Introduction
Agricultural systems in the US and Canada are the most industrialized in the world. Defining characteristics of this system of industrial agriculture include massive machinery, heavy use of inputs, the predominance of monocultures, large populations of intensively reared livestock, exceptionally high levels of per farmer productivity, the disarticulation of agriculture from rural communities, the control of agricultural inputs and outputs by large transnational corporations (TNCs), and the illusion of diversity in supermarkets and other retail outlets. The productive bounty of industrial agriculture has led to an out-sized place in the global food economy. With some 5 per cent of the world's total population (1 in 20) and only 0.25 per cent of the world's agricultural population (just 1 in 400), the US and Canada produce 14 per cent of world agro-exports by value, account for 15 per cent of the world's agricultural GDP, and absorb roughly 12 per cent of all agro-exports (FAO, 2007a, Tables C.1, C.2).

Many of the technological innovations underpinning the industrialization of agriculture, from the John Deere steel plough in the 19th century to the rise of factory farming in the 20th century, were initiated in the US and were entwined with mounting corporate power over agriculture. As a result, the US is home to many of the world's largest TNCs in all aspects of these agricultural systems, from farm equipment (for example, Deere & Company, CNH Global and AGCO Corporation), to agro-inputs (Monsanto, Dow, DuPont-Pioneer and Cargill), food processing and distribution (ADM, Kraft, Bunge, PepsiCo,
Tyson, Cargill, Coca-Cola and Mars Inc.), fast food (McDonald's, Compass, Yum! Brands and Sodexo) and grocery retailing (Wal-Mart).

The productivity of industrial agriculture, combined with the extensive global reach of TNCs, has bound agricultural systems in the US and Canada into trading relationships that deeply affect the conditions of food security in many parts of the world, in two primary ways. First, the US and Canada are relatively low-cost ‘breadbasket’ exporters, producing food durables that not only have a powerful impact on world market prices, but also work to reshape consumption patterns. Second, these countries are large-scale importers, assisted by the prominent influence of TNCs in connecting tropical and semitropical agricultural production (which typically constitute a large share of the export base of poor countries) to these sizable markets, while extracting value from commodity chains in the process (Robbins, 2003; Rosset, 2006; Weis, 2007). Consistently large surpluses, cheap food prices and effective corporate branding have long served to conceal (or even counteract) some of the contradictions associated with this inequitable, and ultimately unsustainable, trajectory. There are strong indications that the biophysical basis of this system is beginning to fracture and, as cheap food surpluses become more volatile in the short term and inevitably more costly in the longer term, such instability has implications for food security on a much broader scale — with rising food prices in 2006–2007 providing an indication of the uneven social fallout associated with this trend.

To assess this recent price volatility alongside the longer-term challenge of ensuring access to affordable food on a global scale, it is necessary to first examine the nature of the agricultural system in the US and Canada.

The industrial grain-oilseed-livestock complex

The booming productivity of mechanized, high-input, monocultures across much of the temperate world is closely coupled to the growing scale and intensity of farm animal rearing. Nowhere is this more true than in the US and Canada. Friedmann (1993) has described this system as the industrial grain-livestock complex, which should now be slightly nuanced as ‘industrial grain-oilseed-livestock complex’ to reflect the critical role of oilseeds in this system. In 2004, the US and Canada together produced 389 million tonnes of cereal grains, a 29 percent increase from a quarter century earlier and nearly one-fifth of the world’s total production (FAO, 2007a, Table B.1). Maize is by far the largest grain produced in the US by volume and land area, and the US produced more than two-fifths of the world’s total in 2007, while wheat has long been Canada’s most important grain (FAOSTAT, 2009). Soybeans are the primary oilseed in the US (as they are globally), and are connected to maize for both rotational and feed-mixing benefits. US soybean production has more than doubled by volume since the early 1970s, and accounted for roughly one-third of the world’s total in 2007. Canola/rapeseed is the primary oilseed produced in Canada, accounting for nearly one-fifth of the world’s total in 2007 (FAOSTAT, 2009).

