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The Future of Meat without Animals

Edited by
Brianne Donaldson and Christopher Carter

ROWMAN & LITTLEFIELD
INTERNATIONAL
London • New York

Published by Rowman & Littlefield International, Ltd.
Unit A, Whitacre Mews, 26-34 Stannary Street, London SE11 4AB
www.rowmaninternational.com

Rowman & Littlefield International, Ltd. is an affiliate of Rowman & Littlefield
4501 Forbes Boulevard, Suite 200, Lanham, Maryland 20706, USA
With additional offices in Boulder, New York, Toronto (Canada), and Plymouth (UK)
www.rowman.com

British Library Cataloguing in Publication Data
A catalogue record for this book is available from the British Library

ISBN: HB 978-1-7834-8905-3
PB 978-1-7834-8906-0

Library of Congress Cataloging-in-Publication Data

Names: Donaldson, Brianne, editor.
Title: The future of meat without animals / edited by Brianne Donaldson and Christopher Carter.
Description: Lanham : Rowman & Littlefield International, 2016. | Series: Future perfect : images of the time to come in philosophy, politics, and cultural studies | Includes bibliographical references and index.
Identifiers: LCCN 2016027650 (print) | LCCN 2016028116 (ebook) | ISBN 9781783489053 (cloth : alk. paper) | ISBN 9781783489060 (pbk. : alk. paper) | ISBN 9781783489077 (Electronic)
Subjects: LCSH: Meat substitutes. | Artificial foods. | Animal culture—Moral and ethical aspects. | Meat industry and trade—Moral and ethical aspects. | Animal welfare.
Classification: LCC TP447.M4 F88 2016 (print) | LCC TP447.M4 (ebook) | DDC 664/.9—dc23 LC record available at https://lccn.loc.gov/2016027650

♾™ The paper used in this publication meets the minimum requirements of American National Standard for Information Sciences—Permanence of Paper for Printed Library Materials, ANSI/NISO Z39.48-1992.

Printed in the United States of America

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Chapter 10

The Future of Industrial Agriculture

An Environmental Justice Perspective

Joseph A. Tuminello, III

Responding to the question 'In the future, will the spread of affluent eating habits destroy the natural environment?', political scientist Robert Paarlberg writes: 'The answer is yes, unless food production systems evolve rapidly toward less dependence on land, water, and chemical inputs and toward reduced dependence on natural systems' (2013, 223). Over the past decade, much ink has been spilled over the future of food production from academics, activists, politicians and business analysts. This concern stems, in many cases, from a growing awareness of the limits being reached and transgressed by industrial agriculture. As in Paarlberg's response, these limits are often articulated in terms of environmental stressors and diminishing natural resources, as well as concern for adequately feeding the expanding human population. However, it is increasingly difficult to disentangle environmental impacts of industrial agriculture from impacts on humans, more-than-human animals and the global economy.

In this chapter, I employ the lens of environmental justice to shed light on the human, animal and environmental dimensions that create tension within the current trajectory of industrial animal agriculture. Framing the agricultural crisis as a cluster of environmental justice issues underscores the interconnected nature of the myriad inequities that are created and exacerbated within this system. At the same time, the theory and practice of environmental justice has largely centred on human social justice concerns. Many human communities experience institutional environmental injustices, and have rightfully benefited from work within the environmental justice movement. Yet more-than-human communities also experience environmental injustice, including farmed animals oppressed within industrial agriculture and wildlife living in areas affected by agriculture's environmental impacts. Thus, I argue that the current trajectory of industrial animal agriculture illustrates the

need for approaches that include more-than-human communities within the paradigm of environmental justice, while also not losing sight of the ongoing human injustices that launched the movement, and which are also perpetuated through industrial agriculture. This need, in tandem with consumer preferences for flesh and other animal products, underscores the importance of research and development of flesh alternatives that are palatable to a diverse array of people, now and in the future. After providing an overview of the history, theory and practice of environmental justice, I recount the current trajectory of industrial animal agriculture, finally situating the industrial agricultural system within the framework of environmental justice.

KEY CONCEPTS IN ENVIRONMENTAL JUSTICE

The United States Environmental Protection Agency defines environmental justice as 'the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies' (EPA). Environmental justice arose as a grassroots advocacy movement, and has also developed into a prolific interdisciplinary field with contributing scholars from the hard sciences, social sciences, arts and humanities (Figueroa 2008, 341). Activists and scholars working in environmental justice view the environment as a social and contextual setting within which activities take place, often characterizing it as the locus in which people 'live, work, and play' (341). This contrasts with the view of environment as something distinct and set apart from human experience. In the words of environmental sociologist Dorceta E. Taylor, '"Environmental problems" are social problems; they are socially constructed claims defined through collective processes' (Taylor 2000, 509).

There are two central dimensions of justice operating within the environmental justice paradigm: distributive justice and participatory justice (Figueroa and Mills 2001, 427). Distributive justice is concerned with the fair allocation of benefits and burdens, and participatory justice is concerned with the extent to which stakeholders are allowed to participate in decision-making processes regarding policies that affect them. As I discuss below, there is debate over the appropriate relationship between distribution and participation in recognizing and resolving environmental injustice. In general, environmental justice practitioners examine the nature of the distribution of environmental benefits and burdens, as well as the presence of community self-determination.

