Morrill 2004:361). In the United States, sugar intake and increased high-fructose corn syrup consumption has been shown to be associated with obesity and diabetes (Drewnowski 2007:5; Johnson 2009:103; Bray 2004:542).⁷ In addition, the lower cost high-energy-dense foods which contain “more refined grains, more added sugars, and more added fats” (Drewnowski 2007:2) and consumption of which is higher among poorer groups, is associated with obesity (Drewnowski 2007:7; Bray 2004:537).

Obesity is consequential because of the serious impacts that it has. Obesity is one of the leading causes of preventable deaths, with an increase of 33 percent in the last decade of deaths “attributable to poor diet and physical inactivity” (Morrill 2004:355). It has been proposed that obesity is actually responsible for “up to 90 percent of type 2 diabetes” (Johnson 2009:96). Crucially as well, obesity has syndemic interactions with other health problems such as hypertension, respiratory problems, and congestive heart failure (Morrill 2004:355). Individuals of lower socioeconomic status, African Americans, and Latinos are at greater structural risk for obesity and therefore type 2 diabetes as well (Morrill 2004:354). While overall, 64 percent of individuals are overweight of which 30 percent are obese; whereas 78 percent of black women are overweight of which 50 percent are obese (Morrill 2004:354). In addition, individuals with lower socioeconomic status have lower access to quality and affordable health care, obesity and diabetes treatment increases their need for, and the costs of, health care. Structural factors including the United States’ industrial food system, poverty, and marginal social status, have syndemic interactions that result in concrete structural violence that increases sickness, suffering, and risk of premature death.

⁷ I have chosen not to include some studies on high-fructose corn syrup which I do not think can be trusted because of the scientist may have been influenced by the food and beverage industry and corn associations (see White 2008; White 2009).

Overconsumption of Corn and Disease in Malawi

The method of processing and cooking corn in Malawi is consequential for the health impacts from consuming it. Corn is grown by 97 percent of the population of predominately small-scale family farmers, and only 44 percent of the population grows other crops in addition to corn (GOM 2005:95). The next most common crop grown is groundnuts which 25 percent of the population grows, and then beans at 8 percent, then rice, millet, and sorghum (GOM 2000:2). Once corn has matured, it is harvested and then stored and processed by each family. Food storage is an important component of the production process because households must try to live off of one harvest for most of the year (Carr 1991:4). Corn processing is done by women by hand, or increasingly, it is milled if households have access to a maize mill and money to pay for milling. Corn is dried, and then kernels must be removed from the cobs, and undergo several rounds of being pounded by hand, soaked, washed, and dried in the sun (Smale 2003:15). Through this process, the corn is transformed into the highly valued, fine, white corn flour (*ufa woyera*) used to make *nsima* (stiff porridge) which is principal food consumed by Malawians.

Malawi's chronic food insecurity has resulted in widespread malnutrition that causes stunting in 56 percent of all children under 5, remaining as high as 41 percent for even the richest 20 percent of children under 5 (GOM 2005:10). As is evidenced by the high levels of stunting even in the wealthiest households, the quantity of food available is not the only cause of malnutrition. Corn comprises 54 percent of Malawian's total caloric intake (McCann 2005:9). Corn is described by Malawian's as their "favorite" food. Meals are synonymous with eating *nsima*, as is expressed when Malawians say that it is time for *nsima* at meal time. As an essential part of a meal, Malawians say that they have not properly eaten if they have not had *nsima*, the "hard" portion of the meal, that is more filling upon initially eating than any other food I have

eaten (Morris 1998:187). Despite how filling it is, *nsima* only has about 160 calories per serving, which, when eaten twice a day with small portions of side dishes (*ndiwo*) is below the recommended 2000 daily caloric intake (Lanning 2009). The small portions of *ndiwo* which are usually greens, beans, or small fish, are the meal's main source of minerals, protein and calories. Women and children do not have equal entitlement with men for *ndiwo*, making them consistently more vulnerability to food scarcity and nutritional deficiency (Mandala 2005:14; Morris 1998:190). Malawian's diet of corn *nsima* is calorie deficient and leads to combinations of micronutrient deficits due to the corn processing methods and an overconsumption of corn (Yeudall 2005:827, 833).

