

Distant agricultural landscapes

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Abstract This paper examines the relationship between the development of the dominant industrial food system and its associated global economic drivers and the environmental sustainability of agricultural landscapes. It makes the case that the growth of the global industrial food system has encouraged increasingly complex forms of “distance” that separate food both geographically and mentally from the landscapes on which it was produced. This separation between food and its originating landscape poses challenges for the ability of more localized agricultural sustainability initiatives to address some of the broader problems in the global food system. In particular, distance enables certain powerful actors to externalize ecological and social costs, which in turn makes it difficult to link specific global actors to particular biophysical and social impacts felt on local agricultural landscapes. Feedback mechanisms that normally would provide pressure for improved agricultural sustainability are weak because there is a lack of clarity regarding responsibility for outcomes. The paper provides a brief illustration of these dynamics with a closer look at increased financialization in the food system. It shows that new forms of distancing are encouraged by the growing significance of financial markets in global agrifood value chains. This dynamic has a substantial impact on food system outcomes and ultimately complicates efforts to scale up small-scale local agricultural models that are more sustainable.

Keywords Global food system · Distance · Agricultural landscape · Financialization · Environmental sustainability

Distant agricultural landscapes

The ecological and social characteristics of agricultural landscapes are profoundly influenced by the food system in which they are embedded. Recent decades have seen growing concern about the sustainability of agricultural landscapes that serve the global industrial food system, as the ecological and social impacts of industrial food production have become clearer. A rich body of research has emerged that focuses on strategies for fostering place-based food initiatives that are more ecologically and socially grounded (Marsden 2013; Blay-Palmer 2013; Friedmann 2007; DuPuis and Goodman 2005; Levkoe 2011). Local and sustainable food systems are often more sensitive to the conditions of agricultural landscapes because the proximity of production and consumption activities fosters well-functioning feedback mechanisms that deliver appropriate information to different actors in the system about the ecological and social effects of their actions (Kneen 1995). Food production is deeply embedded in place, and viable models for ecologically sound and socially just food systems, even on a very small and local scale, serve as important examples of what is possible on a broader level (Gibson-Graham 2003).

At the same time that the internal dynamics of local food systems play an important role in determining their sustainability, the viability of local and place-based food initiatives is influenced by a range of factors, some of which lie outside of the specific localities in which they are grounded. The influence of external forces on agricultural landscapes—in particular the influence of industrialization,

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globalization, corporatization and financialization over the past century—is widely recognized. Indeed, the problems associated with the global industrial food system are a key rationale for creating alternatives that resist those forces. But what is relatively underexplored in this literature is the nature and dynamics of the external influences themselves and the impact they have on the ability to scale up local and sustainable food system initiatives. Indeed, as Erikson notes in her articulation of a framework for analyzing food system–environment interactions (Ericksen 2008), there is a need to better understand the influence of external socioeconomic and environmental drivers that influence food systems, including their associated feedbacks (p. 239). In particular, Erikson notes the need to connect cause and effect within those systems, especially across different spatial scales (2008, p. 243).

In an attempt to begin to unpack some of the external socioeconomic and environmental drivers, this paper examines the ways in which complex global economic forces shape decisions about what food and agricultural products are produced, where and how. A closer look at these forces reveals that they support the expansion the global industrial food system in ways that continually bring new landscapes into the industrial production model, along with a host of environmental and social costs associated with that model. I argue that it is important to investigate these global dynamics and consider the challenges they pose for initiatives that seek to scale up more localized and sustainable agricultural models.

I draw on the concept of “distance” to explain these dynamics (Princen 1997). Food that is produced for global agricultural value chains is typically distanced both mentally and physically from its impact on the landscape. Greater distance in the food system tends to have an obscuring effect that enables powerful actors in global agricultural value chains to externalize ecological and social costs. This tendency makes it more difficult to connect unsustainable outcomes on agricultural landscapes to specific actors and to hold those actors responsible. This fuzziness between precise causes and effects interrupts feedback mechanisms, enabling the dominant system to continue to expand in ways that perpetuate environmental problems associated with the industrial agricultural model and complicate efforts to scale up local agricultural models that are more sustainable.

The paper concludes with a brief illustration of these dynamics associated with the growing influence of financial markets in the food system in recent decades. The financialization of food and agriculture has led to new and more complex forms of distancing that facilitate the appropriation of new landscapes into industrial- and corporate-controlled global agricultural value chains. The type of distancing encouraged by financial forces in the global food system has made it more difficult to link ecological and social cost

externalization with specific actors to hold them responsible. Scaling up more sustainable local food systems is especially difficult in this context because those initiatives compete directly with powerful forces that continue to push for expansion of the industrial food system.

The rise of the global industrial food system: challenges and responses

Today’s global industrial food system grew enormously over the past century. Precise figures on the size of the global food industry are difficult to come by, but some estimates put it at approximately US\$8 trillion as of 2008 (ETC Group 2008). The sector, roughly 10 % of global GDP (Plunkett 2014), is continuing to see rapid growth, in the range of 3–6 % per annum (Marketline 2014). The global food industry has evolved into a series of increasingly complex agricultural value chains from inputs to production, processing, storage, trade and retail, that reach into nearly every country and are dominated by powerful actors: transnational corporations (TNCs) and financiers (McMichael 2013).