From the perspective of distributive justice, environmental injustices take place when communities bear a disproportionate amount of environmental

burdens resulting from a particular practice, while receiving little to no benefits or compensation. Examples of environmental burdens include exposure to air and water pollution, compromised working conditions due to environmental degradation and loss of natural resources. Environmental benefits, in contrast, include routine access to clean, safe environments and the preservation of traditional practices and heritages in relation to a community's environment (Figueroa 2008, 342).

Some scholars, such as philosopher Peter Wenz, have focused solely on distributive justice as a marker for determining environmental justice and injustice (Wenz 1988, 4). Wenz writes: 'The chief topics related to environmental justice concern distributive justice.... Environmental justice focuses ... on the distribution of benefits and burdens among all of those affected by environmentally related decisions and actions' (4). Thus, this view entails that environmental justice is ultimately a matter of distribution, while events outside of distribution are not major contributors to environmental justice and injustice.

Others, however, have critiqued this approach, arguing that important factors relevant to environmental justice are neglected by focusing on distributive justice alone. Political scientist and philosopher Iris M. Young claims that a strictly distributive approach to environmental justice cannot account for the importance of allowing stakeholders to participate in decision-making processes regarding the distribution of environmental benefits and burdens (1983, 171). For instance, when an industry sites a toxic waste facility within or nearby a given community, participatory justice is needed. Those who stress the importance of participation in environmental justice argue that community members who stand to have their environment affected by the implementation of particular practices should be given a voice in evaluating the projected costs and benefits, collectively determining whether these are acceptable for their community. Furthermore, as Young argues, participation should be seen as a fundamental aspect of justice (171). A distributive approach to environmental justice, on the other hand, cannot account for the importance of community self-determination on its own.

Decisions regarding the distribution of environmental benefits and burdens have historically failed to involve those groups who incur the most detrimental effects. Recognizing this, participatory justice is commonly invoked and emphasized within environmental justice discourse. Environmental justice theorists' recognition of the importance of participatory justice reflects values already embedded in communities fighting for environmental justice on the ground (Figueroa and Mills 2001, 427). For example, only 2 of 17 principles of environmental justice established at the 1991 First National People of Color Environmental Leadership Summit reference distributive justice, while many of the other principles focus on various dimensions of participatory justice ('Principles of Environmental Justice').

One of the key claims that has been substantiated through analysis of environmental justice cases over the past few decades is that the inequitable and unjust distribution of environmental benefits and burdens often falls upon certain groups, namely historically marginalized peoples, members of racial and ethnic minorities, and people of lower socioeconomic status. According to environmental philosopher Robert Figueroa, 'Environmental injustice occurs when a policy elite disrespects traditional environmental practices and excludes the least empowered and most economically vulnerable groups from environmental decision-making' (2008, 342). Investigation into structural discrimination against marginalized human populations, and environmental racism in particular, led to the rise of the environmental justice movement, and is the hallmark of many cases of environmental injustice.

A BRIEF HISTORY OF THE ENVIRONMENTAL JUSTICE MOVEMENT

Social justice and environmental issues have been interrelated long before the development of the theoretical framework and language of environmental justice. Sociologist David N. Pellow argues that 'since the dawn of human history environmental inequality has been with us – that it did not begin with the production of toxic waste in the post-World War II era' (Pellow 2000, 591). Thus, events which can be arguably characterized as environmental justice struggles predate the galvanizing of the modern environmental justice movement in the early 1980s. In his book *Garbage in the Cities*, historian Martin Melosi recounts the triumphs and tragedies of human refuse management in ancient and contemporary metropolitan areas, drawing attention to inequalities embedded within these systems. In the ancient Egyptian city of Heracleopolis, for example, people collected and removed waste from the areas where elites lived, while ignoring waste in the non-elite sectors, allowing it to accumulate at the expense of public health (Melosi 2005, 3). Certainly the non-elite citizens of Heracleopolis did not articulate their struggle over waste removal as 'environmental injustice', but it clearly illustrates a connection between social status and environmental health.

Tracing the genealogy of the environmental justice paradigm to the exploitation and oppression of people of colour since the 1600s, Taylor argues that it is unsurprising that environmental justice discourse differs drastically from the rhetoric of mainstream environmentalism, which has tended to focus on the preservation of the environment as a pristine entity unspoiled by human engagement (Taylor 2000, 533). Self-determination and the struggles for autonomy and retention of identity have become essential driving forces in cultures and communities of colour, and self-determination also inherently

raises questions about how people shape their identities in relation to their environment, as well as questions of justice and fairness regarding access to natural resources (534).

From the 1800s through the civil rights movement of the 1960s and beyond, social justice struggles of people of colour and the working class have often been inextricably linked to human relationships with their environments. Some issues of note during this time period include struggles to improve slave housing conditions, opposition to sharecropping, improving housing conditions for people of colour in cities, opposition to segregation of parks, beaches and residences, and struggles regarding fishing rights and pesticide contamination (Taylor 2000, 534–35). Chicano and Filipino-American migrant farmworkers were also pioneers of the environmental justice movement throughout the 1960s and 1970s, raising awareness and fighting against dangerous working conditions, discrimination and pesticide contamination alongside Cesar Chavez and Dolores Huerta in the United Farmworkers Union (Figueroa 2008, 342).