Malawian's diet of corn *nsima* contributes to malnutrition. There is a 29 percent prevalence of undernourishment in the total population (FAO 2008:1). The risk is especially great among children, among whom it can result in stunting, kwashiorkor, and marasmus. In Malawi, stunting occurs in 56 percent of all children under 5 (GOM 2005:10). Stunting results in reduced cognitive abilities, lower educational attainment, and increased risk of perinatal mortality for women later in life (Kalimbira 2009:720). Kwashiorkor is defined by oedema which about 2 percent of Malawian children have, and marasmus is characterized by wasting (Lin 2006:488; Sullivan 2006:115). While there is not agreement about the exact cause of kwashiorkor, "it is clear that kwashiorkor is related to a poor diet" (Lin 2006:488). Malawian children with kwashiorkor have been shown to eat fewer antioxidant micronutrient rich foods, including eggs and tomatoes (Sullivan 2006:120).

HIV/AIDS and malnutrition have a "syndemic interaction" which is "multiplicative in [its] effects" (Singer 2008:12). In Malawi, the HIV prevalence is around 14 percent and HIV/AIDS causes 34 percent of all deaths (WHO 2006:3). Increased nutritional intake is vital for

holding off the progression of HIV to AIDS, to prevent mother to child transmission, and for successful antiretroviral treatment (Singer 2008:12; Rollins 2007:1576; De Waal and Whiteside 2003:6). Malnutrition “increases susceptibility to the disease among non-infected people” as well (Himmelgreen and Romero-Daza 2008:13). So while HIV/AIDS increases the demand for resources from a household and the number of dependents in a household, it lowers a household’s capability to meet those needs. In a context of material poverty, increasing inequality and environmental degradation, malnutrition and food insecurity interact with HIV/AIDS to produce further food insecurity and a worsening HIV/AIDS pandemic. These factors produce “vulnerability [which] is all about... context,” and it is “a process to be understood in terms of cumulative conditions” (Webb 1990:301). This vulnerability makes Malawians structurally at risk to disease as these factors exacerbate and compound one another, and weaken the capacity and resiliency of households and social networks to cope and recover. This structural risk is a form of structural violence due to its adverse impacts on one’s live chances and choices, and has very serious and potentially fatal health consequences.

In addition to malnutrition, overconsumption of porridge made from corn flour also puts Malawians at risk for pellagra, micronutrient deficiencies, problems from mycotoxins, and cancer of the esophagus. Pellagra was first diagnosed in the 1750s in Europe. Pellagra is due to niacin vitamin B deficiency and its symptoms are dermatitis, diarrhea, and dementia, and in its advanced stages it is fatal (Warman 2003:132, 145; Brandes 1992:333). By the early 1900s, the disease began being diagnosed among mine workers in South Africa, and reached epidemic proportions in the south of the United States where it has now been replaced by other dietary and lifestyle diseases (Warman 2003:138, 168). The disease affected women the most, and was associated with poverty in Europe, Africa, and the United States (Warman 2003:143, 145). Corn

production in these countries did not involve adding lime like in the Yucatan in Mexico which helps to break down the niacin (Warman 2003:145). Pellagra is not only a disease of poverty, but “of pro-development capitalism” (Warman 2003:150). It is no longer seen in Europe, and there is now an inexpensive cure, however pellagra still occurs in sub-Saharan Africa and in Malawi (Brandes 1992:333). In the 1970s, pellagra was still affecting 15 percent of Malawians (WHO 2000:3). The World Health Organization found two outbreaks of pellagra among Mozambican refugees in Malawi with a prevalence of 0.5 percent, and the surrounding district only had a slightly lower rate of prevalence at 0.2 percent (WHO 2000:2).

Malawians are at risk for micronutrient deficiencies including iron and zinc. White corn contributes 64-94 percent of phytate in Malawian diets (Hotz 2001:133). The high phytate content of corn is problematic, because it limits the bioavailability of iron, zinc, copper, manganese, and calcium in corn (Manary 2002:133). Limited iron contributes to severe anemia among children which is a problem in Malawi, and is associated with bacteremia, malaria, hookworm, HIV infection, vitamin A and vitamin B12 deficiency (Calis 2008:898). Zinc deficiency is also a problem, particularly for infants because zinc is needed for growth (Hotz 2001:133).