The increasing cycling of concentrated feed through livestock in the US and Canada has allowed farm animal populations to far exceed rangeland stocking capacities, and has led to livestock productivity levels far above global averages. Together, the US and Canada produced 43.5 million tonnes of meat in 2004, representing a 62 per cent increase from the previous quarter century, which amounted to 17 per cent of the world’s meat production by volume, including more than one-fifth of the world’s poultry and beef by volume (it is notable, however, that despite this sizable increase their share in the world total actually fell slightly over this time as meat production grew even faster in some rapidly industrializing countries such as China). Livestock production in the US and Canada is centred upon three species — cattle, chicken and pigs — which account for virtually all animal flesh, as well as derivatives like eggs and dairy products (FAO, 2007a, Table B.2; FAOSTAT, 2009). Most of the livestock (including nearly all chicken and pigs) are raised in homogenized, warehouse conditions on a massive scale, arrangements that have been euphemistically termed ‘concentrated animal feeding operations’ but are more commonly known as factory farms.

To give a sense of the scale of these factory farm operations, in 2007, 99 per cent of ‘broilers and other meat-type chicken’ in the US were reared on farms that had annual sales in excess of 100,000 birds, two-thirds of which sold in excess of 500,000 birds; and 99 per cent of layer hens were reared on farms with an inventory of 10,000 birds or more, with 434 farms having more than 100,000 birds (USDA NASS, 2008, p24). The average pig farm in the US had an inventory of 900 pigs in 2007, compared with 130 three decades earlier, and over four-fifths of all hogs and pigs were reared on operations with more than 5000 animals. Meanwhile, the number of pig farmers fell sixfold from 1978 to 2007 (USDA NASS, 2008, p7, 23). The trajectory of rising scale and declining number of farms is the same in Canada. In 2006, the average poultry farm in Canada had 5518 hens and chickens, a more than sixfold increase from 1976, while the number of farmers raising chickens fell more than fourfold (StatsCan, 2007a, Table 2.16). The average Canadian pig farm had 1308 pigs in 2006, a fourteen-fold increase from 1976, as the total population of pigs in Canada roughly tripped over this period while the number of farms raising them fell more than five-fold (StatsCan, 2007a, Table 2.13).

Beef and dairy cattle are typically reared in considerably lower densities, though concentrated feedlots for beef cattle and factory conditions for dairy cattle are increasingly, and the male offspring of dairy cattle have long been reared in tight confinement forveal production. In 2007, the average cattle farm in the US had an inventory of 100 cattle and calves, but 48 per cent of cattle farms had 500 or more (USDA NASS, 2008, p20). The average cattle farm in Canada had an inventory of 144 in 2006, a rough doubling in three decades, over which time the number of farms raising cattle had fallen by roughly half (StatsCan, 2007a, Table 2.12).

The increased cycling of grains and oilseeds through livestock, the intensification of rearing practices, alongside innovations in breeding and pharmacology, have all served to speed up the ‘turnover time’ of farm animals
from birth to slaughter weight and in yielding dairy products and eggs. This
acceleration of turnover time can be seen clearly in the annual total of pigs
and chickens sold for slaughter, which has grown much faster than the total
‘inventories’ of these animals (i.e. the populations at a given date). This trend
is most dramatic with regard to chicken production in the US. In 2007, more
than 8.9 billion broilers and other meat-type chickens were sold, a threefold
increase from three decades earlier (USDA NASS, 2008, p7).