The late 1970s marked increasing public awareness of the environmental disaster at Love Canal, an abandoned canal project near Niagara Falls as well as the name of an adjacent working-class neighbourhood. In the 1940s and 1950s, a chemical company, sanctioned by the government, dumped chemical waste into the former canal project, later selling the land on which the Love Canal neighbourhood was built ('Love Canal'). Lois Gibbs, along with the Love Canal Homeowners Association, led a campaign which exposed numerous illnesses experienced by the residents of the neighbourhood, and which were correlated with the leaching of toxic water onto residential property. Due to their campaign, state and federal agencies relocated over 900 families from the area.

The Love Canal incident was a major catalyst in the anti-toxics movement, which is considered part of the larger environmental justice movement (Pellow and Brulle 2005, 8; Figueroa 2008, 342). The anti-toxics movement was spurred by the publication of biologist and conservationist Rachel Carson's 1962 book *Silent Spring*, which examines the environmental and public health impacts of the use of DDT and other pesticides (Leonard 2011, 18). According to sociologists Christopher Rootes and Liam Leonard, the anti-toxics movement focuses on 'potentially universal complaints about polluting processes and practices and the threats they pose to public health' (2009, 839). After the events at Love Canal, Lois Gibbs founded the Center for Health, Environment, and Justice, which assists people experiencing environmental injustices, including those related to chemical wastes (Gibbs 2002).

The early 1980s marked the explicit emergence of the environmental justice movement, as well as the emergence of the concept of environmental racism. Environmental justice scholars and activists largely attribute this to

protests taking place in 1982 regarding the presence of a toxic landfill containing the carcinogen polychlorinated biphenyl (PCB) in Warren County, North Carolina. Over 500 people were arrested during the protests, eventually leading to the state of North Carolina spending $25 million to clean and detoxify the landfill in 2002 (Bullard and Johnson 2000, 556; Figueroa 2008, 342). Multiple studies in environmental justice were also conducted as a result of the campaign in Warren County. A 1983 study demonstrated the siting of toxic waste facilities in the southern United States in predominantly African American communities, and The United Church of Christ's Commission for Racial Justice conducted a nationwide study in 1987 showing that race was the number one variable (over variables such as poverty, land value and home ownership) that could be used to accurately predict the locations of toxic waste facilities around the country (Bullard and Johnson 2000, 556). While the Warren County landfill was officially closed in 2004, environmental justice and racism scholar Robert D. Bullard argues that citizens of Afton, North Carolina are still owed a formal apology and at least $18 million in reparations (2004).

In addition to the groups discussed above, indigenous peoples have struggled with environmental injustices for centuries. One recent example involves tribes inhabiting the Klamath River Basin on the border of California and Oregon. Dams constructed in the 1960s and 1970s led to the growth of toxic algal blooms, and tribes traditionally practising subsistence hunting and fishing in the basin lost access to salmon and other species which they relied on as staple foods. The absence of their traditional foods coupled with increasing reliance on commodities and cheap processed foods led to alarming rates of diabetes and heart disease in tribe members (Alkon and Norgaard 2009, 297–99).

Ron Reed, a cultural biologist and member of the Karuk tribe – one of several tribes living in the Klamath River Basin – contacted sociologist Kari Norgaard to request assistance in providing scientific documentation of the effect of the salmon population decline on the health of tribe members (Reed and Norgaard 2010, 2). While the Klamath Basin tribes still face obstacles stemming from environmental and other social injustices, the report generated by Reed and Norgaard has led to the tribes being taken seriously as vital parts of the decision-making process regarding the Klamath River dams (8). Tribal demonstration in urban areas, in tandem with the scientific study and the ensuing media attention given to the tribes, eventually led to meetings with tribe members and the shareholders and CEO of the company responsible for the dams. Reed has since been appointed to the California Environmental Justice Advisory Board and was chosen as a California delegate to the World Social Forum in 2007 (9). Four of the dams are now scheduled to be removed by 2020, as part of what has been called the largest dam removal project in the world (Houston 2015).

The above is a sampling of the rich theory and practice occurring within the paradigm of environmental justice scholarship and activism. There are many more ground-level issues and theoretical debates that are beyond the scope of this chapter. While the cases discussed here have been centred on the rise of the environmental justice movement in the United States, it should also be noted that there are myriad environmental justice issues occurring globally, some of which I will discuss below in the context of industrial agriculture. My purposes in presenting the above discussion are (1) to establish the basic theoretical framework of environmental justice in order to apply it to agricultural issues, (2) to raise the possibility of expanding this framework to accommodate more-than-human communities as stakeholders in environmental justice issues, and (3) to demonstrate some of the victories and obstacles which can occur within environmental justice campaigns. Before framing industrial animal agriculture as a cluster of environmental justice issues, it is important to review the current trajectory of the agricultural system in order to examine the environmental inequities that follow from it.