The overconsumption of corn *nsima* also puts Malawians at risk for cancer of the esophagus. Cancer of the esophagus has been diagnosed in 23 percent of Malawians (Mlombe 2009:67). Ground corn is specifically to cause for cancer of the esophagus, and long-stored corn poses an even greater risk (Sammon 2006:1431, 1433).⁸ Corn meal is high in linoleic acid, and when diets are low in omega-3 fatty acid (corn meal has a very high omega-6 to omega-3 fatty acid ratio of 70:1), Prostaglandin E2 (PGE2) is preferentially produced in the stomach. This results in an overproduction of PGE2, lowering gastric acid secretion which raises the pH

⁸ Cancer of the esophagus has also been associated with corn meal consumption in Italy (Sammon 2006:1433).

balance of the stomach, and increases duodenogastric reflux, thereby creating a predisposition to squamous carcinogenesis which can cause cancer of the esophagus (Sammon 2006:1431). It is the rural poor who have been shown to be most susceptible, although the poorest are not at risk due to their lower ability to buy corn flour (Sammon 2006:1432). In addition, there are “poor survival rates” for esophageal cancer in Malawi (Mlombe 2009:66), which is impacted by limited access to health care, as there is only a density of 0.02 physicians per 1000 and 0.58 nurses per 1000 (WHO 2006:6). Access to health care is additionally limited due to the cost of care and slow and costly transportation to hospitals. Here, as with the other diseases discussed, disease is impacted by limited access to health care, increasing the severity of disease, suffering, and the likelihood of mortality.

There is a risk of mycotoxins developing in corn during storage which Malawians are at risk to because they store one corn harvest to live off of for at least a year. Storage is not controlled, but takes place in structures made of dry grass, or an extra room in one’s house. Specifically, corn is at risk for developing the fungus *Aspergillus flavus* which produces the mycotoxin aflatoxin, which “damages DNA in humans who ingest it and is the strongest known chemical liver carcinogen” which greatly raises the risk of liver cancer, and is synergistic with Hepatitis B and C which are common, and it possibly suppresses the immune system (McCann 2005:206). In 2001, the World Health Organization and the Food and Agriculture Organization found that average exposure to mycotoxins “exceeds the tolerable daily intake and that for about 10 percent of the population, its levels exceed those limits by 300 percent” (McCann 2005:207). Poor, small-scale farmers in Malawi are therefore greatly at risk to mycotoxins, due to their reliance on self-stored corn.

Further, the structural violence which leads to disease and higher mortality is naturalized through symbolic violence. Symbolic violence is a process of misrecognition through which structural violence is legitimized and the sufferers of structural violence blame themselves for the consequences of structural violence (Bourgois 2009:19). Scheper-Hughes provides a pertinent example in Brazil, where hunger was medicalized, and hungry bodies were transformed from lacking food and proper nutrition to sick and nervous, thereby individualizing hunger and placing it within the realm of sickness that can be treated by biomedicine (Scheper-Hughes 1992:174). This “individualized discourse on sickness comes to replace a more radical and socialized discourse on hunger” (Scheper-Hughes 1992:169). Instead of recognizing that hunger is a social illness, it is masked to be a disease divorced from the material conditions and structural violence which create it.

Similarly in Malawi, predominate consumption of *nsima* made from corn is seen as positive and healthy. There is not commonly recognition that corn consumption contributes to malnutrition and other micronutrient deficiencies. Malawians have a proverb stating “‘maize is life’ (*chimanga ndi moyo*),” which in Chichewa also connotes health and well-being (Smale 1995:352-353; Morris 1998:211). A focus on corn production and consumption is learned by children at home and in school. Additionally, corn has been a key component of the government’s social contract with its people, and the basis of the definition of food security since colonial rule (Smale 2003:17; Thornton 2008:18). Of potential importance as well is that in the Chewa symbolic system, in cooking *nsima*, one is essentially making a baby (Kaspin 1996:569). So, through making *nsima*, women enact and embody the symbolic homological oppositions and processes which produce and ensure the production and regeneration of life. The Chewa

symbolic system and social structures like the educational system and government policy, support the idea that *nsima* made from corn is indeed a healthy staple food.

