'Solving' the problems of sustainability and food security: exploring the new disorder and its scientific and spatial responses
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1. **Introduction: Food security and sustainability as spatial fixes: the origins**

Food production and consumption embody essential natural and metabolic processes which cannot be completely controlled by capital or for capital (see Mann and Dickenson, 1978; Morgan et al 2006; Kitchen and Marsden, 2011). Partly for this reason, food systems hold particular spatial configurative features in capitalist economies. And once these spatial configurations take hold they tend to last and influence the pathways of any new dynamics. The story of food systems over the past two centuries can be seen as part of this paradox. No matter how globalised and inherently footloose it may become, the food system- and its consumption and production dynamics - inherently interact with and shape spaces and places. In turn these spaces and places act to reconfigure the food system. This chapter starts to chart this paradox.

It is then not surprising that, in advanced economies, food security and sustainability (both essentially socio- natural features) have been key food governance concerns for over two centuries. Indeed, as industrial capitalism developed, rapid urbanisation led to more intensive enclosure of agricultural land and an ever-increasing use of fertilisers to enhance production for the growing and increasingly concentrated population. In his letters to Engels, Marx, among others in the 19th century, clearly understood the necessity of linking food security and sustainability[1] by showing an appreciation for the then rapidly growing field of soil science (led by Liebig), which seemed to provide the scientific means to sustain larger and larger urban settlements through the intensification of agricultural production. At that time, food security and sustainability began to find a long-lasting 'spatial fix', or what some Marxists called the 'metabolic rift' (see Foster, 1999), which, along with various public health measures (like clean drinking water and milk pasteurisation -see Atkins, 2010), seemed to provide a platform to sustain continued urbanisation throughout the 20th century.

As industrial and urban-based capitalism developed it was necessary to 'solve' the twin problems of security and sustainability, first through intensification and fertilisation of the land, and second by unleashing mechanisation of production. In the late nineteenth and early twentieth centuries these forms of agri-industrialism struggled with resolving Kautsky's formulation of the agrarian question: that is, how to continue to intensify production and appropriate some farming functions in processing and agri-industry whilst at the same time maintain some sort of ecological or natural balance in the agricultural transformation process (Kautsky, 1988; Goodman and Watts, 1997). Unlike with other forms of industry, the food system would not abide by the same principles of concentration and centralisation

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[1] Here I use the term food security to denote not only the appropriate quantity of food available to a given population, but also its effective quality in sustaining human health and wellbeing. Sustainability, in turn, denotes the ability of productive and consumptive systems to remain ecologically, socially and economically resilient over time and space.

partly due to the reliance upon the soil and dispersed family farms or peasants which were essential for sustaining production for the increasing urban masses. However much industrial and then corporate capital attempted to appropriate these 'awkward' agrarian processes- as witnessed throughout the 20th century with the arrival of the intensive food regime (see Friedmann and McMichael, 1989)- a dominant feature of capitalist penetration in the food systems has been the maintenance of family-based production units and the resilience of dispersed, land based farming systems. The way around these 'obstacles' was to create an ever concentrated agri-industrial complex around the farming sector, on the one hand, at the same time as subject producers through arms-length control of its activities through the operation of a continuous 'cost-price' squeeze and the dynamics of the 'technological treadmill' on the other. It is perhaps remarkable how these attempted processes of subsumption of agrarian nature have been so longlasting, despite the different cycles of technological and regulatory change experienced in food systems over the past two centuries. As we shall see these are processes which encompass both capital and the state; for it is in both of their interests to continually attempt to arrest the problems of food security and sustainability in an advanced world context of rapid urbanisation and population growth.