THE TRAJECTORY OF INDUSTRIAL ANIMAL AGRICULTURE

From 2005 to 2008, global food prices rose by 83 percent (Mittal 2009). This increase directly affected staple foods such as maize, wheat, rice and soy, and subsequently affected value-added foods containing these crops, leading to a crisis that drove 40 million more people into hunger worldwide (Mittal 2009). In response, the Food and Agriculture Organization (FAO) of the United Nations assembled a group of experts to discuss the topic of feeding the world over the forthcoming decades, culminating in a volume titled *Looking Ahead in World Food and Agriculture: Perspectives to 2050*. Economist Piero Conforti briefly summarizes some of the fundamental questions to consider regarding the future of agriculture:

> How are the evolution of demand and supply in the next decades going to shape agricultural markets? How are long-term growth prospects and the expected evolution of per capita income going to affect agriculture and food production? Are the natural resources available, such as land and water, sufficient to feed a growing population? What role can economic incentives and technical change play in shaping supply? And what are the priority areas where investment and research should be directed? How may the use of agricultural products in biofuel production affect markets? How can climate change affect production possibilities, and hence markets? (Conforti 2011)

The ongoing rise of the global population is creating further difficulty for already strained food markets. As of 2016 the global human population is

estimated at 7.3 billion (United States Census Bureau). By 2050, the population is expected to grow by at least two billion people, with the largest increase occurring in the 'majority world' countries (meaning those who make up the majority of the world population though their economies may be considered 'developing')[1] and more than half in Africa (UN 2015). The locations of projected global population growth are of particular importance because of the justice issues stemming from agriculture and food production. These issues include climate change, which is exacerbated by industrial agriculture via factors such as greenhouse gas emissions, the effects of which will be endured disproportionately by citizens of majority world nations in the global south.

Human population growth is also projected to be accompanied by increased flesh consumption, hence the increase of global livestock populations. The rise in flesh consumption will largely take place within developing countries, as citizens of those countries achieve greater affluence, expanding membership in the middle and upper classes. For instance, geographer and political ecologist Tony Weis observes that 'the per capita consumption of both meat and milk [in China] has roughly doubled since the reforms of the early 1980s, or roughly a single generation' (Weis 2007, 105). This claim is also born out in Song Tian's chapter in this volume where the author analyses the meteoric rise in Chinese meat consumption over the past three decades.

The tendency for meat-eating to increase as nation-states develop economically is well documented. A primary factor in this correlation is that many people understand animal protein to be more nutritious than protein from plant sources. According to Weis, various authorities have championed this view in the United States, embedded it in mainstream perspectives on nutrition, and passed it on to majority world countries as propaganda, encouraging them to industrialize according to Western standards so as to increase access to and affordability of animal meat (2013, 71). Interestingly, the rise of 'Western diseases' such as obesity, Type-2 diabetes, hypertension, stroke and heart disease within populations that have adopted a Westernized diet – characterized by high levels of animal products and processed foods – has not appeared to be a major deterrent from this lifestyle change (Pollan 2008, 84). Westerners have also historically perceived meat from animals as a status symbol, and this line of thought can be traced at least as far back as the proliferation of meat-eating in Europe, especially in England, during the Middle Ages (Weis 2013, 59).

The glorification of animal meat, and the rise of its consumption is also conceptually tied to the reification of a developmental hierarchy. People who subscribe to this view take the United States to be at the highest developmental tier, while other countries should strive to attain the same level of development as the United States. In conjunction with this idea, a prerequisite

for becoming a so-called 'developed' country consists of industrializing food production processes, including introducing and proliferating confinement animal agriculture, with the goal of producing cheap, plentiful flesh. While the consumption of animal flesh was once an occasional luxury, a delicacy even in many minority world countries, this is no longer the case.

Thus, world flesh consumption has quadrupled from 1961 to 2011, and these numbers are expected to continue rising into the mid-twenty-first century (Weis 2007, 105). Weis asserts that, according to projections from the FAO, 'global meat production will rise to 52 kg per person in a world with 9.3 billion people [in 2050], which amounts to 484 million tonnes'(Weis 2013, 1). This figure is up from 43 kg in 2011 (1). Importantly, while many people writing on agricultural economics do not spend a great deal of time reflecting on the ways that increased consumption of animal flesh impacts the lives of individual animals, others such as Weis take great pains to make their suffering palpable, providing data to make the scale and horror of intensive animal agriculture more meaningful. If humans increase their consumption of animal meat according to the aforementioned projections by 2050, then this inevitably also means that more animals must be bred, reared and killed, and that industrial animal agriculture, or 'factory farming', will continue to proliferate as well. Hence, more sentient beings with individual personalities, whose lives matter to them, and who have moral worth for their own sake, will not only be brought into existence solely for the sake of human consumption and profit, but will be brought into existence under consistently miserable, painful and oppressive circumstances. If the FAO's projections regarding future world consumption of animal flesh hold true, then the amount of animals slaughtered will increase from 64 billion in 2010 (up from a significantly smaller 8 billion in 1961) to 120 billion in 2050 (Weis 2013, 2).