Dynamics within the global economy have long had a profound influence over agricultural landscapes dating back centuries. Since the rise of colonialism and the early establishment of trading posts, agricultural production in some parts of the world has served distant markets (see, for example, Mintz 1985). Over the past century, this process has intensified. With the growth of scientific agriculture since the late 1800s and early 1900s, agricultural production has become more industrialized, based on highly mechanized monocultures that rely on scientifically engineered seeds and chemical fertilizers and pesticides (Weis 2010). The industrial food system became increasingly globalized since the 1960s and 70s as integration within the world economy intensified (Friedmann and McMichael 1989). The rise of neoliberal economic policies in the 1980s and 1990s led to the growing power of transnational corporations in the food system. Since this time, corporate concentration all along agricultural value chains has increased markedly (McMichael 2013). Recent decades have witnessed an intensified influence of financial actors and financial markets in agricultural value chains, especially with the advent of new and complex agricultural commodity derivatives and financing arrangements for the agricultural sector (Isakson 2014).

Over the past century, the forces of industrialization, globalization, corporatization and financialization have influenced the development of the global food system in ways that have built upon and reinforced each other. As the system has expanded under these global economic influences, new agricultural landscapes have been brought into the industrial agricultural model, producing goods for global value chains controlled by transnational

corporations and financed by large-scale financial investors. These developments have been key drivers of change over time in the global food regime (McMichael 2009).

These developments within the global food system were each initially promoted by nation states and the private sector as bringing benefits for the agricultural sector as well as for consumers because they promised efficiency gains. The spread of industrial agricultural production methods under the Green Revolution, for example, sought to make food production more efficient by increasing output and addressing the problem of hunger and food shortages (Evenson and Gollin 2003; Pingali 2012). The global trade in food, advocates argued, enabled more efficient production and distribution of foodstuffs by enabling specialization in areas that were more amenable to certain crops (Lamy 2013). Corporations frequently make the case that they bring benefits to the system with their organization of food storage, processing and distribution in ways that eliminate inefficiencies and capitalize on synergies between their different activities (Cargill 2014). Financial actors have also been seen by many economists to be key players in facilitating more efficient management of risk via financial tools and markets (Irwin and Sanders 2011).

Recent decades have seen an extensive literature emerge that highlights how these external economic drivers have been linked to a variety of ecological and social effects within food systems that have brought profound changes to agricultural landscapes (Weis 2007; McMichael et al. 2007; Sage 2011; Vermeulen et al. 2012). Common practices of industrial agricultural systems, such as the increased use of modern engineered seeds and agricultural chemicals, monocropping, mechanization, and irrigation, have been linked to the loss of biological diversity, the contamination of water and soils with pesticides and fertilizers, depletion of water supplies, and increased carbon emissions, among other environmental stresses (see Weis 2010; Garnett 2013). Industrial farming systems have become huge consumers of energy and are highly dependent on fossil fuels (Beilin et al. 2012). Industrialization has also contributed to more concentrated and unequal agricultural landholdings (GRAIN 2014), as well as land clearing to enable an expansion of farmland under cultivation. Such dynamics have pushed many smallholder farmers onto more marginal lands, which also contributes to environmental stress and tenuous land rights (Clunies-Ross and Hildyard 2013). These biophysical and social impacts of modern agriculture are now widely understood to be responsible for the degradation of agricultural landscapes, as well as landscapes more broadly that are affected by these dynamics, around the world.

The globalization of the modern food system through increased food trade has also affected agricultural landscapes. International food trade and its organization into

global value chains encourage even more agricultural specialization, reinforcing trends toward large-scale industrial production, which in turn increases pressure for monocropping that has direct implications for biodiversity loss as well as the other environmental implications noted above (Fuchs and Hoffmann 2013). There are also environmental consequences associated with the transportation of food around the world. A typical plate of food in North America now travels thousands of kilometers from farm to plate (Clapp 2012). This growing global trade has given rise to concerns about the embodied carbon in food products that is associated with their transportation and storage (Iles 2005; Schmitz 2012).

The rise of transnational food corporations as key players in the global food system also has consequences for agricultural landscapes. Corporate actors engage in the organization of agricultural production, processing, packaging as well as wholesale and retail distribution (Burch and Lawrence 2007). Their decisions have an enormous impact on what foods are produced and by what methods, often reinforcing industrial agricultural production methods noted above. They also have influence over how and how far food travels, frequently encouraging more elongated global food trade patterns. Corporations also have a say in how food is processed and stored, with rising levels of highly processed, packaged, and refrigerated foods marketed in the global food system, using increasing amounts of water and energy (Garnett 2013). TNCs also influence where food is sold, typically in corporate-dominated high energy use retail outlets that are increasingly dominating food markets around the world in both rich and poor countries and which have had direct impacts on the viability of small-scale food producers and markets (Fuchs et al. 2009).

