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# Regimes and Resilience in the Modern Global Food System

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# Regimes and Resilience in the Modern Global Food System

## **Abstract**

Much public discourse surrounding the modern global food system operates on the assumption of the primary agency of individual consumers in ensuring an equitable and sustainable food supply. However, this approach fails to account for the larger structural forces of the system which frame the limits of how we interact with and are affected by our food system. Taking a closer look at the global economic, political, cultural, and environmental forces that have collectively shaped historical food regimes reveals the deeper structural patterns that currently determine how we produce, distribute, and consume food around the world. Due to the underlying structural processes of increasing distancing and standardization, we have become highly disembedded from our food system and will need to look for clues from past periods of transition between food regimes to better position ourselves to work towards a global restructuring of, and human reembedding in, the modern global food system.

## **Keywords**

Food systems, Food regimes, Globalization, Systems theory, Feedback loops, Resilience

## **Disciplines**

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## **Comments**

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REGIMES AND RESILIENCE IN THE MODERN GLOBAL FOOD SYSTEM:  
A SOCIO-ECOLOGICAL SYSTEMS APPROACH

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Globalization Studies Capstone  
Spring 2012

ABSTRACT

Much public discourse surrounding the modern global food system operates on the assumption of the primary agency of individual consumers in ensuring an equitable and sustainable food supply. However, this approach fails to account for the larger structural forces of the system which frame the limits of how we interact with and are affected by our food system. Taking a closer look at the global economic, political, cultural, and environmental forces that have collectively shaped historical food regimes reveals the deeper structural patterns that currently determine how we produce, distribute, and consume food around the world. Due to the underlying structural processes of increasing distancing and standardization, we have become highly disembedded from our food system and will need to look for clues from past periods of transition between food regimes to better position ourselves to work towards a global restructuring of, and human reembedding in, the modern global food system.

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*If a factory is torn down but the rationality which produced it is left standing, then that rationality will simply produce another factory. If a revolution destroys a government, but the systematic patterns of thought that produced that government are left intact, than those patters will repeat themselves... There's so much talk about the system. And so little understanding.*

--- Robert Pirsig,  
*Zen and the Art of Motorcycle Maintenance*

*A nation that destroys its soils destroys itself.*

--- Franklin D. Roosevelt



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## INTRODUCTION

As eaters, we are all entangled in a global food system. Following the threads of what we eat, to how it was produced, and what was involved to coax it from the earth, transform it into a material commodity, and deliver it from source to plate, we quickly find a vast and complex web of socioecological relationships that wind themselves around every aspect of our lives. Food is far more intimate to us than anything else we consume in the material economy, affecting our social and biological wellbeing and directly mediating our relationship to nature. “Eating is an agricultural act,” as Wendell Berry (1990) famously wrote. But it is also a political, economic, social, and ecological act too.

Yet, contrary to the shining neoliberal doctrine of consumerism, our individual consumer decisions are little more than symbolic in their impact on a food system that has truly become global. Although the food we choose to put on our plate invariably makes a statement about the world we want to live in, we cannot be expected to *buy* our way to social and environmental justice with labels such as “organic”, “fair trade”, and “local”. Such assumptions carry hefty classist undertones and miss the deeper connections that must be made in order to truly understand, evaluate, and effect change in the way we produce, distribute, and consume food around the world (Carolan, 2011). Although food is indeed a commodity on the global market, its true cost can never be factored into its price; moreover, those who are rendered most vulnerable by the global food system also tend to be those most commonly stripped of the economic and political means to change it. Therefore, instead of focusing all our attention on the *food* in the food system, we must shift our focus, as this paper attempts to do, to the *system*. Unmasking the structural and organization aspects of the food system will help us understand why eating is not an individual or even autonomous act. In today’s globalized world, our eating is tangled up in a complex web of relations, where most of what ends up on our plate is not simply a matter of consumer choice. In some way or another, the system shapes our every interaction with food: through the influence of

branding, labeling and marketing; the recommendations of nutrition scientists; the policies and politics of governments; the chemical compounds developed by private biotech and pharmaceutical companies; the profit-driven interests of trade organizations and development agencies; the protective and exploitative measures of the fossil fuel industry; and the standardization, mechanization, and technologization of industrial agriculture. Once the interconnections begin to be traced, it is almost impossible to define the limits of the global food system.

Although it is easy to point fingers at all of these external agents for a system that is failing on many counts to produce and distribute food in a sustainable and equitable way, taking a systems approach requires us to acknowledge that ultimately, *no one is in control of the food system*. Rather than view the food system as a linear progression that moves food from production to processing, distribution, consumption, and waste, it is far better understood as a network of non-hierarchical components that shape and influence each other in non-linear, and often unpredictable, ways. A systems approach also departs from the relatively deterministic historical narrative of agricultural change that accepts the ‘inevitability’ of food industrialization (Campbell, 2009), narratives which align with early doctrines of modernization theory (cf. Rostow, 1960) and leave no space for alternative visions of our food futures (Goodman, DuPuis, & Goodman, 2012). The systems approach brings to fore a different theoretical basis for understanding and analyzing how the global food system developed over the last several decades, while leaving the future wide open for any number of alternative outcomes for a global restructuring of the food system.