INEFFICIENCY AND THE GRAIN-OILSEED-LIVESTOCK COMPLEX

Even when the efficiency of animal agriculture is increased, the consumption of animals is still less efficient than consuming the vast amounts of water and nutrient inputs that are cycled through animals as part of the production process. When farmers feed soybeans, grains and oilseeds – meaning those seeds grown for use of their oil such as peanuts, soybeans and cottonseed, among others – to animals who are being raised for their protein products, their digestive systems also direct nutrients from these plant sources towards their bones, muscles, skin and other organs, as well as towards the production of energy which is expended as part of being alive, moving and generating heat. On these grounds, the philosopher Peter Singer has argued that important

strides could be made towards alleviating starvation by feeding people the grain and soy which is instead fed to animals (Singer 2009, 121).

In this vein, one change we are likely to see in animal agriculture as we move towards 2050 is an increase in the amount of livestock that utilize nutrients more efficiently, as feed-to-flesh conversion ratios vary widely among different species of livestock. Assessing the main species of animals raised for their flesh, beef cattle are by far the least efficient, followed by pigs, and then broiler chickens, who are the most efficient of these three species, with a feed conversion ratio estimated at two to three units of feed per one unit of flesh (Weis 2013, 115). As Brian Henning argues convincingly in the first chapter of this volume, growing plants as the primary source of protein for human consumption is far and away the most efficient use of resources and the only option that drastically reduces present and projected 'environmental boundary conditions' for greenhouse gas emissions, sustainable biomass appropriation and sustainable reactive nitrogen mobilization set by the FAO.

In the report *World Livestock 2011: Livestock in Food Security*, the FAO projects that, in 2050, '2.3 times as much poultry meat and between 1.4 and 1.8 times as much of other livestock products will be consumed as in 2010' (FAO 2011). While the same report projects that people worldwide will increase their animal meat consumption by 173 percent from 2010 to 2050, and that people in majority world countries will increase their meat consumption by 209 percent by 2050, people worldwide will also increase their consumption of poultry by 225 percent. This is significantly higher than increases in the worldwide consumption of flesh from other animals, which range from 137 percent (for consumption of meat from pigs) to 178 percent (consumption of meat from sheep) (FAO 2011). While the dramatic increases in human consumption of poultry in majority world countries is seen as a more efficient way to curb hunger, it is also important to keep in mind that (1) this is still less efficient than plant-based diets which eliminate the need for livestock as the inefficient 'middlemen', and (2) as chickens are significantly smaller in size than other livestock, increases in the amount of poultry that people consume also signify a much larger amount of individual lives that people will take and exploit as part of the food production process.

Awareness of the environmental impacts of industrial animal agriculture is growing, and Tony Weis coins the term 'ecological hoofprint' as a useful heuristic in helping us to think about the implications of these effects. This term plays on the idea of ecological footprints, which Mathis Wackernagel and William Rees coined (1996, xi). Wackernagel and Rees use this term to help conceptualize the ecological effects of consumption, and consumption's contributions to economic inequalities and injustices (3–5). As Weis puts it, 'The ecological *hoof*print seeks to connect and extend some of these

basic concerns to a different and much bigger "population bomb" than what environmentalists have long focused upon: that which is occurring within systems of industrial livestock production' (Weis 2013, 51). At a time when we should be working to mitigate climate change, industrial animal agriculture is one of the key contributors to this problematic phenomenon. Also, as the documentary *Cowspiracy* (2014) cleverly illustrates, while numerous mainstream environmental groups have made concerted efforts to get individual consumers to take shorter showers and use less water on their lawns, very little energy has been devoted to informing consumers about the detrimental effects of eating meat from animals or more ecologically sound dietary patterns.

Weis identifies the key driver/s behind the ecological hoofprint, as well as the trajectory of industrial animal agriculture into the future, as the 'grain-oilseed-livestock complex' (2013, 95). This complex consists of myriad factors that work in tandem to perpetuate the current inefficient and destructive model of industrial agriculture. As such, I will provide a brief overview of the different elements that aid in its function.[2]

After World War II, the rise of industrialized agriculture manifested through large monoculture crops, high degrees of mechanization and dramatic increases in productivity that led to grain surpluses.[3] In order to stabilize crop prices, the United States government needed effective and profitable ways to absorb this chronic grain surplus. The government could stabilize prices for farmers purchasing a specific amount of the surplus. However, this can become expensive, and the government must also find some use for the purchased surplus. Thus, the government could also send purchased crops to other countries as food aid and cheap food exports (Weis 2013, 72). In his first book, *The Global Food Economy*, Weis describes this process in great detail, as it led to a number of majority world countries becoming dependent on low-cost food imported from minority world countries, often overcrowding and out-competing local farmers in their own markets, and ultimately becoming a threat to food security and sovereignty. Weis expertly details the complex set of trade agreements undertaken by minority world countries and transnational corporations that embed and strengthen intensely asymmetrical power relations, also limiting the control of governments in majority world countries over their imports and exports (2007, 128).

The third main method of chronic surplus absorption is to cycle grains through livestock. Even though this method is nutritionally inefficient, and certain animals such as cattle and other ruminants are not evolutionarily adapted to eating grains, the livestock who are being fed the grains can then be sold for greater amounts of money because people see them as being of greater value and a better protein source than grain (Weis 2013, 73). Thus, monoculture crops and confinement animal feeding operations reinforce one

another, with each major area of industrial agriculture growing and expanding into other countries.