Monoculture grains and oilseeds, and rising populations of intensively
raised livestock are, in short, two sides of the same biologically simplified coin.
The factory farms dotting the US and Canadian agricultural landscape are
directly tied to a large share of both monoculture output and, by extension, to a
large share of agricultural inputs and associated toxic waste. When aggregated,
the grain-oilseed-livestock complex accounts for roughly 80 per cent of the total
volume of agricultural production in the US and Canada (FAO, 2007b). Because
of the inefficiencies of cycling grains and oilseeds through livestock to produce
flesh and derivatives, the overall land and resources required for agriculture
necessarily increase as livestock consumption increases – a relationship that
might be conceptualized as the expanding ‘ecological hoofprint’ of agriculture
(Weis, 2007).

The productivity of this system is reflected in comparatively low real
consumer food prices, the low average share of income spent on food and high
food consumption levels. Based on 2001–2003 data, Americans consumed
33 per cent more calories, 32 per cent more protein and 100 per cent more
fat than the world average, while Canadians were also well above the world
average for calorific intake (by 28 per cent), for protein intake (by 41 per cent)
and for fat intake (by 88 per cent) (FAO, 2007b). A large part of this excessive
consumption lies in the steady ‘meatification’ of diets, or the progressive shift
of livestock products to the centre of societal food consumption patterns (Weis,
2007) – particularly poultry, beef, dairy and eggs. The average American
consumes roughly 4 times more poultry, 3 times more beef and 6 times more
cheese than world per capita levels, with the average Canadian not far behind
in consuming 3 times more poultry, 2.5 times more beef and 5 times more
cheese than the rest of humanity (FAO, 2007b).

Beyond US and Canadian shores, the global marketplace has also been
impacted by the immense productivity of this industrial grain-oilseed-livestock
complex, which is characterized by a strong export imperative and an influential
position in world trade. In 2004, the US and Canada accounted for some 35
per cent of the world’s cereal grain exports by value, including 53 per cent of
all maize (primarily the US) and 41 per cent of all wheat (Canada’s largest
export). Together, these countries have secured an even larger share in the
world’s oilseeds, with the US being the world’s largest exporter of soybeans,
and Canada the dominant exporter of canola/rapeseed. For the period from
2001 to 2003, the US exported an average of 85 million tonnes of grain, over
2.5 times more than its total human domestic consumption (i.e. grain consumed
as food rather than animal feed). This ratio was even higher in Canada, as
average grain exports (18.5 million tonnes) were more than 5 times greater
than domestic human consumption (FAO, 2007a, Tables C.16, C18, D.3).
Industrial grains, oilseeds and livestock products are also central components
in a huge range of globally traded processed goods.

The scale of these surpluses, coupled with long-term price declines, have
masked the highly unstable biophysical foundation on which they depend – one
that is linked to steady but differentiated processes of dislocation of farmers
and consolidation of corporate power across the globe.

Instabilities, distortions and polarization

The nature of the industrial grain-oilseed-livestock complex, as just described,
reflects one of the most basic tendencies of industrial capitalism: the progressive
substitution of skillful human labour with capital and technology that is at
the heart of economies of scale. Mechanization demands the standardization
of the productive environment, which has driven the simplification of agro-
ecosystems at progressively smaller as well as larger scales, from plant genetics
to the celebrated ‘amber waves of grain’ in the US and Canadian Midwest.
Though the scope of this transformation has been momentous, the process of
standardizing and simplifying the biophysical foundations of agriculture has not
come easy. Bare ground between planted rows, no rotation of crops or falling
of the land, and the compaction of soil caused by heavy machinery and over-
ploughing all pose problems for soil degradation, while the standardization of
plant and animal life enhances vulnerability to the impact of weeds, insects,
fungus and diseases.

An early and spectacular indication of the biophysical instability of
industrializing agriculture occurred with the Dust Bowl of the 1930s in the
Midwest, when layers of fertile soils that had accumulated over millennia
were swept up and carried away, darkening skies and destroying many farm
livelihoods. However, responses to the Dust Bowl did not question the nature
of the problems. Instead, a ‘technological fix’ was sought to override them.
For soils, by far the most crucial technological fix was the increasing application
of synthetic fertilizer, manufactured using natural gas, with phosphorous and
potassium substitutes also dependent upon a non-renewable resource base. In
addition to its manufacture, the bulky nature of fertilizer means that its distribution
and application also entails significant oil consumption. The post-war period
also saw the development of an expanding array of agro-chemicals and animal
pharmaceuticals, which were applied to contain the spread of weeds, insects,
fungus and disease. While the state subsidized the rapid capitalization of
agriculture, subsidies were concentrated amongst the largest producers, while
doing little to support most farm households (see Weis, 2007, chapter 2).