Financialization also has important implications for agricultural landscapes through new kinds of financial investment tools that enable financial investors to buy into farmland and industrial agricultural production around the world in search of lucrative investment returns. The acquisition by financial investors of large tracts of land around the world, labeled by some 'land grabs,' has increased dramatically since 2006 and is frequently associated with industrial agricultural production methods, dominated by TNCs producing for export (see for example White et al. 2012; Fairbairn 2014). Financialization has also been associated with a rise in food price volatility that in turn affects food access for some of the world's poorest people and further increases incentives for investment in agricultural markets by financial actors (Ghosh 2010; Worthy 2011).

As the ecological and social costs of the global industrial food system have become more apparent in recent decades, calls have increased for more sustainable agricultural

practices and food systems (Pretty 2003). Organic agriculture and certification schemes for sustainable production, for example, have emerged in response to environmental and health crises associated with industrial agriculture (Raynolds 2004). Fair trade schemes have responded to both ecological crisis and social inequities in the global food trade system (Raynolds 2000; Goodman 2004). Local food movements and advocacy for the concept of food sovereignty, which incorporates the right of communities to determine local food systems, are largely a response to the dominance of TNCs in the global system (Wittman et al. 2010). Social movement campaigns against land grabs and commodity speculation that promote land rights and protection for local production have emerged in response to a growing dominance of financial actors in the global food system. Many of these alternatives emphasize the importance of fostering a more ecological form of agriculture, in particular highlighting the important role of small-scale production and agroecology for addressing climate change and biodiversity loss (Holt-Giménez and Altieri 2013; Martinez-Alier 2011).

Although support for these sustainable food initiatives has expanded in recent years, the formal market shares of these other systems remain small when compared with the size of the dominant food system. The global organic market, though growing rapidly, is valued at US\$63 billion (Willer et al. 2013). The fair trade market, also expanding, is much smaller in absolute terms, at US\$7 billion (Elliot 2012). Similarly, a number of sustainability certification schemes for individual commodities traded on global markets have appeared in the past decade for products ranging from soy, palm oil, beef, sugar, cotton and biofuel production (see WWF 2012 for a survey). These various certification schemes vary in their stringency and their effectiveness (Derckx and Glasbergen 2014; Fortin 2013). Although these commodity-specific measures have proliferated in recent years, they represent at best only a small slice of their respective markets. In some cases around 10–13 % of the market is certified—for example, in the case of palm oil—but in most cases only 1–2 % of commodities with certification schemes are actually certified (WWF 2012). Compared to the US\$8 trillion size of the industrial food system, these market-based sustainability initiatives are still very small. Yet at the same time, other estimates indicate that the bulk of the world's food is supplied by small-scale producers. According to the ETC Group (2009), small-scale producers feed around 70 % of the world's population. Much of this production is uncoupled in formal markets, making comparisons difficult.

Growing support for certified sustainable alternatives and for small scale production more generally contributed to pressure within the mainstream industrial food system to improve its sustainability performance. The notion of sustainable intensification has been increasingly promoted

by dominant actors within the sector (see Smith 2013; Garnett et al. 2013). Just what exactly a sustainable intensification of agriculture would entail is still being defined, but already the concept is quite controversial. Its intention is to produce more food with fewer resources on the same amount of land, thus intensifying production, but doing so in an environmentally sound way that in theory should ensure that the system does not expand onto new landscapes. Critics question the productionist undertones of this approach as well as its sustainability claims, and argue for a fundamentally different approach to addressing food insecurity and environmental degradation (Loos et al. 2014). As this debate continues, it remains to be seen whether the idea of sustainable intensification, however defined, will gain traction in a significant enough way to alter current production and distribution within the dominant global food system.

Distance and cost externalization

The ecological and social costs of the dominant food system are increasingly recognized and understood as outlined above. But despite this recognition, that system remains robust and continues to expand to incorporate new agricultural landscapes, even as it promotes the notion of sustainable intensification. There is considerable debate over how to respond to this situation. Some point out that the dynamics of capitalism ensure that the profit motive trumps ecological considerations, making the dominant system largely un-reformable, requiring an entirely separate, bottom-up ecological food movement (e.g. McMichael 2000). Others argue that there is a possibility of reform through the installation of a 'green economy' through new governance mechanisms that internalize ecological costs into economic decision-making in ways that can make the current system more sustainable (Food and Agriculture Organization 2012).

My intention is not to adjudicate this polarized debate, but rather to draw attention to insights from the literature on environmental sustainability that can help to inform it. Here I suggest that the concept of 'distance' within commodity chains, an idea developed to improve understanding of the sustainable consumption debate (Princen et al. 2002), can help to explain why the current global food system has only weakly adopted ecological considerations. Distance introduces complexities into the global food system that in turn shape the politics and governance of food in ways that tend to reinforce and expand the dominance of the existing system, including its ecological and social impact on agricultural landscapes. Distance in global commodity chains refers to the space that exists—both physical and conceptual—between producers and consumers of a good. As Princen notes, distance can refer to

numerous aspects of separation, including geography or physical distance (the number of kilometers an item may travel), cultural divides (knowledge and understanding of the conditions of production), differentials in bargaining power (the ability to drive decisions) and agency between different actors (the number of middle persons, or exchange points) within a commodity chain (Princen 1997, 2001).