The grain-oilseed-livestock complex is characterized by the process of overriding the biological and physical foundations of agriculture. This overriding allows for higher productivity and lower prices, at the cost of the well-being of humans, animals and the environment (Weis 2013, 8). Rather than increasing soil fertility through intercropping, fixing nitrogen by rotating fields with crops of legumes and integrating livestock in fields to use their manure as fertilizer, industrial farms employ synthetic fertilizers that rely on non-renewable fossil fuels for their production (104–05). Scientists have linked the overuse of these fertilizers to nitrogen runoff which leads to hypoxic areas such as the 'dead zone' in the Gulf of Mexico (Rabotyagov et al. 2010, 1542).

The proliferation of monocultures and the subsequent narrowing of gene pools of industrial livestock have severely impacted biodiversity in the name of increasing productivity and efficiency. Intense selective breeding of animals has progressed throughout the twentieth century into the present, and farmers have bred livestock with the narrow goal of increasing the production of animal proteins as quickly as possible, which has also resulted in increased animal suffering. Broiler chickens, for instance, regularly endure muscular and skeletal problems, their bodies struggling under the weight of breasts that have been selected to grow larger than ever, and in as small a time period as possible. In 1956, broilers required 84 days to reach 1.82 kg. In 2000, broilers took only 34 days to reach this same weight (Hafez and Hauck 2005). Instead of reducing the crowding of animals, which leads to the spread of disease as well as damaging behaviours such as feather-pecking and cannibalism in chickens, industrial farms perform various 'routine' mutilations such as debeaking with no anaesthetic. Workers in industrial agriculture also administer antibiotics to animals on a regular basis for purposes of growth promotion and disease prevention, contributing significantly to antibiotic resistance for humans as well as other animals (Khachatourians 1998, 1129).

Rather than constraining water use at a time where it is fast becoming a precious resource, industrial farming operations pump underground aquifers, such as the Ogallala (which supplies water to 20 percent of the United States' irrigated land), to the extent that they are essentially non-renewable. At the same time, the diminishing global water supply threatens the stability of food production worldwide. Hydraulic engineer Charlotte de Fraiture and agricultural economist Dennis Wichelns write that 'at the local and regional scales water scarcity will constrain efforts to increase agricultural production in some of the world's major breadbaskets' (2010, 502). Farmers are producing plenty of food, but they inefficiently cycle it through exploited livestock before it reaches the consumer in the form of manufactured animal flesh.

INDUSTRIAL AGRICULTURE AND ENVIRONMENTAL JUSTICE

When one views this system strictly in terms of short-term profit and an extremely narrow and distorted view of productivity, one may think of industrial agriculture as efficient, leading to cheap, accessible products. However, industrial agriculture requires the externalization of so many costs – onto the environment, the animals imprisoned by the system, exploited workers, citizens of the global south, the people who live near Concentrated Animal Feeding Operations (CAFOs) and monocultures, as well as taxpayers who continue to subsidize industrial crops such as soy and corn[4] – that this view is inherently and considerably inadequate. If people increase their animal meat consumption according to the aforementioned 2050 projections, this will exacerbate the destructive tendencies of this system. People will dedicate more land to growing feed for animals, the growing animal and human populations will consume more water, the industrial agricultural system will emit more greenhouse gases and more people and animals will be exploited and oppressed.

Viewing industrial animal agriculture through the lens of environmental justice aids in clarifying the ways that communities endure environmental inequities as a result of this model of food production. In this section, I examine environmental injustices experienced by human communities on both local and global scales. I conclude by considering the possibility of expanding the parameters of the environmental justice paradigm to include more-than-human communities as stakeholders to whom justice is owed.

As mentioned above, the environmental justice movement views the environment as the setting in which we live, work and play. On this view, human communities deserve justice regarding their ability to access and exist in spaces free from environmental burdens, especially when they are not responsible for the introduction and proliferation of those burdens. Further, those communities should be given voices in decision-making processes in evaluating the acceptability of environmental benefits and burdens. Within this framework, there are myriad examples of environmental justice issues that communities experience by living adjacent to areas in which others have decided to construct CAFOs.

Multiple studies have focused on marginalized communities living next to industrial hog operations in North Carolina. A pivotal study by Bob Edwards and Anthony Ladd suggested that 'a significant number of Black households slipped into poverty as a result of losing small farms or losing supplemental household income derived from farming' (Edwards and Ladd 2000, 286). Their results also suggest that 'this process was aided throughout eastern North Carolina in no small way by the recent agro-industrialization of pork production' (286). Edwards and Ladd argue for the importance of expanding

the parameters of environmental justice to also take into account the siting of CAFOs in low-income communities, as well as those of people of colour. Additional research on North Carolina shows that 'both poverty and race are strongly related to the location of hog operations' (Wing et al. 2000, 230). Given the noxious odours, proximity to waste lagoons, and various respiratory and other health problems that have been linked to these farms, this no doubt compromises the quality of life experienced by people living nearby. Residents in these areas did not get to choose whether or not facilities were sited near their home, and stand to profit in no way from being in such close proximity. A 2011 study of humans living near hog CAFOs showed impaired neurobehavioral and pulmonary functions experienced by neighbours of these facilities (Kilburn 2011, 4).