Thus, although the Dust Bowl exemplified the instability of industrializing
agriculture, subsequent responses accelerated its reliance on an array of external
inputs. Increasing dependence upon input suppliers systematically undermined
the importance of localized ecological knowledge in agriculture, an important
aspect of the shift in control and income away from farmers. So while tractors,
combine harvesters, balers and planter/seeds are the most obvious way that
labour is substituted with technology, exceptionally high per-farmer levels of fertilizer and chemical consumption are no less central to understanding this trend. The US and Canada together account for roughly 20 per cent of the world's fertilizer production, consuming slightly less than this total (15 per cent), with Canada a major fertilizer exporter (FAO, 2007a, Tables A7, B4). In 2001, the US alone consumed over one-fifth of the world's pesticides, taken as the total of herbicides (which makes up the largest proportion), insecticides, fungicides and disinfectants (US EPA, 2001).

One of the clearest indications of the way that extensive corporate power has shaped the trajectory of agriculture in the US and Canada—a well as the close linkage between agro-input companies and relevant government ministries, regulatory authorities, and extension agencies—is that genetically modified organisms (GMOs) are diffused throughout the agricultural landscapes of the US and Canada more than anywhere else in the world. Conversely, low-input agriculture represents a mere blip on the landscape: certified organic production occurs on less than 1 per cent of all farms in the US (USDA NASS, 2008, p602), and only 1.5 per cent of all farms in Canada (StatsCan, 2007b, Table 1.16), though in both instances this is growing.

Along with rising input costs, control has also been systematically transferred away from farms on the output side of agriculture, and re-directed towards the corporate interests driving technological advances in processing, packaging, refrigeration, transportation and food safety (which have overridden the previous limits to centralization posed by perishability). US corporations were leaders in integrating these activities, as reflected in their prominent global role in processing, distribution and retail.1

On the consumption side, the disarticulation of agriculture from communities and the predominance of corporate intermediaries (as agents) and profit maximization (as motive force) are reflected in poles of over- and under-consumption. There are a host of epidemiological problems linked to the proliferation of unhealthy diets (such as the prevalence of excessive fat and cholesterol intake), with the US having the world's highest levels of obesity. Meanwhile, considerable food insecurity persists in spite of very high average consumption levels. In 2007, over 36 million Americans were found to have struggled with food insecurity during the year, including 12 million who went hungry at some point, with much higher percentages among minority populations (Nord et al, 2008). In Canada, some 2.3 million people were identified as being food insecure in 2004, with over 700,000 facing hunger—something particularly marked among the indigenous population (Agriculture and Agri-Food Canada, 2006).

For farmers, the net outcome of the escalating corporate control over agriculture is a rising cost-price squeeze. Farmers purchase machinery and inputs in retail markets while selling to a shrinking number of outlets, with prices further depressed by aggregate productivity gains. This combination of increasing costs, low prices and reduced margins has generated pressure to expand farm size in order to survive, which in turn produces heavy debt loads and bankruptcies—with bigger and more competitive farmers able to grow at the expense of smaller and less successful ones. The net result has been a profound polarization of landholding and productivity, and a steadily decreasing agricultural population. Only 2 per cent of economically active people in the US and Canada are now employed in agriculture (FAO, 2007a, Table A.3). While some see this as 'development' or 'modernization', it nevertheless depends upon fossil energy and derivatives to an extent that is rarely appreciated.