When there is a recognition of malnutrition and its consequent problems, corn is not at fault. Rather, there is the assumption that one does not have enough corn to eat. The reasons for not having enough corn could be seen as poor rains, flooding, not having enough fertilizer, or low yields. Instead, factors like growing expensive hybrid Monsanto corn, government agricultural policies that favor the cash crop estate sector, or a lack of infrastructure are often where one should look to understand why Malawians do not have sufficient supply and entitlement to food (Smale 2003:40, 47). Not having enough corn is not the fault of an individual farming family. Rather, it is the broader social, political, and economic system in which they grow and eat corn that produces structural violence of food insecurity and the many resulting serious, and at times fatal, diseases.

Conclusion

Americans and Malawians in general, and individuals of lower socioeconomic status in particular, are structurally at risk to disease from an overconsumption of corn. As has been explored, an overconsumption of corn in both countries is the result of forces of structural violence. As such, treatments of, and solutions for, these diseases must involve structural change that would alter the global political economy of food, domestic economic structures and agriculture policies, and increase social and material equality. Specifically, structural changes need to take place to diversify diets in both countries, increase entitlement to healthy and balanced diets, and ensure access quality and affordable health care.

Works Cited

- Bonanno, Alessandro, Lawrence Busch, and William H. Friedland, eds., et al. 1994. *From Columbus to ConAgra: The Globalization of Agriculture and Food*. Lawrence: University Press of Kansas.
- Bourgois, Philippe. 2009. "Recognizing Invisible Violence: A Thirty-Year Ethnographic Retrospective." In *Global Health in Times of Violence*, ed. Barbara Rylko-Bauer, Linda Whiteford, and Paul Farmer, 17-40. Santa Fe, N.M.: School for Advanced Research Press.
- Brandes S. 1992. Maize as a culinary mystery. *Ethnology* 31:331-36.
- Bray, George A., Samara Joy Nielsen, and Barry M. Popkin. 2004. Consumption of high-fructose corn syrup in beverages may play a role in the epidemics of obesity. *Am J Clin Nutr* 79:537-543.
- Calis Job, C.J., Kamija S. Phiri, and E. Brian Faragher, et al. 2008. Severe Anemia in Malawian Children. *The New England Journal of Medicine* 358:888-899
- Carr, Marilyn, ed. 1991. "Malawi." In *Women and Food Security: The experience of the SADCC countries*, ed. Marilyn Carr, 1-21.
- De Waal, Alex, and Alan Whiteside. 2003. 'New Variant Famine': AIDS and Food Crisis in Southern Africa. *The Lancet* 362:1234-37.
- Drewnowski, Adam. 2007. The Real Contribution of Added Sugars and Fats to Obesity. *Epidemiologic Reviews* 1-12.
- Farmer, Paul. 2004. An Anthropology of Structural Violence. *Current Anthropology* 45(3):305-325.