Distance has three key effects. First, it obscures information about the functioning and operation of the relationships between producers and consumers and between the commodity production and the natural environment (Princen 1997). When the distance between the point of production and consumption along these various dimensions is extended, feedback mechanisms that provide information to others in the commodity chain tend to be constrained. In such cases, when a good changes hands in return for money, more detailed information about production processes and social relationships at different points along commodity chains can easily be lost. As a result, consumers are often largely unaware of the full ecological and social consequences of their consumption choices (Princen et al. 2002).

Second, when distance is great and information is scarce, certain powerful actors within the commodity chain are able to externalize or obscure ecological and social costs, which are then absorbed by other, less powerful actors (Princen 1997, 2001). Cost externalization can have wide effects. Dauvergne refers to the international impact of externalized costs as the ‘shadows’ of consumption (Dauvergne 2008). Shadows result when consumption activity in one part of the world has a discernible environmental and/or social impact that is experienced in another part of the world, a phenomenon made possible by the globalization of commodity markets (Dauvergne 1997). He argues that the unequal nature of the global economy, characterized by uneven global trade, investment and finance relationships, drives consumption activity as well as its environmental and social consequences in different locations around the world, with the costs typically falling disproportionately on the world’s poorest people (Dauvergne 2008, p. 10).

Third, distancing constrains the politics of environmental protection. When information about the ecological and social implications of an economic activity is obscured, and the costs associated with it are externalized onto other actors and landscapes that may be half way around the world, the politics of addressing those problems is fraught with challenges (Princen 2002, p. 123–130; Dauvergne 2008 p. 210). Greater distance in particular constrains feedbacks and complicates efforts to draw clear lines of responsibility between a specific ecological cost and specific actors. This inability to be precise about the

actors responsible for certain outcomes opens space for competing interpretations about cause, effect and responsibility (Clapp 2014). This uncertainty enables powerful actors to shape public discourse in ways that cast themselves as the solution, for example, rather than the cause, of certain environmental outcomes (see Clapp and Fuchs 2009). Efforts to improve sustainability of resource use and consumption are especially difficult in these circumstances, because a ‘business as usual’ approach tends to dominate.

These concepts are particularly relevant when examining the external forces driving the global food system discussed above and the politics of sustainable landscapes. As the global food system evolved over the past century, agricultural commodity chains have become more extensive in terms of their geographical reach and more complex in terms of their organization (Kneen 1995; Friedmann 1994). As this process has taken place, new forms of distance have been introduced that in turn have important ecological and social consequences, as summarized in Fig. 1. This distance makes causes and their effects much more challenging to link up. As Iles notes, “The underlying structural causes of environmental damage in industrial agriculture are missing because they are too remote for most people, even inside the production system, to visualise or to interact with” (Iles 2005, p. 166).

Forms of distance are evident in the food system in a number of ways. The industrialization of agricultural production, for example, has altered basic cultural understandings of the properties of seeds and the rhythm of growing cycles and seasons. Industrial production systems are much more complex and reliant on multiple external inputs that have a variety of implications that are often obscured. Knowledge about the impact of monocultures on the soil and biodiversity, the exact chemicals used to keep pests at bay, and the effect of irrigation on local water supplies, for example, are not readily available pieces of information for mass-produced agricultural goods. A tomato on a supermarket shelf does not reveal this information itself, nor do most typical supermarkets provide it to consumers. Agricultural products from different locations and production systems may be mixed and substituted for one another on a regular basis (for example, vegetable oils), pieces of information that do not typically get transferred to those that consume them. As a result, the precise environmental impacts of particular foods and the specific landscapes that were altered in their production, apart from broad generalizations, are not easy to ascertain.

The globalization of the food system has elongated physical distance and further obscured information about the ecological impact of production as well as its social dimensions, such as whether the farmers producing those goods have been fairly compensated for their work and whether their rights as landholders or producers are