Productivism and the intensive regime

Following the imperial food regime which had gained ground in the UK and a host of settler countries during the 19th century, based upon imperial free trade and settler extensive agriculture (see Marsden et al, 1993), the more 'intensive food regime' that dominated the 20th century (see Friedmann and McMichael, 1989) provided not just a major Fordist solution for the growth of cities and towns but also a clear allocation of functions for the countryside (see Cronin, 1991). For instance, by the 1930s, and especially after the war, in the UK the countryside was strictly demarcated to guarantee the stimulation of food production; at the same time, rigid restrictions were placed upon unplanned ribbon development around the expanding cities. In 1947, at the nadir of the British post-war financial debt crisis, and with severe food and energy shortages amidst one of the worst winters of the century, this process culminated with the passing of the Agriculture and the Town and Country Planning Acts: the former introduced direct state subsidies for intensifying national food production, whilst the latter defined the rigid functionality of the 'town ' and 'country' as clear regulatory spatial fixes (see Marsden et al, 1993; Murdoch et al , 2003).

This system, which developed to varying degrees in other advanced countries (e.g, Holland), allowed for a continuous compromise to be made between food and nutritional security and the alleged sustainability of a productivist agriculture. It also favoured a particular spatial shaping of cities, towns and villages around functional hierarchies and varying types of spatial planning mechanisms – a dynamic that is often by-passed in the literature. The relative success of this spatially regulated system meant that human health concerns regarding food could be relatively marginalised into concerns about food adulteration and minimum safety and nutritional standards (see Lang et al, 2009).

As the twentieth century unfolded then what became clear was the need for a stronger and interventionary state to support agri-food productionism. Some commentators have talked of the establishment from the 1930's of an 'international food order' under US hegemony, which brought about a remarkable period of security and stability to world agricultural markets by the 1950s and 1960's (Goodman and Redclift, 1989; Kenney et al 1989). The US was pre-eminent among a number of

settler societies in creating innovation and technologies for the period. These became integrated into an export-oriented global system. By the 1940s, the US administration was expounding a model of technological innovation and market innovation in agriculture to be disseminated internationally. This was, of course to be matched by a soviet race for modernisation which encompassed state ownership of land and farms. In the west, intervention, by and large, left the property rights in the hands of its farmers whilst, through state mechanisms like the New Deal, provided massive programmes of protection, price stabilisation, farm-income support and investment incentives, as well as research and development support through the network of Land Grant Colleges.

In the UK, and as Marsden et al depicted (1993), these comprehensive systems of state intervention built around a productivist ideology provided a package of security and sustainability systems. It secured land rights, land uses (between town and country), provided financial and political security for it producers and their representative bodies, and through to the 1980s provided an ideological security in protecting the national and international priority for technologically-induced productivism. These productivist systems became the subject of a renaissance of scholarly work in the 1980s, both in the UK and in North America. This involved theoretical work on understanding the evolution of food regimes, to more empirical work on tracing the complexity of commodity chains in the increasingly globalised food systems (see Friedland et al 1981; Buttel and Newby, 1982; Marsden et al 1986). In summary theoretical and empirical work concentrated on four areas. These concerned, firstly, the ways in which capitalism sought to penetrate agriculture and the reasons why it was not always successful; second, the nature of agrarian class structures and the role of rent in providing a theoretical underpinning for a comparative political economy of agrarian class structures; third the transformation and social patterns of resistance associated with family farming; and finally a concentration upon the relations between agriculture and the state (see Buttel, 1982; Bonanno et al, 1992; Goodman and Watts, 1997).

As the intensive regime of productionism continued, super concentration of the non-farm parts of the food chain seemed never ending. By the 1990's Hefferenan et al (1999) conceive of the agri-industrial system as an increasingly globalised 'hour-glass' whereby thousands of farmers feed millions of consumers through an increasingly corporately controlled system that involves webs of interconnected input suppliers, food processors and retailers. Much of the American literature has focussed on these corporate strategies and concentration patterns, but their effect been, and still are felt world wide. By the end of the 20th century, five major companies dominate seed production; and in the US 81% of beef is processed by four firms. In addition four firms control the majority of broiler and pig production, with 81% of corn exports undertaken by three firms.

Whilst it is important not to assume that this period of productivist regulation of food systems came to an abrupt ending in the latter parts of the 20th century, it certainly faced a new set of challenges. These were again associated with the established synergies between security and sustainability coming under intense pressure. This became increasingly depicted in the scholarly literature, from the middle of the 1980s, when attention started to shift from critiques of productionism to wider understandings of envrionmentalisation and consumerism.