The first part of this paper will provide a brief introduction to the systems approach, with its wide and versatile prescriptions for understanding the basic functions, feedback loops, and underlying structures of all manner of social and ecological systems. The systems view of the world (Laszlo, 1972) is a compelling one, for it seeks to introduce a new paradigm for understanding the incredible complexity of the world in a holistic and integrative way. Systems theory (von Bertalanffy, 1968) is a particularly appropriate for making sense of an increasingly

interconnected and globalized world, acknowledging the structures that frame the limits of what is possible while still leaving room for contingency, uncertainty, vulnerability, and opportunity.

Socioecological systems theory (Gunderson & Holling, 2002; Berkes, Colding, & Folke, 2003; Cumming, 2011) in particular offers a cogent means for recognizing the deep interlinkages between the wellbeing of society and ecology, using the same adaptive cycle observed in ecosystems to understand human social, political, and economic systems. Although all systems can arguably find themselves linked to processes in the human and natural world, the food system stands alone in its deep dependency on the synchronous functioning of both the social and ecological alike.

The second part of this paper will explore the central themes of food regimes theory, an effective and influential approach to understanding the modern global food system, and a fruitful (though not widely recognized) application of the principles of systems theory. Since its development in the late 1980s, food regimes theory (Friedmann, 1987; Friedmann & McMichael, 1989) has attempted to reinterpret both colonial and postcolonial global-scale food relationships and their role in the contributing to stable growth in the capitalist world economy (Campbell, 2009). Using the lens of food regimes to study the historically contingent relationships that have structured the modern global food system has inspired many to explore the inherent potential for developing alternative food networks and systems (cf. Kneafsey et al., 2008; Goodman et al., 2012). However, as the third part of this paper will argue, any attempt to change the food system will have to address the deep structural relations and processes that currently keep the systemic inequalities in place, a difficult task given the extent to which these processes tend to augment and reinforce each other despite their growing detriment to human and ecological wellbeing. Although any number of processes could be studied as contributing to these systemic inequalities, the two global trends, or self-reinforcing feedback loops, of *distancing* and *standardization* will serve as the principle focus within the limited scope of this paper.



The fourth and final part of the paper will focus on the ways we might situate ourselves both individually and collectively to become more aware of these underlying structural dissensions in the food system. Such observations will invite us work towards a framework that would most effectively reconfigure those structures to reflect an alternative, and ultimately more sustainable, set of socioecological food relations. To a large extent however, simply analyzing the structural processes and recommending policy measures from afar will never be enough to construct this new framework; only by embedding ourselves within the global food system will we ultimately reveal the kinds of spaces and relations that will radically transform it.

## I. THE SYSTEM OF FOOD

A remarkably interdisciplinary approach, systems thinking falls in line with a long philosophical dialectic between atomistic and holistic ways of thinking about the world (Laszlo, 1972). Despite the dominance of the mechanistic and empirical worldview of modern science, new insight into the non-linear and non-reductive complexity of living organisms in the early twentieth century led to the development of a new paradigm of systems science, which seeks to not to isolate and analyze individual parts but rather to investigate the shared aspects of organization *between* interacting parts. A system, in the most general sense, is a configuration of parts connected and joined together by a web of relationships (von Bertalanffy, 1968). To take a systems approach, therefore, is to study the structures and configurations which bind those parts together, keep them functioning, and allow them to withstand and respond to changes in the environment.

When applied to the food system, systems thinking gives us an ascendant perspective that allows for complexity and nonlinearity in piecing together a tenable worldview (Ulanowicz, 1997). Though we tend to assume that our linear mathematic models can be universally applied to the world, nature generally does not hold to constants; not all causal forces produce proportionate effects. For instance, while it may follow that 50 lbs of fertilizer increases yield by five percent and

100 lbs of fertilizer by ten percent, 200 lbs of fertilizer may not increase yields at all, and 300 lbs may cause yields to plummet. “The world is full of nonlinearities” (Meadows, 2008), another reason why turning to look at the underlying structures of systems is crucial for understanding how incremental actions can suddenly precipitate a crisis situation (Berkes et al., 2003). Famines, price hikes, food riots, and food recalls all erupt out of a system unintentionally,<sup>1</sup> yet are clearly driven by the confluence of several forces that behave in complex and non-linear ways. We can predict neither when nor where the next famine or food scare will arise, nor can we point to any one specific cause. It is from this general observation that we might begin to develop an understanding of the food system as a self-organizing and self-perpetuating entity, subject to no single outside agent or force. Rather than fixating on cause and effect, systems theory encourages us to look for feedback loops that inform and reinforce system behavior from within. The food system is by no means a closed system; it is highly vulnerable to outside fluctuations in and perturbations from external social and ecological systems. However, over time certain structures have developed—expressed in cultural values, political regimes, and public policy decisions—in the food system, and the world system at large, that guide its functioning, often irrespective of concerted efforts to change it.