- Ferguson, James. 1999. *Expectations of Modernity: Myths and Meanings of Urban Life on the Zambian Copperbelt*. Berkeley: University of California Press.
- Fields, Scott. 2004. The Fat of the Land: Do Agricultural Subsidies Foster Poor Health? *Environmental Health Perspectives* 112(14):A820-A823.
- Food and Agriculture Organization. 2007. "Top Production – Maize – 2007." FAOSTAT.
- . 2008. "Malawi." Statistics Division, Global Statistics Service – Food Security Indicators.
- Friedmann, Harriet. 1982. The Political Economy of Food: The Rise and Fall of the Postwar International Food Order. *The American Journal of Sociology* 88:S248-S286.
- Gordon, D. 1988. "Tenacious Assumptions in Western Medicine." In *Biomedicine Examined*, ed. Margaret Lock and Deborah Gordon, 19-56. Dordrecht: Kluwer Academic Publishers.
- Government of Malawi. 2000. "The State of Malawi's Poor: Agriculture and making a living from the land." Government of the Republic of Malawi, Poverty Monitoring System.
- . 2005. "Integrated Household Survey 2004-2005: Volume I, Household Socio-Economic Characteristics." Zomba: National Statistical Office.
- Himmelgreen, David A., and Nancy Romero-Daza. 2008. Food Security and the Battle against HIV/AIDS. *Anthropology News* 49(7):13-14.
- Hotz, Christine, Rosalina S. Gibson, and Lara Temple. 2001. A home-based method to reduce content and increase zinc bioavailability in maize-base complementary diets. *International Journal of Food Sciences and Nutrition* 52:133-142.
- Jenks, Angela. 2010. "What's the Use of Culture?: Health Disparities and the Development of Culturally Competent Health Care." In *What's the Use of Race?*, ed. David S. Jones and Ian Whitmarsh, 207-224. Cambridge: MIT Press.

- Johnson, Richard J., Santos E. Perez-Pozo, and Yuri Y. Sautin, et al. 2009. *Endocrine Reviews* 30(1):96-116.
- Kalimbira, Alexander A., Carolyn MacDonald, and Janis Randall Simpson. 2009. The impact of an integrated community-based micronutrient and health programme on stunting in Malawian preschool children. *Public Health Nutrition* 13(5):720-729.
- Kaspin, Deborah. 1996. A Chewa Cosmology of the Body. *American Ethnologist*. 23(3):561-578.
- Lanning, Joseph. 2009. Personal Communication. January 13.
- Lin, Carol A., Sarah Boslaugh, and Heather M. Ciliberto, et al. 2007. A Prospective Assessment of Food and Nutrient Intake in a Population of Malawi Children at Risk for Kwashiorkor. *Journal of Pediatric Gastroenterology and Nutrition* 44:487-493.
- Manary, Mark J., Nancy F. Krebs, and Rosalinda S. Gibson, et al. 2002. Community-based dietary phytate reduction and its effect on iron status in Malawian children. *Annals of Tropical Paediatrics* 22:133-136.
- Mandala, Elias. 2005. *The end of Chidyerano: a history of food and everyday life in Malawi, 1860-2004*. Ann Arbor: University of Michigan.
- . 2006. Feeding and Fleecing the Native: How the Nyasaland Transport System Distorted a New Food Market, 1890s-1920s. *Journal of Southern African Studies* 32(3):505-524.
- McCann, James C. 2005. *Maize and Grace: Africa's Encounter with a New World Crop, 1500-2000*. Cambridge: Harvard University Press.
- McMichael, P. 1992. Tensions between National and International Control of the World Food Order: Contours of a New Food Regime. *Sociological Perspectives* 35(2):343-365.

- Mlombe, Yohannie, Charles Dzamalala, and John Chisi, et al. 2009. Oesophageal cancer and Kaposi's Sarcoma in Malawi: a comparative analysis. *Malawi Medical Journal* 21(2):66-68.
- Morrill, Allison C., and Christopher D. Chinn. 2004. The Obesity Epidemic in the United States. *Journal of Public Health Policy* 25(3/4):353-366.
- Morris, Brian. 1998. *The Power of Animals: An Ethnography*. Oxford: Berg.
- Phillips, Lynne. Food and Globalization. *Annual Review of Anthropology* 35:37-57.
- Pollan, Michael. 2006. "I: Industrial Corn." In *The Omnivore's Dilemma: A Natural History of Four Meals*, 15-119. New York: The Penguin Press.
- Roberts, Paul. 2008. *The End of Food*. Boston: Houghton Mifflin Company.
- Rollins, Nigel. 2007. Food Insecurity – A Risk Factor for HIV Infection. *PLoS Med* 4(10):1576-1577.
- Sammon, A.M., and J.E. Iputo. 2006. Maize meal predisposes to endemic squamous cancer of the oesophagus in Africa: Breakdown of esterified linoleic acid to the free form in stored meal leads to increased intragastric PGE2 production and a low-acid reflux. *Medical Hypotheses* 67:1430-1435.
- Sauer, Johannes, and Hardwick Tchale. 2006. Alternative Soil Fertility Management Options in Malawi – an Economic Analysis. Paper presented at IAAE 2006 Conference, Queensland, Australia.
- Scheper-Hughes, Nancy. 1990. Three Propositions for a Critically Applied Medical Anthropology. *Social Science and Medicine* 30(2):189-197.
- . 1992. *Death Without Weeping: The Violence of Everyday Life in Brazil*. Berkeley/Los Angeles: Univ. Calif. Press.