2. Unravelling the productivist spatial fix: the post productivist compromise

Since the middle of the 1980s, this stable and productivist regulatory and state-private-public sector compromise has been progressively dismantled – and, with it, the spatial fixes that previously existed

between the city and the countryside (Marsden 2009). What we have been witnessing since then is the emergence of a more volatile and contingent period of variable spatial relationships, functional uncertainties and crises of legitimacy with regard to both food security and wider questions of sustainability. Amidst the current crisis of the dominant carbon-intensive food system, the city, or more precisely the city-region, is increasingly becoming the fulcrum for innovative forms of (alternative) food production and consumption.

The origins of these changes can be traced to the period between the 1980s and 2008, when deepening public health concerns associated with crises like BSE, coupled with the recognition of a host of severe environmental 'externalities' created by the intensive food regime (see OECD, 1986; Lowe et al., 1990), led to a revised regime of 'post-productionism' (see Murdoch et al., 2003; Marsden, 2012). To solve these problems, faith was put in the burgeoning corporate retail sector (Marsden et al., 2010; Spaargaren et al., 2012) as well as in a range of usually voluntary agri-environmental schemes), without however challenging the fundamental separation between rural intensive production systems (see Buttel, 2006; van der Ploeg and Marsden, 2008) and urban consumption spaces. During this period, a myriad of new private and public food quality standards and conventions (Busch, 2007) served the function of conveniently separating, and in some cases fragmenting the growing environmental problems (e.g., sustainability) from increasing public health concerns (e.g., food and nutrition security). This was , with hindsight a period, in Europe in particular, of the post-productivist compromise (see Marsden, 2012). And as such brought together a new set of state and spatial 'fixes'. First growing environmental and public safety concern meant that the state has to shed some of its productivist idealogy. It did this by attempting to 'ring-fence' intensive systems of production and consumption , rather than dismantling them (see Marsden, 2003). A host a agri-environmental schemes we matched by increasingly European food safely regulation to constrain the producer and the food processor. Second, as it was now deemed in a context of 'over production', more European land could be 'set-aside' for environmental schemes of various sorts. Thirdly, with reductions in transport costs and the rise in just-in time logistics and 'lean' supply chain management, a greater volume and diversity of food products could be shipped and flown into the European zone from developing countries. This allowed productionism to be re-located, whilst post-productivism could be created at home. Hence the period of post-productionism created its own set of new spatial fixes in which it disguised productionism through new regulatory and spatial designs.

Whilst the early and indeed dominant conceptualisations of post-productivism concentrated upon agricultural policy regime change which was undoubtedly occurring in Europe from the late 1980s onwards (see Marsden and Symes, 1987, Lowe, et al 1993; Ward et al 2008; Wilson, 2007), these underplay the wider parallel shift towards reflexive consumerism and the rise in regulatory power of the corporate retailers occurring at the same time. These forces acted to further shift economic as well as political power away from producers and post-war productivist corporatism. With the rise of neo-liberal applications in other economic spheres, agri-food corporatism became translated into a form of 'private-interest government' (Grant, 1994). It is important to recognise, therefore, that the arrival of a somewhat peculiar form of European post-productivism created simultaneous conditions for the rise of retailer corporatism and post-modern reflexive consumer practices. This was partly made possible in Europe by the drive for the 'European project', especially the integrated single European market (SEM), and the expansion of the European area to include former eastern bloc countries. This created the

conditions for the unleashing of new forms of collective and reflexive consumption almost as a celebration over the defeat of the (increasingly food insecure) eastern bloc and the attractions of an expanding array of globalised imports as well as subsidised domestic products. New, neo-liberal and retailer led systems of globalised food supply were thus a powerful political and post-communist tool in late 20th century Europe.