Feedback loops are an important feature for understanding the self-organizing capacity of any system (Figure 1). They can function either to a) maintain the stability of a system, resisting changes and seeking an end in equilibrium; or b) build upon themselves, exacerbating a situation unto the brink of collapse (Meadows, 2008). The food system contains both kinds of feedback loops, many of them tangentially connected to one another. They are the principle driving forces

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<sup>1</sup> Although certain crises can be traced back genealogically to reveal immediate causes (i.e. political seizures, market crashes, inspection failures, etc.) for legal adjudication, systems theory calls for a wider distribution of culpability, recognizing the systemic conditions that create the possibility for crisis. The creation of such conditions are never intentional; however, this does not preclude the deliberate social construction of certain crises such food scarcity (cf. Lappe and Collins 1977; Bull 1982; Yapa 1993). Systems theory would seek to understand the conditions that permitted the social construction itself to arise.

that form the backbone of the food system, compelling outside forces to respond and thus further perpetuate and precipitate system behavior. Evident feedback loops include the use of subsidies and the concentration of power in agro-industry in social systems (balancing loop), and the ever increasing need for pesticide application and declining soil fertility in agro-ecological systems (reinforcing loop), all of which keep the food system locked into structures that are difficult to break down. These basic feedback loops, along the complexity of their constitution, largely obscure what would otherwise be logical places to intervene for reforming structural inequities in the food system (Malhi et al., 2009).

Systems modeling has also demonstrated the importance of time lags or information gaps in feedback loops, which can cause systems to oscillate as they continuously over-correct and adjust themselves. Food surplus and scarcity often operate in this recurring pattern; with so many producers, distributors, and consumers (i.e. the entire human population), it is nearly impossible to regulate the market well enough to maintain a perfectly balanced (just and sustainable) global food supply. These basic fluctuations are prevalent in many different social and ecological systems; the over-proliferation of one good or resource drives overconsumption, which leads to collapse, thus creating conditions anew for its re-proliferation. Ecological theorists Lance Gunderson and Buzz Holling (2002) have developed a conceptual model to account for these dynamics of stability and change over time based on initial observations on the dynamics of ecosystems. The model, known as *panarchy*, identifies four basic stages of ecosystem dynamics: exploitation ( $r$ ), conservation ( $K$ ), release ( $\Omega$ ), and reorganization ( $\alpha$ ) (Figure 2). These four episodic stages are neither constant nor chaotic, but are instead a function of the connectedness and potential for growth within an ecosystem. The more complex and interconnected a system is, the more it becomes vulnerable to surprises or even collapse from small scale disturbances, and the less potential it has for sustaining growth in the long term (Holling, 1973; Gunderson & Holling, 2002).

Although the adaptive cycle of panarchy was originally conceived from observations about ecosystem dynamics, the same framework has also been applied to human social, political, and economic systems (cf. Odum, 1970; Berkes et al., 1998; Zimmerer, 2000). The political cycle and the business cycle both display remarkably similar characteristics in their ability to remain relatively stable amidst continual change, quickly adapting to new circumstances following a volatile period of disturbance or release. Likewise, the food system is even more explicitly subject to social and ecological disturbances and can be similarly assessed for its resilience to destabilization and change. *Resilience*, one of the key concepts that has emerged from developing this model of ecosystem evolution, is the parameter that determines just how much disturbance a system can withstand before transforming into a qualitatively different state (Holling, 1973; Gunderson & Holling, 2002; Berkes et al., 2003; Cumming 2011). Moving beyond earlier notions of perfectly balanced and stable ecosystems, resilience introduces a new paradigm that understands ecological sustainability as a quality that emerges over time as the ability to adapt fluidly and withstand or change in response to external threats and shocks (Gunderson & Holling, 2002; Cumming, 2011). Cultivating the resilience of a system allows it to retain its identity without ever fully collapsing into an alternate state (Meadows, 2008). In other words, resilience is generally understood to be an advantageous quality for a system seeking to sustain itself (Cumming, 2011).

Major shifts in the structural forces and relationships that bind any socioecological system together can therefore be understood as resulting from a *lack* of resilience. Indeed, in examining the longer term environmental history of colonial and industrial societies, we can uncover a variety of examples of a lack of resilience in the early development of the global food system that caused qualitatively new regimes to emerge in place of the old. This method of investigating the food system as a dynamic socioecological system allows us to develop a robust understanding of the self-organized and self-perpetuating feedback loops that have historically precipitated shifts between periods of stability and change throughout the development of the modern global food system.

## II. A GENEALOGY OF FOOD REGIMES

By taking a systems approach to understanding the development of the modern global food system, all notions of teleological determinism must be abandoned; fundamental to all systems theory is the conception that the world system is ruled by deep contingencies that can be traced backwards indefinitely, but which carry forth no prescriptions for determining how the future will *necessarily* unfold. Studying the relationships between interacting actions and events provide us with a reasonable methodology for understanding where and why we are now, but acknowledging the contingency of these deep structures only reveals their fundamental uncertainty and vulnerability, creating vast potentialities and opportunities for reform.