In the aptly titled article 'The World Eats Cheap Bacon At the Expense of North Carolina's Rural Poor', Lily Kuo describes further discrimination against people of colour in these areas. Kuo describes the circumstances of these communities as 'a story about poverty and racial inequality, and how those forces play out in a state where the hog industry has emerged as both essential for the economy and an oppressor of poorer communities of color' (2015). Protests began in Craven County and nearby areas in the late 1990s after multiple waste lagoons overflowed. However, the state took no legal action until the industry proposed a hog farm and lagoon near the wealthy community of Pinehurst in 1999, which led to a statewide moratorium on new hog farms which is still in place (Kuo 2015).

Unfortunately, scenarios such as these are common for those living near CAFOs; not only regarding hog farms in North Carolina, but throughout the nation and world. While conducting research for their book *Farmaged-don: The True Cost of Cheap Meat*, Philip Lymbery, the CEO of the animal advocacy group Compassion in World Farming (CIWF), and journalist Isabel Oakeshott travelled around the world, documenting various human, animal and environmental impacts of industrial animal agriculture. While visiting areas adjacent to industrial dairy operations in California, the authors were able to interview a number of residents of these areas, as well as collect data that substantiated many of their claims. Due to air pollution which is at least partially linked to area mega-dairies, one-fifth of children in the Central Valley are diagnosed with asthma, and boiling water due to contamination from dairy waste lagoons is a part of everyday life for residents of the small Hispanic communities who provide labour for the CAFOs (Lymbery and Oakeshott 2014, 18–21).

A physical incarnation of the interconnected and international nature of industrial animal agriculture, the Argentinian city of Rosario has become an industrial hub known for its factories which process soy used as feed for animals in CAFOs all around the world. The processing plants and heavy

traffic contribute large amounts of air and noise pollution, and a recent study showed that six towns in the region have alarmingly high rates of testicular, gastric, liver, pancreas and lung cancer, linked to the use of pesticides on soy fields (Valente 2009). Many people moved to Rosario before the soy industry moved in, thinking that it would be a good place to live. Surveying the landscape of factories generating feed for factory-farmed animals, Lymbery asks himself, 'Who would live in such a place? The answer is: people who lived there before the industry arrived, and are stuck' (Lymbery and Oakeshott 2014, 219).

Industrial animal agriculture does not only pose environmental justice issues for those who live and work in and around CAFOs and related industries. Environmental inequities associated with this industry also occur on a global scale, among nations, where industrialized Western countries perpetuate injustice against citizens of the global south. According to the FAO report 'Livestock's Long Shadow', the livestock sector is responsible for 18 percent of greenhouse gas (GHG) emissions including 9 percent of anthropogenic carbon dioxide emissions, 37 percent of anthropogenic methane, 65 percent of anthropogenic nitrous oxide and almost two-thirds of anthropogenic ammonia emissions (Steinfeld et al. 2006). The contributions of industrial animal agriculture to climate change constitute a clear case of environmental injustice, as (1) wealthy, minority world nations are making far more negative contributions to climate change than are other countries, and (2) many majority world countries in the global south are bearing the brunt of the negative effects of climate change. Many island nations, for instance, are already becoming uninhabitable or trending heavily in this direction because of rising sea levels linked to climate change. Weis summarizes the view which has recently galvanized calls for action in this area: 'Justice demands finding policy mechanisms to ensure that those most responsible for climate change are forced to make faster and deeper reductions in per capita GHG emissions (beyond merely proportional cuts), along with making strong commitments to invest in climate change adaptation in the world's most vulnerable countries' (2013, 45).

To return to the projections of increasing meat consumption and animal agriculture towards 2050, the justice dimensions that I discuss here further illustrate the destructive consequences of the expansion of animal agriculture. While animal ethics scholars have reiterated this point throughout the literature, the majority of global citizens simply do not require meat from animals to survive, or even to live well. Further, given the current and projected future circumstances of climate change and resource scarcity, mass consumption of animal flesh and fluids may, in fact, hinder our survival on a collective level.

Within the framework of environmental justice, we can see that refraining from consuming animal by-products is not only a concern for the sake of

animals within industrial agriculture, but for human beings that continue to incur injustices through the perpetuation of the current system of food production. While many factors influence and are influenced by the existence of industrial animal agriculture, the industry would ultimately not exist if consumers ceased to support it. The environmental inequities that compromise the well-being of communities due to their proximity to CAFOs, or due to their living in areas more drastically affected by climate change than others, are perpetuated in large part by the current and projected growth of meat-eating worldwide. Thus, framing industrial animal agriculture as a cluster of environmental justice issues underscores the importance of research and development towards meat alternatives and plant-based eating that are palatable and culturally appropriate for a diverse array of people, now and in the future.

CONSIDERING MORE-THAN-HUMAN COMMUNITIES WITHIN ENVIRONMENTAL JUSTICE

I close this chapter by considering the possibility of including more-than-human communities as stakeholders within the environmental justice paradigm. While I examine this idea in regard to animals within the industrial agricultural system, one may also effectively utilize an environmental justice lens to better understand the plight of other communities, including wildlife experiencing habitat loss as a result of climate change, and aquatic life enduring the consequences of pollution and overfishing.