In the US, the largest 8 per cent of landholders (exceeding 1000 acres/405ha) possess 67 per cent of all farmland, and those with the largest 16 per cent (exceeding 500 acres/202ha) possess 83 per cent of all irrigated farmland. From 1974 to 2007, while the population of farmers declined slightly, the number of farms greater than 2000 acres (809ha) grew by 29 per cent to over 80,000 (USDA NASS, 2004, p6; USDA NASS, 2008, p7). Rather than helping to mitigate this tendency, US agro-subsidies are notorious for having exacerbated it, with a small percentage of the largest farms having long dominated subsidy receipts (see Environmental Working Group, 2009). Another important and often-neglected aspect of the inequality of industrial agriculture is the exploitative working conditions faced by a poorly paid, insecure and mostly non-unionized labour force, with extremely violent conditions pervasive in slaughterhouses and factory farms (Majka and Majka, 2000; Human Rights Watch, 2005; Weis, 2007).

The same basic pattern of increasing scale and consolidation has occurred in Canada, except that agricultural subsidies are distributed more evenly in Canada and are therefore less implicated in the process of polarization. Between 1921 and 2006, the number of farms in Canada fell threefold (from 711,090 to 229,373) while total area of agricultural land increased by 20 per cent. This process is continuing apace: between 1986 and 2006, the number of Canadian farms fell by 22 per cent while the average farm size grew by 28 per cent. Furthermore, of those farmers remaining in agriculture, an increasing proportion need to seek off-farm employment to make ends meet. In 2006, 48 per cent of Canadian farmers reported engaging in paid off-farm work, a proportion that had risen from 37 per cent in 1991 (StatsCan, 2007a, Table 6.3).

Such dislocating pressures have also been projected outwards. As surpluses expanded in the post-war period, an intense export imperative arose and a range of state support mechanisms (e.g. food aid, export subsidies) were developed to foster external market growth. A range of motivations were at the root of this strategy, from helping maintain a measure of price stability in domestic markets to US geopolitics and support for allies in the Cold War. Over time, however, the primary beneficiaries of this state-supported export promotion came to be the fast-growing and increasingly globally oriented TNCs. Moreover, this export promotion cannot be disentangled from the range of domestic subsidies supporting the low cost production of vast surpluses. Nor do explicit subsidies, in themselves, represent the whole picture with regard to the distorted competitive advantage of the industrial grain-oilseed-livestock complex.
Compounding this explicit subsidization are the implicit subsidies contained in the non-valuation or under-valuation of a range of environmental impacts (for example, erosion, salinization, water pollution and consumption) and health burdens (persistent toxins, avian flu, listeriosis and 'mad cow disease'), as well as the ethical implications of factory farming and its ecological footprint. Environmental externalities extend far beyond their borders, as the industrial grain-oilseed-livestock complex is a significant part of a grossly outsized per capita greenhouse gas footprint (made even more reprehensible by the fact that the US and Canada have played prominent roles in impeding or blocking multilateral action on climate change). An incalculable 'geopolitical externality' also implicitly subsidizes industrial agriculture, given that the US consumes roughly a quarter of the world's oil, spends as much on its military as does the rest of the world, and has an entrenched and tensile-filled military presence in the Middle East (Weis, 2007; Foster et al, 2008). Canada's growth into a major oil producer could reduce US dependence on the Middle East, but most of Canada's oil supply is in the difficult-to-extract Alberta Tar Sands, which a recent report describes as 'the most destructive project on earth' (Hatch and Price, 2008).

In sum, the competitive advantage of these large industrial surpluses ultimately rests upon an illusory accounting system, one that has bolstered powerful agro-food TNCs and profoundly influenced world markets and dietary change. Further accentuating this, the US was the most prominent actor in the design of the World Trade Organization's Agreement on Agriculture, which has institutionally locked in as a measure of trade liberalization. For its part, Canada was an influential member of the pro-liberalization Cairns Group (Weis, 2007, chapter 4). The flipside of this aggressively stance on liberalization is the fact that many of the world's poorest countries, which have the largest agrarian populations, are net food importers and depend upon the cheap surpluses of a small number of temperate countries that includes the US and Canada. This dependence is expected to deepen in the coming years, especially in the arid and semi-arid regions of the global South where agricultural production is projected to be most severely impacted by climate change (IPCC, 2007), a situation made more precarious as the implicit subsidies to industrialized agriculture start to break down.