Growing Distance in the Dominant Food System in the past Century

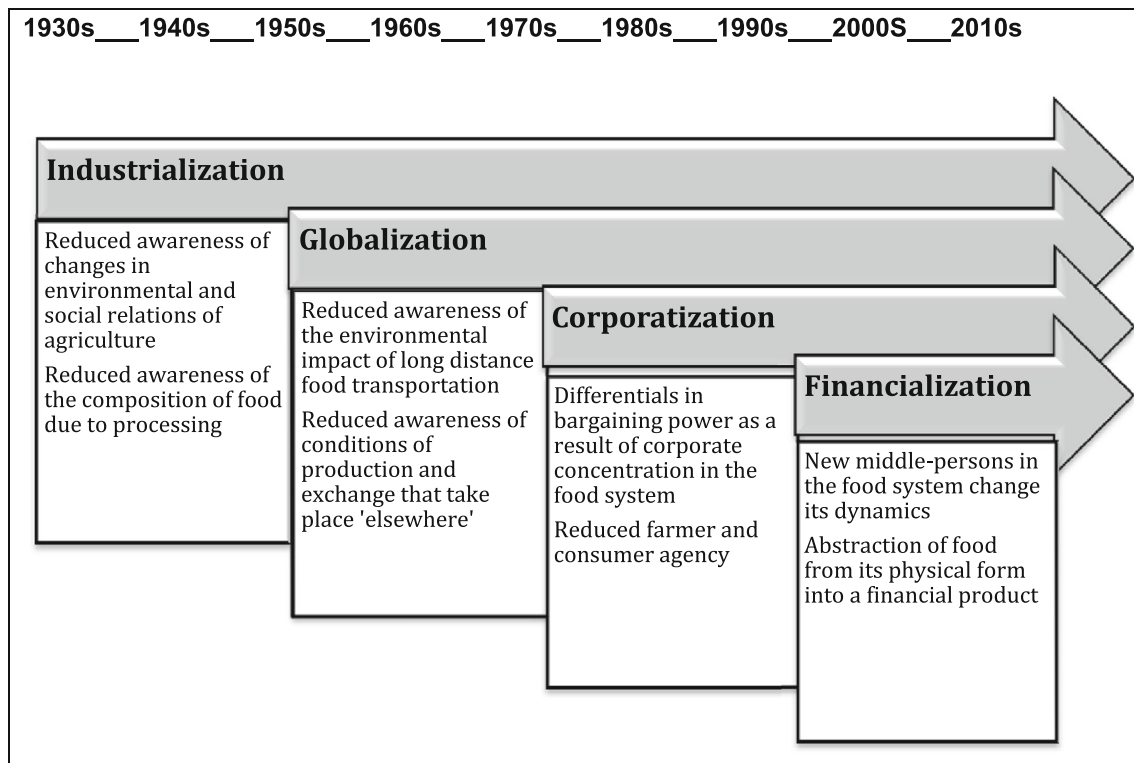


Fig. 1 Growing distance in the dominant food system in the past century

adequately protected. Corporatization of agricultural value chains has introduced new differentials in bargaining power, as large TNCs have gained control of various segments of agricultural value chains in ways that give them leverage over others (McMichael 2013). Financialization, as will be discussed in more detail below, has introduced new middle actors into the food system that fund the entire system, including the acquisition of new landscapes for industrial agricultural production, as well as abstracting food from its physical form.

The politics of sustainability issues within the food system have been profoundly influenced by distance (Kneen 1995; Friedmann 1994; Clapp 2012). When costs are obscured by powerful actors, feedbacks that would normally correct for negative outcomes become constrained. Despite awareness of the broad potential for ecological and social costs associated with the global industrial food system, it is not clear to whom precisely feedback should be directed to demand change. Linking a specific food item to a specific environmental outcome in a particular place, and attributing that outcome to a particular actor who might be held responsible, is virtually impossible. In this way, distance blurs the lines of responsibility for sustaining agricultural landscapes, posing a blockage for effective political processes to support more sustainable

food systems. The sustainable food and agriculture initiatives noted above seek to address this problem by clarifying the lines of responsibility. Certification schemes trace the movement of a commodity and record the practices that surround it, and local food initiatives work to promote responsibility at a more localized level with short supply chains in ways that provide the sorts of information that is missing in the global industrial food system (Iles 2005). But without appropriate feedback within the mainstream system, policy and governance frameworks tend to support 'business as usual' and further appropriation of new landscapes into the industrial agricultural model.

Financialization and agricultural landscapes

The dynamic of distancing in the global food system can be illustrated with a closer look at the growing role of financial actors and financial markets in the sector. Finance has become an increasingly important force shaping the global industrial food system in recent years. Financial actors have historically had a close relationship with the food system, in particular as speculators engaged in commodity futures markets since at least the mid-19th century. Their role has increased markedly since the late twentieth

century. Initially, the involvement of financial actors in commodity markets was to provide liquidity to a market that itself was volatile due to variable production and demand from season to season. Although they could help to stabilize markets by providing the service of acting as middle agents between farmers and commercial grain handlers and users, they have also long been watched closely because of the potential for such speculators to manipulate markets and cause volatility from which they could profit. In the US, home to the largest agricultural commodity exchange, the Chicago Mercantile Exchange, financial speculators were tightly regulated for much of the twentieth century in an attempt to curb excessive speculation (see Clapp and Helleiner 2012).