As such although post-productivism increasingly represented a regulatory shift in the sets of relationships between the state, producers and consumers, it did so by adding to the roles and responsibilities of these agents and interests rather than necessarily eradicating or negating productionism in all its forms. Post-productionism thus emerged as a compromise, in regulatory terms, to attempt to 'solve' the newly recognised EU problems of food surpluses and environmental externalities unleashed by the (US dominated) intensive productivist model. It did so not by eradicating intensive productivism completely, but by spatially containing its externalities at home (i.e in the expanding EU) whilst stimulating and reproducing its less regulated conditions in other more distant parts of the world, through unleashing highly sophisticated and retail-led supply chain regulation. Geo-politically, this allowed Europe to emerge as a more sophisticated and advanced food region, now more distinct from North American food hegemony on the one hand, and clearly more successful at feeding its population with an ever growing variety of fresh products than those dismantling eastern former soviet states on the other.

Again then, from the mid 1980s to 2008, and despite a series of food scares and crises the post-productivist regime took a strong hold especially in Europe. This is represented by a considerable literature on the subject, especially with regard to post-productivist agricultural policy change (Wilson, 2001,2007). However, as with the continuance of the earlier intensive productivist model, it acted as a way of assuaging rather than completely eradicating the twin food regulatory problems of security and sustainability. Neither did it eradicate the intensive regime. Rather it manipulated it into a new set of spatial fixes on a global and regional scale. Post-productivism, in Europe was thus to come with some cost; a cost, not least in terms of vastly extending 'food miles', but also a cost in cleverly distanciating and exporting ecological risk and damage to other parts of the globe.

The new disorder arena: neo-productivism, food security and the sustainability crisis
During the 2000s, however, two major changes in the global context began to redefine the meaning of both sustainability and security in the food system. First, there was the recognised arrival of 'peak food' as part-and-parcel of wider resource depletion and climate change dynamics. Second, the rapid growth of obesity and malnutrition in both developed and developing countries shifted the main health concerns from a series of spasmodic crises associated with food safety as part of 'risk society' (Beck, 2004), to one of human and animal bio-security and well-being. Indeed, the shift from a prevailing perception of a world of food surplus to one of food deficit has been quite rapid and has gained pace since the spikes in fuel, food and energy prices that took place in 2007-8. To further complicate this scenario, the last five years have also witnessed financial speculative binges, a global financial crisis and the recognised depletion of global food stocks (see McMichael, 2012) as vast productive areas have been utilized to produce bio-fuels rather than foods (see Mol, 2007), and countries like China have become engaged in "land grabbing" activities in Africa and Latin America in an effort to solve their

internal energy, water and food security crisis (see several issues of Journal of Agrarian Change, 2010/11 on the food security and land grabbing themes).

Notwithstanding the considerable resilience of prevailing productivist and post-productivist regimes to absorb or accommodate these growing tensions, since 2007 it has been possible to observe the ending of a twenty year un-interrupted trend in falling food prices and the emergence of significant volatility in global food markets. What marked out 2007-8 was not only the problem of endogenous risks prevailing in the food system, but also the new exogenous and interconnected nature of energy/resource concerns. These cannot be so easily spatially fixed, nor can they be contained in existing 'eficiency-led' supply chain systems. As such they represent major perturbations to existing productionist and post – productionist food systems. The literature is only just emerging on coping with the profundity and depth of these processes, with a reliance on headline and chart based trends and predictive scenarios (see Chatham House, 2009). Overall it would seem that this is by no means a short term 'hiccup' prior to the restoration of 'business as usual', given that available evidence suggests that food production systems are hitting up against real resource limits. These are linked clearly to the price volatilities in oil and gas, creating a 'canary in the mine' problem for world agricultural systems.

Under these new recombinant resource pressures, whereby food systems become increasingly folded into wider energy/resource speculative 'races', it can be argued that the interests and focus of governments, whether at the global, EU or national levels will have to shift for reasons more globally profound than those in earlier phases of post-war productivist or post-productivist food regulation. If earlier phases have proved effective and palliative whereby private and public interests, however contested, have reached some form of regulatory compromise in managing security and sustainability concerns, it is clear that now the real and potentially irreversible social, economic and ecological 'externalities' are being exposed. As with the nineteenth century realisation of the consequences of the 'metabolic rift', we now face at least a parallel evolutionary moment in food systems and spatial systems instability and fluidity. In this context, moreover, it is less easy to compartmentalise 'food' as a separate regulatory or system of provision, given its increasing interconnectedness to other sectors. As perhaps before industrialisation and recent modernisation, we have to re-learn these interconnections, linking food systems to broader aspects of 'third nature' thinking (see Marsden, 2012).