**Quickening contradictions**

The biophysical foundation of the industrial grain-oilseed-livestock complex is unstable on many levels, particularly as challenges associated with climate change, land degradation and water availability intensify and intersect. However, the most proximate reason that chronic instabilities are shifting into a state of increasing volatility and crisis - or what might be seen as the quickening of systemic contradictions - stems from the looming scarcity of fossil energy, especially oil.

The energy provided by fossil fuels is the veritable lifeblood of modern economies, accounting for 80 per cent of the world's total primary energy supply, of which oil makes up the largest proportion (34 per cent), followed by coal (25 per cent) and natural gas (21 per cent) (IEA, 2007). Indeed, the centrality of oil is much greater than even this figure indicates, as it provides virtually all of the liquid fuel used to power global transportation systems. It has, of course, long been known that fossil fuel derived energy is a limited resource, but the implications of this realization have been partially obscured by uncertainties about the precise extent of these limits and, hence, the pace at which they are being approached.

Although fossil fuels have continued to be marketed as providing price volatility in recent years, the limits to the world's fossil energy reserves are coming into clearer focus, with oil the most well-known and significant case. For roughly the past three decades there has been a protracted decline in new oil discoveries, despite the application of sophisticated geological assessment techniques. Leading industry estimates, including those given by BP Global and the Oil and Gas Journal (2006), place global oil reserves in the range of 1.2-1.3 trillion barrels, an amount equivalent to that consumed since the rise of the Industrial Revolution. The term 'peak oil' is increasingly used to mark the fact that world oil production will soon peak and inevitably decline. Given that current consumption levels (84.6 million barrels per day in 2007) are much greater than in the past, and are projected to increase still further in the coming decades, the back half of the world's oil supply will be consumed in a much shorter space of time than was the first half. This is described, in bold terms, in a 2007 advertisement from one of the world's largest oil companies, Chevron: 'It took us 125 years to use the first trillion barrels of oil. We'll use the next trillion in 30'. Even an upper-end estimate of 2 trillion barrels of reserves, given by the US Geological Survey, would only delay the inevitable decline by a few decades at current consumption levels. Further, the fact that the remaining supply will be more difficult and more energy intensive to extract (Alberta's Tar Sands being the classic example) promises to compound price pressures associated with increasing scarcity. The decline of coal and natural gas reserves has drawn less attention and is slightly further away, although this trend would be accelerated if large-scale liquefaction of natural gas occurs.

As discussed, oil and natural gas have a pivotal role in substituting labour with technology, in overriding various biophysical constraints to large-scale monocultures, and in promoting the further centralized control of outputs. Thus, diminishing supplies and rising prices will inevitably filter into industrial agriculture in a range of ways, taking away a large source of implicit subsidization. While this impact is so diffuse that it is difficult to quantify, the dramatic increase in the volatility of food, oil and natural gas prices in recent years - and particularly their concurrently rising prices from 2006 to 2007 - is strongly suggestive of what peak oil will mean for industrial agriculture.

Yet, at the same time, industrial grains and oilseeds are being viewed as a partial 'technological fix' for the coming scarcity of liquid fuel, with the US leading the worldwide surge in biofuel production. The promise of biofuels is that the sun's energy can be captured in plant biomass and converted into liquid form on a renewable basis, with the added advantage that these fuels burn
more cleanly. The primary biofuel is ethanol, produced from the fermentation of carbohydrate crops (predominantly maize in the temperate world and sugar in the tropics). Biodiesel production from soybeans is also growing quickly, albeit on a much smaller scale. Over the past decade, a steadily rising share of US grain production has been devoted to ethanol production, including more than one-fifth of the total maize harvest in 2007. More than 100 large-scale ethanol refineries came into production in the US in the past decade, and many more are under construction (WorldWatch and CAP, 2006). The Canadian government has also signalled its enthusiasm for expanding biofuels, though production and related government supports are much smaller than in the US in absolute and relative terms.