Although tight regulations on the agricultural commodity futures trade had been in place for over 50 years, these rules began to be relaxed in the 1980s and 1990s as governments increasingly adopted policies that support more open and liberalized markets. These regulatory changes enabled banks to sell new financial products linked to agricultural commodities with little oversight (Ghosh 2010). A common financial investment product that banks began to sell is known as a ‘commodity index fund’ (CIF). CIFs track changes in the prices of a bundle of different types of commodities as an index. The index is made up of the prices of agricultural commodities, minerals, livestock and petroleum products. Typically, agricultural products account for around one-third of the value of these indices. CIFs enable investors to gain exposure to commodity markets without being required to purchase the actual commodities on exchanges, or without even having to have much knowledge about them (De Schutter 2010).

Investment banks also began to offer other types of financial investments linked to the agricultural sector, such as funds that specialize not only just in agricultural commodities, but also in farmland and agriculture-based firms (Burch and Lawrence 2009, p. 271–272; McMichael 2012, p. 688–691; Daniel 2012). For example, one of the world’s largest asset management companies, BlackRock, established an Agriculture Fund in 2007 that invests in a number of agriculture-based assets, such as commodity futures, farmland, agricultural input firms, and food processing and trading companies. The fund bundles these investments into an index in which retail and institutional investors can purchase shares. A growing number of new agriculture funds specialize specifically in farmland acquisition (Buxton et al. 2012, p. 1). Investment in land allows financial players to gain exposure to the agricultural production that underlies commodity production and prices.

The development of new financial instruments has simplified the involvement of financial investors in agriculture and land. Agricultural investment products are frequently based on an index rather than real assets, which means

investors can gain exposure to agricultural land and its productivity as an asset class without taking the risk of owning the land directly and individually (Burch and Lawrence 2009; McMichael 2012). Land funds grew rapidly after the financial collapse in late 2008, especially as investors increasingly viewed land as a relatively ‘safe’ investment at that time compared to more traditional financial markets. The attractiveness of land was bolstered by rising demand for the production of biofuels that were the products of renewable fuel targets in the EU, US and Canada (McMichael 2010, 2012). The market for these new types of agriculture-related investment products grew rapidly after 2000. Between 2006 and 2011, the total assets of financial speculators in agricultural commodity markets rose from US\$65 billion to US\$126 billion (Worthy 2011, p. 13).

Along with the new types of investment tools linked to agriculture, a new group of investors flocked to the sector, drawn by prospects of high returns due to a rising world population and limited resource base. Large-scale institutional investors, especially those with passive management strategies seeking low-maintenance assets with the intention of holding them for a long period of time, were especially attracted to these features of agricultural sector investment, and in particular farmland. Insurance companies, pension funds, mutual funds, hedge funds, sovereign wealth funds, commodity trading firms, and university and foundation endowments all began to invest in the sector with these new investment tools (Burch and Lawrence 2009, p. 272–273; Buxton et al. 2012). Some estimates, for example, put agricultural investments of pension funds at around US\$320 billion, which is up significantly from the US\$6 billion they held in investments in this sector in 2002 (Buxton et al. 2012, p. 2).

This financialization of agricultural commodities and farmland introduced further distancing into the food system. It has increased the number of actors in and around agricultural commodity chains, adding new agents in the form of financiers and investors that wield significant bargaining power. It has also abstracted food and farmland from its physical form, a novel form of distancing that takes place through the proliferation of complex agricultural derivatives on financial markets (Clapp 2014). For the investors, agricultural commodities and farmland became financial investments, simply another asset class. Most financial investments in the sector are pooled in complicated and overlapping financial instruments that investors can move in and out of with relative ease. But these investments, while seen primarily as monetary transactions for the investors, are tied to real activities and thus have had real-world impacts that have played out on landscapes. Financial investors, even those seeking returns over the long term, typically invest their money on the basis of short-term incentives, which often works at cross-purposes

with long-term environmental aims (Helleiner 2011; Harnes 2011).

Financialization in the food system affects the social and ecological sustainability of agricultural landscapes in several ways. First, financial investment in agricultural commodities has been associated with higher and more volatile food prices (Ghosh 2010). During the 2006–2008 period, as financial investors moved into agricultural commodities, food prices spiked (World Resources Institute 2008). Although it is difficult to tell the exact extent to which financial speculation was responsible for this price volatility, there is growing consensus that it at least played a role in exacerbating food price trends (BIS 2011; De Schutter 2010; United Nations Conference on Trade and Development 2011).

Higher and more volatile food prices affect people's access to food, especially in developing countries where people spend on average 50–80 % of their income on food. For example, in Pakistan and Ghana, the poorest 20 % of the population spends over 70 % of their income on food (FAO 2011). Steep increases in food prices can easily overwhelm a poor family's entire budget in this context, resulting in an immediate decline in food consumption as well as an increase in poverty (International Food Policy Research Institute 2011, p. 21–22). Poor people in developing countries who are highly dependent on food imports are the most vulnerable to price volatility on world food markets. Many sub-Saharan African countries, for example, are highly dependent on imported food and the rate of hunger has risen by 2 % per year since 2007, reversing modest gains made in the previous decade (Food and Agriculture Organization 2012, p. 11). Poorer farmers in developing countries also tend to be negatively affected by volatile food prices. The bulk of farmers' income tends to come from food sales, and volatile food prices mean greater income uncertainty. When prices rise, farmers may see an increase in the amount they earn from food sales, but when prices fall, their income declines. These circumstances make it very difficult for farmers to plan ahead regarding what crops to plant and for which markets (FAO 2011).