It is in this spirit that we turn to investigate the historical food regimes that have structured the modern global food system and contributed to the stable growth in the capitalist agro-industry. Originally conceptualized by Harriet Friedmann (1987) to concentrate on the implicitly negative trends in global food relations, food regimes theory provides a compelling alternative to the linear and deterministic narratives of agricultural change that presuppose the ‘inevitability’ of food industrialization. Drawing on Marxist influences and Polanyi’s (1944) discussion of the dialectical shifts between international regimes of free trade and state regulation, the concept of a food regime links together various social, political, economic, and ecological actions and events that gave rise to distinctive modes of production, distribution, and consumption of food throughout the late nineteenth and twentieth centuries. A food regime can be defined as “an international food order, a stable set of complementary state policies whose implicit coordination creates specific prices relative to other prices, a specific pattern of specialization, and resulting patterns of consumption and trade” (Winders, 2009). The food regime sets the market, which then structures the production and distribution of agricultural commodities throughout the world economy, thereby shaping the international division of labor in agriculture. Food regimes theory thus “historicizes the global food system, problematizing linear representations of agricultural modernization, underlining the pivotal

role of food in the global political-economy, and conceptualizing key historical contradictions in particular food regimes that produce crisis, transformation, and transition” (McMichael, 2009, 140).

According to Friedmann and McMichael (1989), the first ‘colonial-diasporic’ food regime commenced with the powerful influence of European imports of wheat and livestock from settler states between 1870-1914. Growth in capitalist production in Europe included the massive expansion of a class of impoverished wage laborers who obtained food through burgeoning food markets instead of subsistence agriculture. Those who migrated to the United States, Canada, Australia, and other areas of new settlement quickly became commercial farmers directly involved in world markets, producing grain and livestock more cheaply than those who remained in Europe. The flow of commoditized food into Europe further undermined domestic agriculture and encouraged more people to migrate and profit from the export of food crops. (Friedmann, 1993b).

In the years leading up to WWI, European colonialism and imperialism encouraged the systematic production of raw materials for the expanding industries of Europe (Wayne, 1981). In seeking to consolidate their national economies, European states extended their rule to encompass tropical climates in order to secure commodities such as vegetable oils, sugar, tea, and coffee. These commodities not only changed the diets of European consumers but also reconfigured colonial land and labor into specialized exports of these tropical crops, significantly altering the balance of international trade (Winders, 2009). Indeed, England became the first country to sacrifice domestic food security in favor of social stability and industrial capitalist growth (Friedmann, 2005). The first food regime was thus based on implicit rules, framed within a general rhetoric of free trade. According to Friedmann, the world wheat market that arose in the early twentieth century was not really anyone’s goal, but rather a reflection of other objectives; wheat was the substance that gave new railways income from freight, expanding states a way to hold territory against the dispossessed, and diasporic Europeans a way to earn a living (Friedmann, 2005). Indeed, while the regime had the intended effect of reducing food costs for urban

populations in Europe, it “unfolded through a downward spiral of falling prices, crisis of European agriculture, leading to the further immiseration and eviction of small farmers and agricultural workers from the countryside, and a complementary upward spiral of immigration to grain export regions in settler states” (Friedmann, 2005).

The first food regime collapsed in during the two World Wars, the Great Depression and the ecological catastrophe of the American Dust Bowl, only two generations after the rise of an international wheat market (Friedmann, 2005). The combination of transformed ecological landscapes, new world food markets, reorganized agricultural industrial capital, and the emerging international state system thus precipitated the rise of the second food regime (1947-1973). In the United States, the resolution and reconstruction post-Great Depression and Dust Bowl involved a substantial reorganization farm sector with substantial implications for the rest of the world (McMichael, 2009). A new emphasis on commodity programs rather than American rural development laid a foundation for the surplus export regimes in following decades, as well as converting agricultures elsewhere to the agro-export model (Winders, 2009). According to Friedmann, the foundation of the new ‘mercantile-industrial food regime’ were in agro-industrialization and heavy state-protectionist measures that included export subsidies as a defining feature of the political contests and historical circumstances of the time (McMichael, 2009).

In the years following the Second World War, tightly coordinated food supplies and intense domestic regulation of agriculture extended Depression-era farm policies in the United States under the banner of post-war reconstruction. Efforts to raise agricultural prices (rather than directly subsidize farm incomes) through government loans and crop purchases resulted in the accumulation of vast surpluses by government agencies which further exerted a downward pressure on prices and pushed the system into a “self-perpetuating cycle” (Friedmann, 2005). These surpluses spurred the development of the Marshall Plan in 1948, purported to provide industrial and agricultural assistance to Europe after WWII, causing United States exports of wheat, corn, and meat to

increase ninefold between 1945 and 1949 (Winders, 2009). Later, as European markets recovered, the US began to seek out additional markets to dispose of its agricultural surplus, resulting in the passage of PL480 in 1954. Under the auspices of the 1947 GATT agreement, PL480 (later renamed the 'Food for Peace Act' under President John F. Kennedy) was promoted as a form of economic assistance for newly decolonized peripheral nations in Asia, Africa, and the Middle East. U.S. "food aid" thus became a cornerstone of supply management for the burgeoning US hegemony, while implicitly promoting cheap food policies, and food dependency, as part of state-supported industrialization programs in developing countries (Friedmann & McMichael 1989). As a result, other states, whose farmers were unable to sell in protected US markets, adopted similar, and sometimes even more protectionist, subsidized agricultural programs (Friedmann, 1993a).