The biofuel boom is generating lucrative new opportunities for agro-processing TNCs like ADM, Bunge and Cargill, with the combination of surging demand and US government subsidies constituting a powerful dynamic that is, paradoxically, emboldening industrial agriculture even in the face of very dubious energy budgets. When the extensive fossil energy inputs that go into growing and converting most industrial crops into biofuels (farm machinery, fertilizer production and transport, agro-chemicals, irrigation systems, fermenting/distilling and so forth) are weighed against the liquid energy output, research is finding that it takes almost as much (rare best case) or more (typically) fossil energy to make biofuels than is contained in the fuel itself (Pimentel and Patzek, 2003; Patzek and Pimentel, 2006). ‘Second generation’ biofuels (including non-edible grasses, woody biomass, straw and waste by-products) hold the possibility of considerably better input-yield ratios – but which hinge on the development of enzymes capable of converting plant cellulose into liquid fuel – are not yet commercially viable, and would still require huge land areas to substitute even a modest fraction of current oil consumption.

Given the centrality of the US to global trade in maize and soybeans, combined with the dominant position and profit-seeking motivation of TNCs over this trade – and the fact that car-drivers possess vastly more consumer power than do the world’s poor and hungry – it is not surprising that the biofuel boom poses serious threats to international food security. Escalating biofuel production has had a major role in the draw-down of the world’s grain reserves, along with rising demand for livestock feed, and this was another important dimension of rising food prices in 2006–2007. The moral perversity of diverting increasing volumes of edible food into automobiles as hunger worsened was highlighted by Jean Ziegler, the UN Special Rapporteur on Human Rights, who described biofuel production as a ‘crime against humanity’.

It seems clear that as the biophysical contradictions of industrial agriculture in the US and Canada intensify in the age of peak oil, without yet de-stabilizing the operative logic of the dominant actors, the implications for food security in the short-to-medium term are ominous and highly regressive.

Transformative possibilities

In the slightly longer term, the transition towards a post-fossil energy agricultural system in the US and Canada poses momentous challenges. But, as in any systemic crisis, there is the possibility for hopeful change – in particular, the possibility exists that as the substitution of labour with technology becomes more difficult and costly, powerful counter-pressure might mount. There will undoubtedly be a search for more technological fixes, but it is also possible that a new economic and ecological logic will compel more locally oriented and diversified knowledge- and labour-intensive agricultural systems to emerge. The need for more labour-intensive agricultural systems will not necessarily tend towards greater equity – with the increasing exploitation of labour being one possible outcome (and it is worth remembering that agro-labour in the US has been described as the ‘super-exploited segment of the US working class’ – see Majka and Majka, 2000). Nevertheless, it is also possible to envision new opportunities for shifting profits and control away from agro-inputs, trading, processing, distributing and retailing, and re-centring these on farmers and farming communities.

A range of new organizations, together with social activism and a changing (‘greening’) consciousness, are beginning to challenge the dominant agricultural system in the US and Canada. Some notable dimensions of this challenge include: increased support for progressive farmer organizations like the National Family Farmer Coalition and the National Farmers Union; efforts to organize farm workers and legalize ‘illegal’ workers (who constitute a sizable share of US farm labour); organic food movements (associations of ecological farmers and consumer co-operatives); the permaculture movement; community and guerrilla gardening; the resonance of the ‘100 mile diet’; the growth of community supported agriculture and local food boxes; the growth of fair trade networks; the widening base of the Slow Food movement; struggles for the introduction of GMO labelling laws; rural community resistance to factory farms; farm animal welfare movements; ethical vegetarianism; and growing public calls for action to reduce greenhouse gas emissions.