While the environmental justice movement has made significant advances in illuminating and working to correct injustices and inequities, it has also focused largely on environmental injustices incurred by human communities. To be clear, I do not think that the achievements of the environmental justice movement should be devalued in any way. As discussed above, the movement is rooted in recognizing and combatting environmental racism and the structural oppression of marginalized groups who have unfairly incurred disproportionate environmental burdens, and who have been denied a voice in decision-making processes regarding the distribution of benefits and burdens. The growing momentum and success of the environmental justice movement is a major triumph. However, theorists and practitioners should at least be open to the possibility of including other historically marginalized groups, and even eco/systems, within the environmental justice framework.

The environmental justice movement already acknowledges that factors beyond race, such as gender and social class, play a role in discrimination and injustice. To go one step further, if it is the case that species membership

(or lack thereof) plays a role in environmental injustice, then it is also worth considering whether communities of more-than-human animals should be included as stakeholders within the framework of environmental justice. When we speak, for example, of environmental injustices experienced by communities of colour due to their proximity to industrial hog farms, should we also consider the animals within the CAFOs themselves as being deserving of justice? These animals are systematically exploited simply by virtue of being members of a particular species, and have no say, no benefit and no compensation from their roles in the industrial agricultural system. Their environments, the places where they live, not to mention the brevity of their lives, are also detrimental to their health and well-being.

When recognizing race, class and gender as factors influencing environmental discrimination, it is also worth asking whether the line should be drawn at species when determining who should be included within the paradigm of environmental justice. While they may not be able to have voices in decision-making processes in quite the same way as human beings, advocates must speak for more-than-human animals where it is possible to make positive changes, being attentive to the myriad ways that animals clearly communicate their desires and suffering. If they are included as potential recipients of justice or injustice, then this could be a fundamental way of building coalitions for justice which transcend species-specific advocacy.

The inclusion of more-than-human animals as stakeholders within environmental justice discourse would be mutually beneficial for the movement as well as the animals themselves. Political theorist Robert Garner states candidly that 'utilizing the language of justice is beneficial to animals', and proceeds to argue that 'it is commonly regarded as our most politically powerful ethical language' (2003, 13). This inclusion would also strengthen the environmental justice movement as a whole. Interpreting animals as stakeholders within this framework illuminates the interconnection of oppression and injustice across species boundaries. As I illustrated in the above discussion of hog farms, many of the environmental injustices that communities of colour experience as a result of agricultural practices are directly linked to the exploitation of animals within those systems (e.g. the accretion and mismanagement of manure). Activists and scholars of environmental justice have made significant progress in substantiating the claim that disenfranchised groups (often members of historically oppressed races) tend to suffer greater environmental inequities than others. Thus, by recognizing more-than-human communities as experiencing injustice, the environmental justice movement will also make progress in its general goal of calling attention to and resolving environmental injustices. Ultimately, the liberation of these communities are bound up with one another, regardless of the different species that the communities span.

CONCLUDING THOUGHTS: HOPE FOR THE FUTURE

While the projected trajectory of industrial animal agriculture is bleak, I describe it in hopes of spurring action so that it will not be actualized in its current form. As Weis points out throughout his work, one of the most insidious aspects of the current and potential future state of industrial agriculture is that it is presented as being inevitable. This vision of the world is naturalized and presented as normal; that it *must* be this way. Yet, increased meat consumption is not inevitable.

Although there are much larger forces at work regarding agricultural trade policies, this does not mean that individual actions cease to make any difference. Because other countries look to the United States and the minority world as a 'role model' of sorts regarding what kinds of activities minority world countries and their citizens should take part in, it is also important for individuals to involve themselves in compassionate modes of living as much as possible. Given the nature of this volume, I also present this chapter in hopes that it can help to set the stage for other thinkers to consider possibilities for the future of meat without animals, be that in terms of plant-based meat alternatives, delicious experiments in vegetarian and vegan eating, rethinking the definition and ontological status of 'meat' or other related ideas. Despite the projections and the illusory necessity of meat-eating and increased animal meat production discussed above, Paul Shapiro of the Humane Society of the United States recently stated that, in 2014, 400 million fewer animals were raised and killed for food in the United States than in 2007 (Sentenac 2015). Shapiro goes on to attribute this reduction, at least in part, to non-vegetarians who are simply cutting back consumption of animals (Sentenac 2015). While many billions more animals *do* continue to be exploited and killed for the sake of human consumption, this provides some additional hope that it need not be this way. Although drastically reforming our current agricultural system is and will likely remain an uphill battle, it is of the utmost importance that we think and act together to do so.

NOTES

1. I employ the terms 'majority/minority world' in opposition to a conventional hierarchical approach which privileges Western nations and characterizes other nations in terms of particular standards that they should be striving to meet. For more information on this shift in terminology see Shallmani (2015) or simply search 'majority world' on Google Scholar for multiple uses of the term across disciplines.

2. For an in-depth discussion of the grain-oilseed-livestock complex, see Chapter 3 of Tony Weis' *The Ecological Hoofprint*, cited throughout this chapter.

3. See also Brianne Donaldson's chapter in this volume for more details on the history of these surpluses

4. See also Brianne Donaldson's chapter in this volume for more on the history and present practices of US farm subsidies.

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