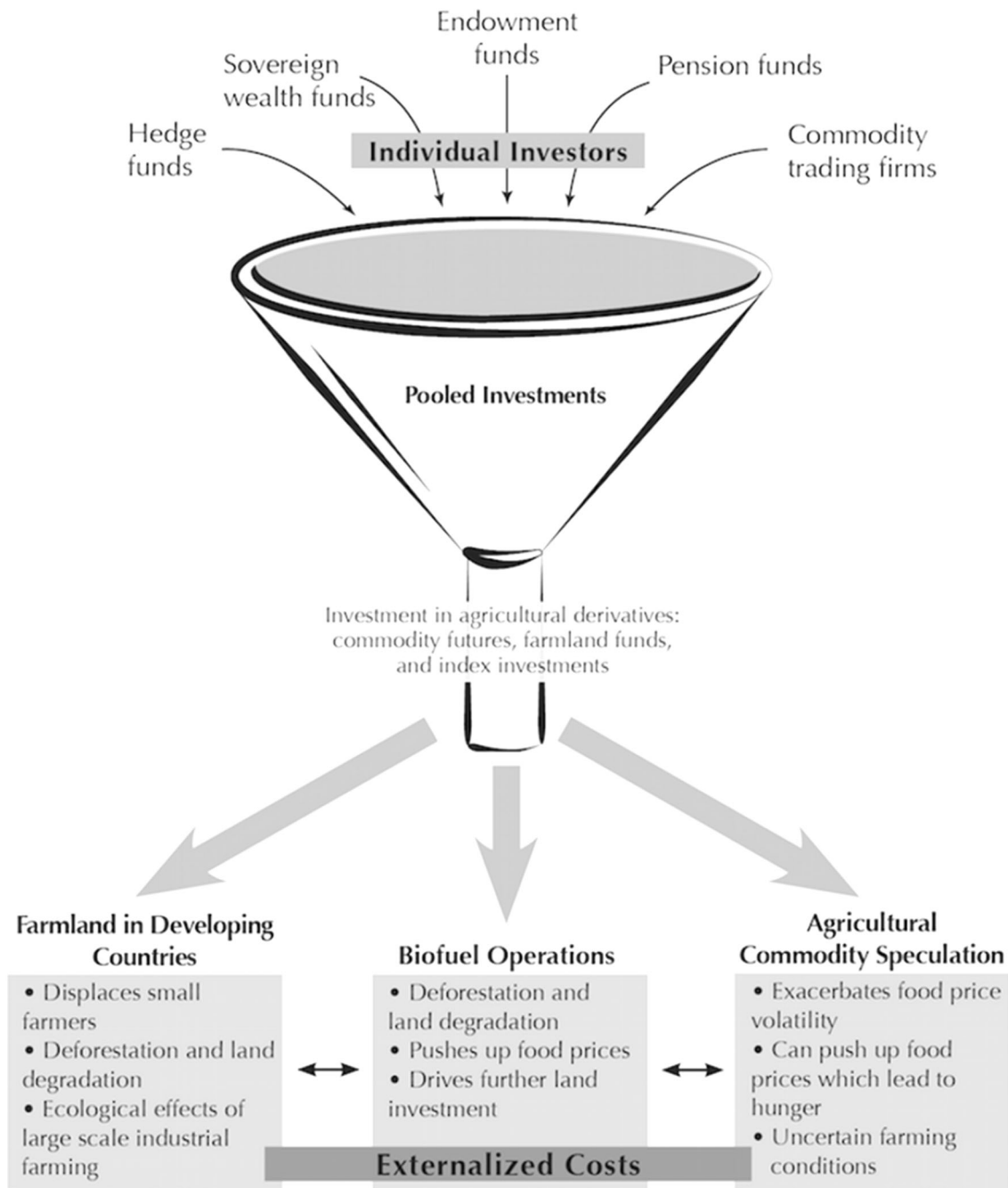
Financialization has also been identified as a contributing factor in the rise in large-scale foreign land acquisition and biofuel production in the past decade, which in turn have considerable environmental and social implications. The acquisition by investors of large tracts of land, a significant proportion of it in developing countries, increased dramatically since 2006 (see White et al. 2012). The Land Matrix, for example, reports that over 900 transnational land deals covering some 37 million hectares have been concluded between 2000 and 2014 (see Land Matrix website at <http://www.landmatrix.org>). This compares with only 4 million hectares per year of global farmland expansion that occurred prior to 2008 (Deininger and

Byerlee 2011). A large number of African countries including Ethiopia, Uganda, Senegal, the Democratic Republic of Congo, Liberia and Zambia have transferred enormous tracts of land—sometimes in the millions of hectares—to foreign investors (Cotula 2012). This land is often purchased through intermediaries such as banks and other financial investment institutions (Fairbairn 2014).