Critics could surely suggest that these influences are largely fragmented at present, and much stronger in some small pockets than they are across large areas of the agro-industrial heartlands. A case could also be made that some ‘alternative food networks’ hinge less on an anti-systemic understanding of industrial agriculture and more on a narrowly framed self-interest, as relatively wealthy consumers seek to escape chemical-laden, heavily refined food durables and begin to access more diverse, healthy, and organic food baskets.

This criticism points to an urgent challenge: if there are abundant but largely scattered seeds of alternatives, there is a need to find fertile common ground for their germination. At the core of this search for common ground is the task of finding practical answers to the big question of how agrarian livelihoods and landscapes can be re-made as agriculture de-industrializes, underpinned by the need for an array of supports needed in realms such as youth outreach; education and training programmes; agro-ecological research
and extension; policies for land access and inheritance; marketing systems; and more equitable subsidy regimes. This will also involve the less tangible but no less central challenge of re-conceptualizing farming within modern societies as a vocation to which people will aspire – one that affords an invigorating, creative, skillful and stable living, and is accessible to non-farmers, particularly younger people.

Conclusion

Given the way that food import dependencies have been forged by cheap food surpluses, the quickening contradictions of industrial agriculture in the US and Canada pose a serious short-term threat to many of the world’s poorest people. A longer-term transition towards less industrialized agricultural systems in the US and Canada, whatever shape this takes, is also bound to create difficult challenges for low income, net food importing countries. In the short term and transitional period, this presents rich countries like the US and Canada with a responsibility to significantly increase food aid – not in the form of food surpluses, but in the form of funding to nations in the South to purchase supplies as locally as possible. In the longer term, as the price-deflating pressures of distant industrial surpluses subside, the need to rebuild and re-localize food economies could also open spaces for shifting income – as well as for reforming large-scale holdings currently in low-value tropical commodities – towards small farmers. But any hopeful prospects for small farm livelihoods in the South ultimately also depend upon the urgent reduction of greenhouse gas emissions in order to mitigate the worst impacts of climate change (IPCC, 2007), another way that the world’s poor are tied to the economic activity of affluent countries like the US and Canada.

Notes

1 The ETC Group’s Oligopoly, Inc. (2006) reports are an excellent asset for tracking the concentration of corporate power in agriculture.

References


Security for Whom? Changing Discourses on Food in Europe in Times of a Global Food Crisis

Gianluca Brunori and Angela Guarino

Introduction: Food security as a key issue in Europe

Over past months, food security has become a familiar phrase in the European mass media – something unprecedented in recent decades. The reason for this renewed interest in food security is related to a sequence of events that has deeply altered public discourse on food, agriculture and – in a more general way – on the role of the state. Four specific crises – occurring in quick succession and thereby suggesting to the general public that they are strongly linked – are at the root of this change: the environmental crisis, the oil crisis, the food crisis and, more recently, the financial crisis.

Climate change has unified the discourse over the environmental crisis. The impact on public opinion of three well-publicized communications – Al Gore’s film *An Inconvenient Truth*; the United Nations Intergovernmental Panel on Climate Change (IPCC) report, which provided evidence of global warming and its potential impact on global security; and the *Stern Review Report on the Economics of Climate Change*, which highlighted the social and economic costs of inaction – has been profound. Further, the endorsement of environmental issues by moderate or conservative leaders, such as Merkel in Germany, Cameron in Britain and Sarkozy in France, appears to have convinced the European public that the environmental crisis is real and not simply a social construction of radical groups.

The oil crisis became evident in the steady rise of oil prices during 2008, which has only recently been mitigated by a slump in demand following the global financial crisis. Oil prices reached a peak of US$140 per barrel in 2008, when the average price in the preceding two years had been below US$70