- Schoonover, Heather, and Mark Muller. 2006. Food without Thought: How U.S. Farm Policy Contributes to Obesity. IATP Environment and Agriculture Program.
- Singer, Merrill. 2008. The Perfect Epidemiological Storm: Food Insecurity, HIV/AIDS and Poverty in Southern Africa. *Anthropology News* 49(7):12, 15.
- . 2009. “Desperate Measures: A Syndemic Approach to the Anthropology of Health in a Violent City.” In *Global Health in Times of Violence*, ed. Barbara Rylko-Bauer, Linda Whiteford, and Paul Farmer, 137-156. Santa Fe, N.M.: School for Advanced Research Press.
- Smale, Melinda, and Paul W. Heisey, Howard D. Leathers. 1995. “Maize of the Ancestors and Modern Varieties: The Microeconomics of High-Yielding Variety Adoption in Malawi.” *Economic Development and Cultural Change* 43(2):351-368.
- Smale, Melinda, and Thom Jayne. 2003. Maize in Eastern and Southern Africa: ‘Seeds’ of Success in Retrospect. EPTD Discussion Paper No. 97. Washington, DC: IFPRI.
- Sullivan, Jesse, MacDonald Ndekha, and Dawn Maker, et al. 2006. The quality of the diet in Malawian children with kwashiorkor and marasmus. *Maternal and Child Nutrition* 2: 114-122.
- Thornton, Hope. 2008. “Permaculture Adoption Among Malawian Farmers: A Positive Deviance Inquiry.” MA Thesis, School for International Training.
- United Nations. 2006. “Malawi: More than half the people still living in poverty – new report.” Johannesburg: UN Office for the Coordination of Humanitarian Affairs.
http://www.irinnews.org/report.asp?ReportID=53688&SelectRegion=Southern_Africa&SelectCountry=MALAWI.

- United States Department of Agriculture. 2006. *Characteristics and Production Costs of U.S. Corn Farms, 2001*. Economic Research Service, Economic Information Bulletin Number 7.
- . 2008. Dietary Assessment of Major Trends in U.S. Food Consumption, 1970-2005. Economic Research Service, Economic Information Bulletin Number 33.
- . 2010. Corn. Economic Research Service, Briefing Room.
- Warman, Arturo. 2003. *Corn and Capitalism: How a Botanical Bastard Grew to Global Dominance*. Chapel Hill: The University of North Carolina Press.
- Webb P, Harinarayan A. 1999. The measure of uncertainty: the nature of vulnerability and its relationship to malnutrition. *Disasters* 23(4):292–305.
- White, John S. 2008. Straight Talk about high-fructose corn syrup: what it is and what it ain't. *Am J Clin Nutr* 88(suppl):1716S-21S.
- . 2009. Misconceptions about High-Fructose Corn Syrup: Is It Uniquely Responsible for Obesity, Reactive Dicarbonyl Compounds, and Advanced Glycation Endproducts? *Journal of Nutrition* 139:1219S-1227S.
- World Health Organization. 2000. Pellagra and its prevention and control in major emergencies. World Health Organization.
- . 2006. “Country Health System Fact Sheet 2006: Malawi.” World Health Statistics 2006. www.who.int/whosis/en/.
- Yeudall, Fiona, Rosalind S. Gibson, Timothy R. Cullinan, and Beatrice Mtimuni. 2005. Efficacy of a Community-Based Dietary Intervention to Enhance Micronutrient Adequacy of High-Phytate Maize-Based Diets of Rural Malawian Children. *Public Health Nutrition* 8:826-836.