The anatomy of the current food security crisis being extensively examined (see special issue of Journal of Rural Studies, 2012 in press; Lawrence et al., 2011; Almas and Campbell, 2012, Spaargaren et al., 2012; Lee and Stokes, 2009). Much less attention has been devoted to the emerging landscape associated with the new variable spatial, social and economic relations and 'fixes' that local responses to this new metabolic crisis are creating. In the next section, I will outline some of these key spatial dimensions and contingencies, which call into question the new role of cities as food policy actors.

3. Third natures: From Sectors to Spaces: reconnecting cities with the countryside

Clearly we are left, as the second decade of the 21st century emerges with a food system landscape which clings to the architecture and infrastructures of the productivist and post-productivist agri-food regimes. We are clearly dealing with their 'sunk costs', inertias and continued spatial fixes. In this sense, to employ a transitions perspective (see Geels, 2002; Spaagaren et al, 2012) we are still dealing with dominant regimes or 'worlds of food' (Morgan et al, 2006) which are attempting to diffuse the new and

combined 'landscape pressures' now being witnessed in different regions of the world. One major question thus becomes how will these transitions play themselves out?

One of the most vibrant trends in agri-food systems research over the past decade has been to trace the proliferation of alternative agri-food networks (AFNs) (see Goodman et al, 2012 for a comprehensive synthesis of the phenomenon in North America and Europe). A major question now occurs given the growing crisis of food security and sustainability. Can alternative food movements, as a variegated assemblage of what Morgan et al (2006) call the new 'moral economy' of food (Sayer,2000) begin to scale up and out in ways which absorb more systemic and more dominant characteristics? In short are they destined to remain an amalgam of niches or can they metamorphose into a new 'third nature' regime? As Spaargaren et al (2012:333) argue after completing one of the most comprehensive collections considering food system transitions:

'The foodscape of the future will be less homogenous and well-structured when compared with the post-war period. In particular, the dichotomy between alternative and mainstream food sectors and dynamics seems to have lost most of its significance. The alternative sector- be in its primarily 'local' forms of organic agriculture or in its 'global' form of fair-trade food-is rapidly becoming more 'mainstream' both in its outlook, its major relations and dynamics and also its market shares. At the same time, the dominant, mainstream sector of global processing and retail has started to confront the (niche) challenges put forward by bottom-up, alternative food innovations in non-trivial ways, resulting in a reformulation of the dominant mainstream regime in several respects… One does not have to be a post-modernist to recognise the fact that a sustainable, global food regime will be multi-dimensional and in some respects heterogeneous in character'.

For another key commentator (McMichael, 2012:117) such a critical juxtaposition is changing the nature and function of the former dominant corporate regime:

'The so called corporate food regime is a vehicle of a contradictory conjucture, embodying a basic tension between a trajectory of 'world agriculture' represented by agro-industrialisation (food from nowhere), and a place-based form of agro-ecology (food from somewhere), including cultural survival, and expressed in food sovereignty politics- a politics of modernity in a global moral economy'. That is, the food sovereignty movement is a reflex neo-liberal project-seeking to reverse its catastrophic social and ecological impacts, and in so doing to develop an alternative political ontology constructed around values that are antithesis of capital accumulation (the self valorisation of capital at whatever cost).'

These two insights sum up nicely the variations of debate concerning the transitional and, at the same time oppositional regulatory context global food systems now represent. The crisis is clearly giving vibrancy for more opposition and more heterogeneity of response which traditional regulatory governments find hard to cope with. At the same time bio-economic advances in plant and animal genome technologies are now geared to at least a weak form of ecological modernisation, as they attempt to demonstrate how plants and animals can be intensively produced under lower carbon and chemical conditions (see Kitchen and Marsden, 2011). This is at the same time giving more oppositional

vibrancy to deeper-eco-economic solutions built around agri-ecology and ethical and fair trade principles (see Horlings and Marsden, 2011).