Beneath the emergent nationalist surface of agriculture during the second food regime, however, a deeper structural process involving the transnational integration of agrofood sectors was forming. The relative success of commodity protectionism spurred the industrialization of agriculture and the shift from the production of final consumer goods to industrial raw materials for the manufacture of processed, value added foods. According to Friedmann (1993b), farms became "integrated with and subordinated to agrofood industries, which became some of the most dynamic components of advanced capitalist economies, linked to key sectors such as chemicals and energy." During the Green Revolution of the 1960s, farmers in intense competition with each other were placed on a "technical treadmill," forced to buy industrial inputs (feedstuffs for animals, chemicals, and machinery for crops) and sell to food-processing industries. The rise of this so-called "durable foods complex" further entrenched the "wheat and meat complex" and more fully incorporated food and agriculture into industrial capital (Friedmann, 1993b). Yet, as the cultural and geopolitical landscape shifted in the mid- to late-1960s, the stability of state interventionist and protectionist policies in the emerging transnational agro-industrial complex began to erode, leading to an unexpected shift from problems of food surplus to food scarcity as the patterns of agricultural trade



and food distribution failed to align with the actual needs of developing nations that had become dependent on subsidized U.S. surplus stocks. The World Food Crisis of 1974 thus signaled the end of the merchantile-industrial food regime and ushered in a new era of aggressive economic liberalization in global trade relations (Friedmann, 2005).

Since the collapse of the second food regime, food regime scholars (Le Heron, 1993; Friedland, 1994; Araghi, 2003; Friedmann, 2005; McMichael, 2009) have devoted significant efforts toward determining whether or not we have entered into a third food regime, characterized by the rise of a global food/fuel agricultural complex, the consolidation of corporate supply chains, increasing ecological degradation, and the more recent emergence of alternative social visions for the future of the global food system. Friedmann (2005) suggests that the larger restructuring of capitalism and social movements has precipitated the rise of a ‘corporate-environmental’ food regime, poised to shift the historical balance between public and private regulation of new standards in the food system. However, such a formulation also carries inherent contradictions given the tension between “world agriculture” and cultural survival, expressed in the politics of food sovereignty (McMichael, 2005). Additional tensions are also apparent in the growing differential between rich and poor consumers: “the distinction between fresh, relatively unprocessed, and low-chemical input products on one side, and highly engineered edible commodities composed of denatured and recombined ingredients on the other, describes two complementary systems within a single emerging food regime” (Friedmann 2005, 258). The important question arising out of these observations is whether the current food system is still embroiled in the remnant political and ecological crises of the previous regime, or whether a new system of ‘corporate-environmental’ organization has come to take its place. Such a question can only be investigated by peering into the structural foundations of historical food regimes and understanding the extent to which those structures have changed.

### III. STRUCTURES OF GLOBAL FOOD

In the brief overview of historical food regimes above, many of the key moments signifying the rise and fall of food regimes hint at the presence of self-reinforcing feedback loops driving the movement of people, commodity chains, prices, and international trade relations. In fact, there are countless such feedback loops that influence both national policies and individuals responses, both during and in-between dominant food regimes. The use of agricultural subsidies and Green Revolution technologies are two prominent examples of politically driven feedback loops that, once begun, generated their own dependency and continuation; many including Friedmann have noted the “self-perpetuating cycle” of price supports and surplus food and the “technical treadmill” of chemical agriculture during the second food regime (Friedmann 1993b; 2005). However, the feedback loops that drive the food system also have deeper structural roots in the changing cultural values of a society, which the policies themselves then reflect and reinforce. Indeed, it is social movements that ultimately serve as the engines of regime crisis and reformation, insofar as these social movements enter into shared perceptual frames that allow for food regimes to emerge and collaboratively name the implicit rules that drive them (Friedmann, 2005).

#### **DISTANCING**

In his analysis of the principle driver of modern globalization, Giddens (1990) points to *disembedding* or “the lifting out of social relations from local contexts of interaction.” The concept refers to the process of making distance irrelevant, such that it no longer matters where something is made or done; it loses all specificity and relevancy of the relations that converged in its creation. The loss of this local context of interaction in food relations is prevalent in the global food system.

The relationship between food and distance has its antecedents in social theory long before our more modern awareness of “food miles” and recognition of the technological conditions that

now make it possible for our food to travel thousands of miles before we consume it. In *The German Ideology*, Marx and Engels (1846) notoriously contrasted the abstract, large-scale, industrial societies of their day with the concrete, small-scale, agricultural societies that preceded them, noting how modernity's increasing penchant for consumption has alienated us from a deeper understanding of the natural biological basis of our society. This alienation is no less than a systematic result of capitalism, whereby we have come to disregard the social and ecological embeddedness of relations and accept the apparent fungibility of all commodities. The observation led to his conception of the *metabolic rift*, marking "the material estrangement of human beings within capitalist society from the natural conditions which formed the basis for their existence" (Foster 2000, 163). Although the metabolic rift initially referred to the depletion of Irish soils due to the constant export of nutrients (in the form of food crops) to England, the concept has since become foundational to the formulation of food regimes (Schneider & McMichael 2010). As the capitalist world system developed, price became the principle driver of what was deemed socially legitimate irrespective of the context of its production or its unquantifiable ecological consequences, allowing the networks of agrofood to spread globally in search of the cheapest labor and raw materials and further deepening the metabolic rift.