The environmental impact of large-scale land acquisitions can be significant and is exacerbated by the financialization of agricultural commodities that increases the demand for this kind of investment. Most of the investments that take place with the explicit purpose of agricultural commodity production are typically associated with large-scale industrial farming methods that are known to have detrimental effects on ecosystems, as noted above. Deforestation to clear land for production is common on acquired lands, particularly in cases where land is purchased for the production of biofuel crops (Dauvergne and Neville 2010). The loss of tree cover is associated with rising carbon emissions and the erosion of biodiversity. Tropical forests have already been cleared in many parts of Asia and Africa for the production of palm oil, one of the more common biofuel crops. The carbon emissions that result from these operations raise serious doubts about the supposed environmental benefits of biofuels (McMichael 2010). Significant human impacts are also common with large-scale agricultural land investments. In many cases people have been displaced from land that they have traditionally cultivated, even in instances where the acquired land is purely for speculative investment rather than for productive use (Daniel and Mittal 2011). In cases of speculative investment where investors are only hoping to hold land until its price rises, poorer farmers who used to work in that land watch it sit idle. Whether or not the land in these investments is used productively, smallholder farmers often lose their rights to that land, and the benefits that flow from it (Vermeulen and Cotula 2010).

There is growing awareness of these broad connections between financial investments in the sector and the social and environmental costs associated with the types of activities that those investments support (Deininger and Byerlee 2011). But at the same time, the kinds of distance in the food system that are associated with financialization—multiple new middle actors in and around agricultural value chains whose investments are pooled with others in abstract financial instruments—make it difficult to specify those connections with precise detail. The complexity of these markets, combined with the multiple actors involved, make it nearly impossible to unambiguously trace the decisions of specific financial investors to particular ecological and social outcomes on specific agricultural landscapes. This uncertainty constrains feedbacks within the system that might push for policies that ensure

Cost Externalization through Financialization of Agriculture



Source: author; graphic by Taarini Chopra

Fig. 2 Cost externalization through financialization of agriculture

the internalization of costs. Local landscapes are left to absorb any costs that may result from speculative financial investments in the sector. Figure 2 summarizes how individual financial investments in land and agricultural commodities are pooled together and abstracted from their

agricultural landscapes, and the kinds of cost externalization that can occur.

The dynamics associated with financialization in the global food system create a difficult context for the promotion of small-scale and more sustainable agricultural

initiatives. The uncertainty and fuzziness that surrounds these transactions, and in particular the inability to connect cause and effect with precision, enable, and even encourage, the continued appropriation of new landscapes into the dominant agricultural model and the externalization of the costs associated with it. The ambiguity over cause and effect also renders governance processes complex and fraught with debate, as we have seen with the contested politics over the appropriate governance responses to large-scale land acquisitions (Margulis and Porter 2013). Scaling up sustainability initiatives is especially challenging in this context because they are in direct competition with powerful dynamics that are pushing in a different direction.

Conclusion

Fostering more sustainable food systems and agricultural landscapes requires not just a focus on fostering and scaling up small-scale and place-based sustainable agriculture initiatives. It also requires a deep understanding of global economic forces that shape the global food system. The dynamics within that system, driven in particular over the past 100 years by processes of industrialization, globalization, corporatization and financialization, not only influence landscapes directly through distancing and the externalization of social and ecological costs. They also reinforce the growth of the dominant food system in ways that make it difficult to trace the outcomes on local agricultural landscapes back to specific actors. Because of this conceptual disconnect between cause and effect, feedback has been interrupted and governance frameworks have only weakly addressed the system's ecological and social problems. Although alternative, place-based sustainability initiatives have begun to emerge in response to these problems and have grown remarkably in recent decades, these initiatives find themselves in increasing tension and indeed competition with the ever-expanding industrial food system. Small scale agricultural producers worldwide have come under increased pressure as agricultural landholdings become more concentrated (GRAIN 2014).

This analysis has sought to bring greater clarity to some of the external socioeconomic drivers affecting food systems, in particular the way in which those drivers articulate with environmental dimensions of those systems. The complex dynamics of the global economy, distance, and ecological and social outcomes on agricultural landscapes, as illustrated here with respect to financialization in the food system, show that the global and local are inextricably interlinked. This case reinforces the point made by Beilin et al. (2012, p. 464) that in examining the links between policy and farming practices, "...the boundaries of local and global are more like a semi-permeable membrane than

anything fixed." Understanding how to foster and scale up more effective sustainable food systems in this context necessitates a greater understanding of the dominant food system that those initiatives seek to replace, and in particular the ways in which global economic forces shape that system as well as its relationship to alternatives.

Policy-making for more sustainable agricultural landscapes is anything but neat in this context, and will require action on multiple scales. In addition to governance frameworks that support the adoption of more sustainable agricultural models at the local level, there is a need to shape rules at the international level that discourages the kinds of dynamics that encourage cost externalization in the global food system.

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