What is clear amongst all this fluidity and contestation is that there is less regulatory or political coherence associated with this new disorder foodscape. Indeed, given this fluidity, 'foodscape' becomes an improved analytical tool over food 'system' or 'regime'. These new foodscapes have no similar or equivalent spatial fix. They are highly spatially variable, and as such are indeed undermining the logics of the earlier food regimes described above. For instance, the productivist regime can no longer legitimate itself without accommodating at least some ecological modernising principles; similarly post-productionist compromises and their spatial fixes are being undermined by the depth and profundity of the ecological crisis their policies are now seen to have created. This is creating great challenges for state authorities (as we have seen in the Middle East, and increasing in China, for example) to create new legitimating frameworks which can reintegrated food security with sustainability around the needs of a neo-productivist priority (see Burton and Wilson, 2012). The effects of new economic growth and the nutrition transition in newly developing countries are leading will necessarily lead to new innovations around neo-productivism; but this will need new spatial as well as political compromises associated with creating synergies between ecology and economy, using different business models and sustainability approaches.

A relatively new driver for these shifts now arises from growing health and welfare concerns as part of a wider moral economy. The "new food equation" (Morgan and Sonnino, 2010) outlined above is having major repercussions on public health in both the North and the South of the world. Recent data show that there are currently 925 million undernourished people – all but 2% of them in developing countries (FAO, 2010); 1 billion overweight people; and 475 million people suffering from obesity. In the EU, obesity and overweight together include 60% of adults and 20% of children (IOTF 2010), but the phenomenon is widespread in the global South as well (Sonnino et al., in press). Indeed, many low- and middle-income countries are experiencing rising rates of obesity and overweight and face the 'double burden' of obesity and hunger: Mexico's proportion of overweight individuals has reached 70%; Brazil's, 50%; and China's, nearly 30% (Cecchini et al. 2010, 1775).

National and sectoral policies and their related spatial fixes are becoming less relevant in dealing with these problems – which, to a significant extent, have been caused by global policies that have placed too much emphasis on the production of (rather than access to) food, as explained above (see also Sonnino, 2009). In this context, a growing number of cities around the world are devising their own place-based solutions to the current security and sustainability crisis, largely (although not exclusively) through urban food strategies that aim to forge new alliances between food consumers and producers, the growing health agenda, urban centres and their surrounding rural hinterlands. This is creating a new counter-paradigm of (urban and rural) place-based eco-economic strategies which are becoming a significant counterforce to the global intensive food agenda (see Horlings and Marsden, in press).
Human health and wellbeing are central to the narratives of many of these policy documents, especially amongst pioneering North American cities that have long been experiencing the negative effects of the twin food security and sustainability crises on the urban environment. Toronto is a case in point. The

Canadian city, where the first food policy council was established, envisions in its recent urban food strategy a "health-focused food system" that makes safe and nutritious food available to all urban residents, thereby nourishing the environment, protecting against climate change, promoting social justice, creating local and diverse economic development and building community (Toronto Public Health Department and Food Strategy Steering Group, 2010: 6). In a similar fashion, the city of Los Angeles utilizes the notion of "good food" to emphasize the centrality of citizens' health - also in relation to other sustainability objectives. Indeed, the American city's food strategy defines as a "good food" system one that "prioritizes the health and well being of our residents; makes healthy, high quality food affordable; contributes to a thriving economy […]; protects and strengthens our biodiversity and natural resources throughout the region" (Los Angeles Food Policy Task Force, 2010: 11).

As even FAO (2011: 6) has recently recognized, we are now witnessing the emergence of "a new paradigm for ecosystem-based, territorial food system planning, based on a more localized approach to food", which holds the potential to create new forms of connectivity across urban and rural landscapes, bringing the concept of sustainability into new and more profound significance – i.e., as an integrative policy tool that links human and environmental health.