The metabolic rift underlies both the material and epistemic relations of capitalism. In separating agriculture from its natural foundations, the metabolic rift informs the episteme through which we analyze the value relations of commodity production. The abstraction of agriculture and therefore the foundations of social production, means that value relations organize agriculture, and it comes to be understood in these terms. This has become readily apparent today, in context of the combined crises of food, energy, and climate change (McMichael 2009, 162).

The metabolic rift thus signifies the deep rupture that has disrupted both patterns of consumption and patterns of thought. The ability of consumers to distance themselves from the social and ecological consequences of their actions has consequently given rise to *ecologies-at-a-distance*, (Campbell, 2009), a situation of prolonged metabolic rift between the bases of production and

consumption of food, yet culturally disguised and rendered invisible (or at best irrelevant) by the powerful cultural narratives of development, empire, and limitless expansion.

In their earlier work, Friedmann and McMichael (1989) took note of the increasing distance that developed between producers and consumers, as well as between producers and producers, during both historical food regimes. The trend in specialization, first in cash crops and then later in chemical agriculture, increasingly separated producers and consumers and legitimized the mediation of agrofood industries in manufacturing food out of ingredients from disparate regions of the world, rendering invisible the ecological impacts of world agriculture. Friedmann (1992) has since named *distance* and *durability* as the two key relations lying at the heart of unsustainable relations during the first two food regimes. According to Friedmann (1992), transnational agrofood capitals essentially succeeded in disconnecting production from consumption and relinking them through buying and selling. Through the “stretching” of global food relations (Carolan, 2011), wealthy consumers have grown accustomed to purchasing world agriculture, whereas people in the Global South have become simultaneously incorporated and marginalized as both consumers and workers.

Ultimately, the growing ‘invisibilization’ of socioecological food relations has undergirded the development of what McMichael (2002) has popularly termed ‘Food from Nowhere.’ Concentrated in “the cheaper end of the food market” and “rooted within a set of cultural framings that emphasize cheapness, convenience, attractive transformation through processing and rendering invisible the origins of food products” (Campbell, 2009, 313), the ‘Food from Nowhere’ formulation captures the essence of the cultural legitimacy that has permitted the dominance of transnational agrofood. However, the conditions that gave rise to the destructive power of distanced and socially disembodied food relations (Friedmann & McNair, 2008) have also simultaneously and dialectically given rise to its critique, and consequently its inverse; a socially and ecologically embedded ‘Food from Somewhere’ (McMichael, 2009, Campbell, 2009).

## STANDARDIZATION

Just as the stretching and distancing of global food relations has wound itself into the structural roots of the modern global food system, so too has the spread of global regulations and standards that homogenized much of the way food is produced, distributed, and consumed around the world. Building on Max Weber's theory of rationalization (1905), George Ritzer (2004) has named five key characteristics of this process of standardization: efficiency, calculability, predictability, control, and the irrationality of rationality. In the streamlining of work through Fordist models of production and reducing all processes to quantifiable formulas, the food system has come under a level of control that has only deepened the commodification of food, dehumanized its production and consumption, and rendered its very rationalization as irrational (Barndt, 2008, 102).

Like distancing, standardization also has roots in Marxist social theories of alienation as well as commodity fetishism: "in capitalism, the fetish of a commodity is built on the notion of land as property, to be bought and sold, and the related conception of all of nature as a resource to be exploited for the accumulation of wealth... While foodstuffs and raw materials have been exchanged among peoples for millennia, the more recent abstraction of money as the medium of exchange... has come to dominate our understanding of the value of food" (Barndt, 2008, 34). Industrialization has not only separated us from the social dynamics, contexts, and conditions that constitute food, but also led us to believe that food is little more than an object to be consumed.

Accompanying the industrialization of food, the dual processes of *appropriation* and *substitution* (Goodman, Sorj, & Wilkinson, 1987) further sowed the seeds of standardization in the global food relations during the second food regime. As corporate giants began to expand to supply for year-round consumption of crops such as lettuce and tomatoes, the need to breed specific varieties to withstand machine harvesting and long-distance shipping further reinforced the development of monocultural, industrial farming. A classic example of appropriation, the potato

became the basis for one of the largest corporate empires in the world, McCain, whose first major product was frozen French fries. To assure a steady supply of genetically standard fresh crops, McCain reorganized traditional agricultural communities in eastern Canada, monopolized contracts specifying most aspects of production on family farms, and created a monocultural region.

(Friedmann, 1992). Substitution of traditional ingredients with laboratory-based alternatives (i.e. cane sugar and high fructose corn syrup) likewise reinforced standardization in the manufacture of processed foods, significantly altering international terms of trade and further solidifying the durable foods complex (Friedmann, 1993b).

Standardization has played a key role in many of the forces driving globalization, permitting the rise of a market of mass-produced consumer goods and associated patterns of standardized use (Eriksen, 2007). For instance, as a parallel to the “world car,” Steven Sanderson (1986) has posited the similar notion of a “world steer,” a high quality product that has been standardized from its genetic lines to its packaging. “Regardless of the nationality of ownership, the ‘world steer’ reorganizes beef production to meet international standards through expensive feeds and medicines, concentrated feedlots, and centralized slaughtering” (Friedmann, 1992, 271). In a similar fashion, US agro-industrialization, seen as the ideal vehicle and outcome of development, encouraged international agribusiness to universalize the American farming *and* dietary models; not only were farming technologies exported during the Green Revolution, but Korean housewives were in fact taught to make sandwiches with imported American wheat (McMichael, 2009).

Like the metabolic rift, standardization effects not only material realities but also epistemological perspectives. Vandana Shiva (1994) suggests that the *fragmentation* and *uniformity* promoted by the current global economic system “destroy[s] the living forces which arise from relationships within the ‘web of life’ and the diversity in the elements and patters of these relationships” (Shiva, 1994, 274). She further contends that “uniformity and diversity are not just patterns of land use, they are ways of thinking and ways of living,” a global process of mental

homogenization that has produced “monocultures of the mind” (Shiva, 1993, 6). The roots of such patterns of thought are deep, and the decisions made in consequence can create a kind of irreversible ‘path dependence’ (David, 1992) whereby certain shared standards begin to enforce themselves. However, just the ubiquitous ‘Food from Nowhere’ has created the fertile ground for the emergence of a ‘Food from Somewhere,’ so too can the patterns of material and epistemological homogeneity so named give rise to the willful reintegration of diversity and a turn towards the accentuation of plurality and non-universalizable particulars.

#### IV. REGIMES, RESILIENCE AND REEMBEDDING

Although food regimes theory has long sought to reframe the linear and deterministic narratives of global agricultural change in terms of their economic, political, and historical contingencies, recent development in socioecological systems theory has provided a fruitful new interpretive framework for understanding the rise and fall of historical food regimes. According to McMichael (2005), one of the key dynamics of all food regimes is their ability to stabilize contradictory forces. In each food regime, the key dynamics of the regime have simultaneously created consent and resistance, an observation that Friedmann (2005) developed in her analysis of the crucial period in-between the first and second food regime. Both Friedmann and McMichael focus on the role of social movements in transitions between regimes, showing how simple framing mechanisms were largely responsible for the policy outcomes (i.e. the transferring of surplus commodities post-WWII under the rubric of “food aid”). However, the dynamics of food regimes also map well onto the ecological theories of adaptability and resilience within the conceptual framework of panarchy (Berkes et al., 2003; Campbell, 2009).

By reexamining the concept of a food regime through the lens of socioecological systems theory, the notion of feedbacks as a central component of the structural underpinnings of various

regimes becomes categorical. As such, the two simultaneous processes of distancing and standardization not only describe the development of the modern global food system, but also function as positive feedback loops that reinforce and perpetuate its continuation. Moreover, given the complexity of the food system, these two processes can be understood not only as reinforcing in themselves, but also reinforcing of each other; as societies grow more distant from their ecological foundations, commodities such as food become increasingly more abstract, standardized and homogenized. The opposite is also true: standardization is an impetus for further distancing.

Given the strength of these reinforcing feedback loops underpinning unsustainable relations in the global food system, it can be difficult to see how such structures might be reconfigured to better promote human and ecological wellbeing. Like all systems, the food system is inherently in a state of constant flux, governed by nonequilibrium dynamics, long-term shifts, and historical conditionalities (Zimmerer, 2000). However, the food system also involves social mechanisms of management that allow for rapid transformations in response to changes both internally and externally. These transformations take place at the *threshold*, or breakpoint between two “regimes” of a system (Walker & Meyers, 2004). A shift in regimes occurs when a threshold level of a controlling variable in a system is passed, such that the nature and extent of feedbacks change, resulting in a change of direction (the trajectory) of the system itself (Walker & Meyers, 2004). In other words, a change in the variables of a single feedback loop are all that is necessary to trigger a shift in the overall system regime. These changes can be socially or ecologically induced, as shown during the period between the first and second food regime by the rise of protectionist policies in response to the Great Depression and Dust Bowl.

Thus, at the center of any discussion of thresholds, regime shifts, and transformation is *resilience*, the prime indicator for determining just how much disturbance is needed to cross a threshold. As resilience declines, so too does the amount of disturbance needed to cross the threshold (Walker & Salt, 2006). Therefore, efforts to change the global food system must be



directed toward undermining the resilience of the current system, while simultaneously building the capacity for a new set of sustainable food relations to unfold in the emerging, yet still undefined, third food regime. Of course, while the theories of system dynamics are easy enough to apply in identifying the category of shifts necessary to transform the global food system, integrating such knowledge in a way that effectively precipitates the changes that will trigger such large-scale shifts is decidedly more difficult. However, refocusing on the feedback loops that most strongly influence the structures of systems provides the most advantageous point of departure in formulating strategies for reform. Though not the only such feedback loops by far, distancing and standardization can still serve as key focal points in identifying the most logical places to intervene.