4. Conclusions: towards new spatial and sustainability fixes?

It is of course not clear how successful or otherwise the proliferation of city-region food strategies across the world are going to be in really reshaping established food systems (Blay-Palmer, 2010). However, it is clear that new questions are being addressed and visions created about the development of more sustainable and secure city- countryside linkages, at the same time as larger groups of consumer interests are acting to re-value consumption and production links in terms of a wider but more integrated set of security and sustainability criteria. These movements, from Porte Allegre in Brazil, to Brighton and Plymouth in the UK, raise some important questions for the role of the multi-level state and the sustainability research and development base in stimulating, scaling- up and scaling out such initiatives and 'niches'. The role of public procurement and its potential to link with the preservation of small farmers and set challenging standards for institutional and household food provision (e.g in schools and hospitals) is one key area of variable innovation (in some Brazilian cities for example).

 Of equal importance are the ways in which such city initiatives are contributing to the wider realisation that current food and farming systems are not fit for purpose, and that a new approach is needed from the global level to the local level. Mirroring the IAASTD report (2009) the main EU scientific committee on agriculture, the Standing Committee on Agricultural Research (SCAR:2011) has called for radically new farming systems and research to meet these challenges, suggesting: 'approaches that promise building blocks towards low-input high –output systems, integrate historical knowledge and agro-ecological principles that use nature's capacity'.

What is clear is that under the new global food crisis conditions, when deficits and surpluses both create new food equations and disrupt established spatial fixes, both between the city and the countryside on the one hand, and the relationships between the advanced and developing worlds on the other, these new city based initiatives provide a vibrant and potentially radical approach to creating new platforms for both food security and sustainability. To become more mainstream they will require far more innovative institutional and governance support at especially at local and city regional levels. As we

know from the past, sustainable transitions in the food sector, do not just occur on the 'head of a pin'; they are spatially created, maintained and then reinforced; hence the relationships between sustainable place- making and food transitions deserve to be a critical area for further sustainability science research.

A hopefully consistent theme running through this chapter has been the necessity in modern agri-food systems to attempt to 'solve' the twin conundrums associated with food security and sustainability. This was a problem in early industrialisation and urbanisation as it is today. It is important conceptually to trace these continuities given the distinctive nature of food in capitalist development. What is striking, but sometimes omitted from debate, are the ways in which the regulation of food- its partial but nevertheless successful security and sustainability over time and space- has significantly conditioned the spatial structures and relations which are embedded in and between our societies and economies. Under the productivist and post-productivist regimes we tended to quietly ignore or at least hide these natural and physical geographies. But under the more radical crisis conditions we are currently amidst we cannot afford that luxury. In short we need to spatially as well as socially plan for our more heterogeneous sustainable foodscapes in ways which engage with producers and consumers in new alliances and relationships as part of sustainable place-making.

The current food crisis, while often articulated at a global and aggregated level of discourse, will only be overcome by developing far more spatially- connected as well as ecologically grounded solutions in building the adaptive capacities needed. This does not espouse a defensive localism or fall into the 'local trap' of seeing local as good and global as bad. Rather it needs the innovative energy to shape global-local relations in way which re-valorise and reconnect social ecologies.

Nevertheless, whilst the problematic continuities depicted here clearly exist today as they did two centuries ago, after significant bouts of state and private-led productionism and post-productivism in the 20th century and beyond, one feels that the problems of solving the age old condundrums of food security and sustainability have become just that more insurmountable.

They will, I argue, require 'new deals' for agri-food in the context of a wider sustainability paradigm. They will need civil, government and private sector support to overcome the necessary complexities in making sustainable transitions in food and health planning. They will need new engaging alliances between interdisciplinary sustainability science and the public and consumers in order to create more effective and place-based adaptive capacities. Above all, they will need new forms of effective spatial and sustainable management which harnesses the innovative potentials of a new equation between our growing cities and much needed but vulnerable countrysides. We need to re-create many Liebigs; and foster a more sustainable paradigm of neo-productivism which dovetails with the growing moral and health concerns of reflexive consumers.

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