Indeed, in keeping with the traditional role of social movements in navigating transitions between food regimes, the last two decades have already seen an unprecedented surge in individual and collective efforts to draw in distant ecologies and celebrate the unique features and flavors of regionally produced food. Articulated most effectively in popular movements such as Food Sovereignty, Slow Food, and Fair Trade (McMichael, 2005), such efforts conspicuously undermine the implicitly functioning and self-reinforcing feedback loops that degrade global food relations, turning “Food from Nowhere” into “Food from Somewhere” (Campbell, 2009). Another way of altering these processes is by tightening the feedback loops, or reducing the lag time that delays or weakens communication within the system (Sundkvist et al., 2005; Campbell, 2009). Improved communication, whether by physically shortening distances or employing better social and environmental auditing and labeling, would significantly undermine the reinforcing feedback loops that characterize and perpetuate the current global food system.

However, while these particular methods have many clear advantages and hold a great deal of promise for shaping future food relations, they largely only pertain to consumer-oriented models of social change, limiting the scope of interactions that can lead to large-scale shifts in the global food system. To this end, it is crucial that we also considered alternative ways of integrating new

awareness of the structures of the global food system: namely, through lived experiences that facilitate a visceral reembedding in the food system. Such embodied perspectives begin with the premise of the integrated concept of human-in-ecosystem, or dwelling, perspective (Berkes et al., 1998; Descola & Palsson, 1996; Ingold, 2000). Knowledge of the environment, in this perspective, is “not of a formal, authorized kind, transmissible in context outside those of its practical application. On the contrary, it is based in feeling, consisting in the skills, sensitivities and orientations that have developed through long experience of conducting one’s life in a particular environment” (Ingold 2000, 25). The human-in-ecosystem perspective takes the concept of resilience and applies it to lived experiences that allow humans to adapt to and thrive in ‘multiple equilibrium’ systems without becoming too dependent on stability or resistant to change. As evidenced by the continuous cycling of panarchy, periods of stability are inherently short lived, and building resilience to fluctuating resource cycles is far more advantageous than trying to rely on stable resource production that will inevitably become vulnerable to collapse.

Ultimately, it is clear that we are in a crucial period of transformation and reorganization, with many different contradictions playing out in the new emerging food regime. However, by undermining both the material and epistemic conditions created by self-reinforcing feedback loops through an engaged humans-in-ecosystem perspective, we can build resilience in ways that help us learn to live with change and uncertainty, nurture diversity, participate in alternative ways of knowing and learning, and create new opportunities for socioecological sustainability (Folke et al., 2002). It is not enough to simply ‘buy’ our way to a more just and sustainable world, nor should we settle in finding new ways of conceptually framing the complexities of the modern global food system. Rather, we must strive to reembed ourselves *within* the framework to understand how our ability to name and critique the conditions that have degraded our food relations might also become wholly integrated into our lived experiences in ways that inform, and ultimately change, our interactions with the system at large.

## CONCLUSION

Clearly, there is much to be learned from applying the dual frameworks of systems theory and food regimes to understanding the structure and development of the modern global food system. By looking at the development of the modern global food system as the aggregation of international policies and patterns of consumption and trade, we have opened up the possibility of uncovering the deeper structures and relations that ultimately support and reinforce its collective functioning *as* a complex interconnected system. In essence, a food regime *is* a system; it links together disparate parts and processes while perpetuating itself through structural forces and feedback loops across all manner of social, economic, political, and environmental relations.

Yet, in viewing food regimes through the socioecological systems lens, it quickly becomes clear that any attempt to distill patterns and principles of organization is inherently complex, and at times contradictory. In no way should the rise of a food regime be interpreted as the “cause” or “effect” of any particular historical event, but rather a reflection of multiple interacting strands of social forces, cultural values and political decisions. As Pritchard (2007) argues, “the essential feature of the food regimes approach is that it is a best used as a tool of hindsight. It can help order and organize the messy reality of contemporary global food politics, but its applications are necessarily contingent upon an unfolding and unknowable future.” Such an observation of the contingent nature of all systems ultimately liberates us to examine the structures that currently limit certain possibilities, while still leaving room for new possibilities for transformation to unfold.

There is no doubt that we are, and have always been, entangled in a complex relationship with our environment, principally through the development of our food system. However, in embracing human-in-ecosystem perspective, we can begin to move beyond the social and ecological divide that has long prevented us from seeing ourselves *within* the system, as an integral part *of* the environment. For it is dwelling, and not consuming, that will ultimately bring about the revolution.

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APPENDIX

Figure 1. Basic framework of systems dynamics with a feedback loop (Meadows, 2008).

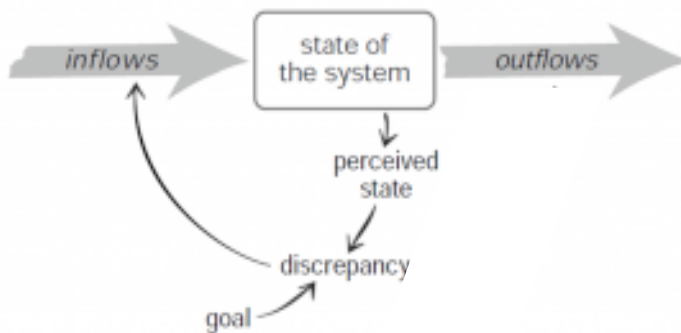


Figure 2. Stages of the adaptive cycle: basic ecosystem dynamics (Gunderson & Holling, 2002).

